



# Contents

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## English: Anita & Me

### Plot Summary

At the beginning of the novel, Meena is caught telling a lie to her father. She finally admits to taking money from her mother to buy sweets, which leaves Meena's father furious. Although Meena's extended family make Meena feel loved, she also feels pressure to conform to a traditional image of an Indian girl: pleasant and polite, when she wants to spend time outdoors and play sports.

When Meena meets thirteen-year-old Anita Rutter, everything changes.. Anita is known for being the leader of a group of two friends, Sherrie and Fat Sally; Meena soon becomes one of Anita's followers.. At the same time, Meena finds that Sam Lowbridge, a sixteen-year-old boy who is considered the town rebel, is kind to her, despite their age difference.

As Meena gets older, she starts to notice things she didn't before. She hears someone refer to herself and her mother as "bloody wogs," which serves as her first indirect encounter with racism. At school, she notices that she is sometimes treated differently, especially after a boy in her class is relieved at being paired up with Fat Sally instead of her.

Meena continues to act out at home, getting in trouble when she uses the same foul language as Anita, shocking her entire family. Meena and Anita start spending a lot of time together and convince younger children to form a gang. Meena initially enjoys their games but one day is shocked to see Anita and other young children pick on Anita's sister, Tracey. Shocked by this public humiliation, Meena concludes that people cannot be trusted, as they turn on their friends to humiliate them.

Things come to a head between Meena and Anita when they attend Fete, a party organized by the wealthy Mr. Pembroke. At the party, Sam Lowbridge loudly voices his hatred of "wogs," and members of the crowd cheer in support. Meena had thought Sam was her friend and is shocked both by his behavior and by the fact that local villagers agree with him. She suddenly realizes that some people harbor racist beliefs. As Meena walks away, Anita stops her, commenting on Sam's good looks. Outraged, Meena calls Anita stupid, which puts a strain on their friendship.

Meena resolves to distance herself from Anita's bad influence, to focus on her family, and to devote herself to her studies—in particular, the preparation for the eleven-plus exam, which might allow her to go to a good grammar school and move out of Tollington.

Meena isolates herself to study, however, on the eve of the exam, when Meena's parents are out, Tracey comes knocking on Meena's door. She urges Meena to follow her, saying that someone is trying to kill her sister. Meena follows Tracey to the Big House, where she sees Anita and Sam having sex—a physical act that Tracey has interpreted as violence. Unable to contain her rage at discovering that Anita actually wants to have sex, Tracey attacks her and the two run off, chasing each other.

Sam then calls out to Meena, telling her that he has always had feelings for her. Meena tries to communicate to him that he has hurt her feelings, but Sam argues that he only ever meant to target "others." Tracey suddenly appears, running to attack Sam. In doing so, she accidentally falls in the pond. Realizing that the three have the potential to ruin her life, Meena decides to keep her distance.

By the end of the novel, Meena succeeds at her eleven-plus exam and her family moves out of Tollington. Eager to say a few last words to Anita, Meena leaves her a note, but never receives any response.

### Key Characters

#### Meena Kumar

Protagonist and narrator Meena is nine years old when *Anita and Me* begins. A daughter of Indian immigrants, she has grown up in the English village of Tollington and struggles to define her cultural identity.

#### Anita Rutter

Anita is a domineering, self-centered thirteen-year-old girl who enjoys manipulating the people around her.

#### Mrs. Kumar ("Mama")

Meena's mother is known in the Tollington community as a warm, kind, and beautiful person. She has a principle of being friendly with everyone, although she makes an exception for racist and intolerant people

#### Mr. Kumar ("Papa")

Like his wife Mrs. Kumar, Meena's father is devoted to his family and wishes he were closer to his Indian parents, to be able to take care of them.

#### Nanima

Meena's maternal grandmother is a joyful, caring person who takes an immediate liking to Meena. She recognizes her granddaughter as a wild, boisterous soul—perhaps just as mischievous as Nanima herself when she was young

#### Sam Lowbridge

Sam Lowbridge already has a criminal record at the age of sixteen and is thus considered Tollington's rebel. He drives around the village with his gang on mopeds and intimidates little children, although he shows a sincere interest in [Meena](#) and often behaves kindly and protectively toward her

#### Tracey Rutter

Emotionally vulnerable, shy, and discreet, Tracey is the complete opposite of her rebellious older sister [Anita](#). Tracey apparently suffers from sexual violence, likely perpetrated by her father [Roberto](#).

#### Robert

After breaking her leg, Meena meets Robert at the hospital, where he is confined to an isolation room and separated from Meena by a window.

#### Uncle Alan

The youth leader of the local Methodist church and teacher of the Sunday school Meena goes to, Uncle Alan is considered handsome and charming by most women in Tollington.

#### Mr. Ormerod

The local shopkeeper is known for being gentle, talkative, and condescending toward foreign peoples.

**English: Anita & Me**



**Key Context**

**Historical context: The Black Country**

The Black Country is an area to the north and west of Birmingham in England. It is in the West Midlands. The name Black Country originates from the nineteenth century, when the region had become one of the most important parts of the Industrial Revolution in Britain.

The region was the major producer of metalwork. The scale of the metal industry and the burning of fossil fuels in the area created heavy air pollution, with a thick black smoke clouding the skies and black soot colouring the communities below. This is where the name Black Country is believed to have originated.

By the mid-twentieth century, less than a hundred years later, the industries that the area had become dependent on were now in decline. The decline of the manufacturing industries was made worse in the late 1970s and early 1980s, with over 300,000 jobs lost. Men who were now unemployed expected to find work in factories. However, they found that many of the jobs were performed by women. World War II had also devastated the country and its population. The Government focused on rebuilding the country quickly and encouraged immigration from Europe and Commonwealth countries such as India and Pakistan.

Some people resisted the changes to their communities and were prejudiced against immigrants who were perceived to be responsible for the lack of jobs.

**Historical events in India**

India became independent from British rule on the stroke of midnight on 15 August 1947. At the same time, parts of India were partitioned off, mainly for political and religious reasons – West Pakistan (now Pakistan) and East Pakistan (now Bangladesh) were created. The new Pakistan was to be a Muslim state while the main religions in India would be Hinduism and Sikhism. Hundreds of thousands of people were relocated, many involuntarily, to the country that was of their religion. Many people were angry and resistance caused violence and bloodshed in the regions. Other than British nationals who had lived in India, there were many people who preferred to move to the UK rather than relocate as a result of partition or to live in an independent India.

The British Nationality Act of 1948 granted the right to live in the UK for all those people who lived in colonies of the Empire. It is through this act and subsequent legislation that Meena’s family came to, and stayed in, the UK.

There were direct benefits to the country. Following World War II, many industries experienced a shortage of workers. One example was the railways which found new workers amongst the Anglo-Indians (mixed race people of both British and Indian descent born in India) who had run the railways in British India and who returned to their ‘home’ country on and after independence in the late 1940s.

The post-war establishment of the National Health Service meant that the UK needed more and more qualified staff and more importantly qualified to British standards and in British practices. Doctors and nurses from the British Empire were the perfect solution. Also, during the 1950s and 1960s, a large number of South Asians settled in the industrial towns of the West and East Midlands and the North to work in their factories and textiles businesses.

| <b>Key vocabulary and methods</b> |   |
|-----------------------------------|---|
| <b>Word</b>                       | <b>Definition</b>   |
| <b>Epigraph</b>                   | a short quotation or saying at the beginning of a book or chapter, intended to suggest its theme.   |
| <b>Identity</b>                   | the fact of being who or what a person or thing is.<br>the characteristics determining who or what a person or thing is.  |
| <b>Literary Modernism</b>         | Literary modernism, otherwise known as “modernist literature”, has its origins in the late 19 <sup>th</sup> and early 20 <sup>th</sup> centuries. At this time, writers chosen to break with the traditional ways of writing and experimented with literary form an expression. |
| <b>Race</b>                       | any one of the groups that human beings can be divided into based on shared distinctive physical traits. 2 : a group of individuals who share a common culture or history   |
| <b>Rebel</b>                      | a person who opposes or fights against a government. 2 : a person who does not obey authority or follow usual standards.  |
| <b>Humiliation</b>                | to cause (someone) to feel very ashamed or foolish  |
| <b>Haughty</b>                    | having or showing a proud and superior attitude   |
| <b>Displaced</b>                  | to feel removed from the usual or proper place  |
| <b>Repercussion</b>               | a widespread, indirect, or unexpected effect of something said or done  |
| <b>Recalcitrant</b>               | stubbornly defiant of authority or being controlled   |
| <b>Benevolent</b>                 | to be kind and to show good sense   |
| <b>Dignity</b>                    | the quality or state of being worthy of honour and respect  |
| <b>Disaffected</b>                | discontented and resentful especially against authority   |
| <b>Persecute</b>                  | to treat (someone) cruelly or unfairly especially because of race or religious or political beliefs   |
| <b>Maturity</b>                   | the condition of being fully developed  |



## Women in the Middle Ages and Mary Magdalene

Women in the Middle Ages (lasting from the 5th to the 15th century) were officially required to be subordinate to some men. This would be their father, husband or any other male relative. Widows, however, were often allowed much more control over their own lives but were restricted legally. It was a woman's responsibility to take care of her family and to oversee the running of the household. According to the teachings of the Bible, it is believed that God created Eve from Adam's rib and, having eaten the forbidden fruit, was responsible for man's expulsion from paradise. In **Medieval** art, the responsibility for this 'original sin' is often emphasised by giving a female head to the serpent who tempts Eve to disobey God. This Bible story underlined the belief that women were inferior to men and that they were morally weaker and likely to tempt men to sin.

Throughout the Middle Ages, the place of women in society was often dictated by biblical texts. The writing of **apostle** Paul, in particular, emphasised men's authority over women, forbidding women from teaching and instructing them to remain silent. However, the Virgin Mary was a contrast to this negative image: as the mother of Christ, she was the channel through which Christian women might be saved. She was sometimes described as the 'second Eve', as she was seen to have made up for Eve's sins.

Mary Magdalene, sometimes simply called Magdalene, was a Jewish woman who travelled with Jesus as one of his followers. As well as travelling with Jesus, Mary helped and supported him, indicating that she was probably relatively wealthy. In the gospels that she is referred to, she was a witness to the crucifixion of Jesus and she was also present at his burial. All four gospels identify her, either alone or as a member of a larger group of women, as the first witness to Jesus' empty tomb, and the first to testify to Jesus' resurrection. She is known in many Christian traditions as the 'apostle to the apostles.' She is a central figure in later apocryphal (a-pock- ra-full) Christian writing, which scholars do not regard as containing accurate historical information, portray her as Jesus' closet disciple and the only who truly understood his teachings.

During the Middle Ages, Mary Magdalene was combined in western tradition with Mary of Bethany and the unnamed 'sinful woman.' This led to a widespread but inaccurate belief that Mary Magdalene was a remorseful prostitute. In the four Gospels, many women were portrayed in a very negative way. These Gospels were written at least 35 and up to 95 years after Jesus' death. Many of the portrayals of women in these Gospels were shaped by the time that they were written. By the Middle Ages, the view of women was already negative so many believed in these negative portrayals of the women.

## English: The Female Voice Over Time

### Eleanor of Aquitaine (c.1122 – 1204)

Eleanor of Aquitaine was one of the most powerful women of the Middle Ages. She would go on to become queen-consort of France and later the queen of England.

She was the eldest daughter of William, tenth Duke of Aquitaine, and was raised in one of Europe's most **cultured** courts of the time and was given an excellent education. Although it changed in later times for women, Eleanor lived during a time where women could and did inherit. When her father dies in 1137, she was left with a vast inheritance. At just 15-years-old, she became the most eligible heiress in Europe. She married Louis, heir to Louis VI of France, who later became king. During the Second Crusade, Eleanor travelled with her husband but the relationship failed and they were divorced in 1152. Divorce, as we understand it today, was different in the medieval times. The only way to end a marriage was to prove it had not legally existed in the first place. Her husband, Louis VI, claimed that they were 'too closely related' to be married which was a legitimate way to end the marriage.

Two months after the divorce, Eleanor married Henry of Anjou, who became the king of England in 1154. For nearly two decades, Eleanor played an active part in the running of Henry's empire, travelling backwards and forwards between territories in England and France.

In 1173, two of Eleanor's sons involved her in a plot against their father and, as a result, Henry imprisoned her. After Henry's death in 1189, his eldest son, Richard I, ordered his mother's release. In 1190, she acted as regent in England when Richard went to join the Third Crusade. She even played a part in the negotiations for his release after he was taken prisoner in Germany on his way home.

In 1199, Richard died and was succeeded by Eleanor and Henry's youngest son, John. Eleanor's role in English affairs then ceased, although she continued to be closely involved in those of Aquitaine, where she spent her final years. She died on 31st March, 1204, living for 82 years.



**Joan of Arc**

Joan of Arc (1412-1431) and the 100 Years' War The Hundred Year's War was a long struggle between England and France over the succession of the French throne. It lasted from 1337-1453, so might be more accurately called "The 116 Year's War." The war started off successfully for England and the English forces dominated France for decades. From 1422 onwards, however, the French crown struck back. The teenage girl Jeanne d'Arc (Joan of Arc) led the French troops to reclaim their lands from the English.

By the end of 1430, the rulers of England and France became increasingly preoccupied by the fate of an 18-year-old peasant girl called Joan of Arc. This was a time of the feudal system and any commoner, especially a woman, who led an army, would have been shocking and offensive to the ruling classes; armies were headed by kings who believed that they were ordained by God. In the December

of that year, the faculty of the University of Paris wrote a letter to the king of England, who controlled Paris at that time: "We have recently heard that the woman called 'The Maid' is now delivered into your power, (and)... must humbly beseech you, most feared and sovereign lord... to command that this woman shall be shortly delivered into the hands of the justice of the Church."

However, things soon changed for Joan of Arc. Instead of expelling the English from France, Joan and the army she led suffered several military setbacks. On 23rd May, 1430, Joan was captured near Paris. Her claims that divine voices, which had told her to dress as a man and to help the French army, made her appear weak. How could the envoy of God fall so easily into enemy hands? Joan refused to deny that she heard divine voices and the punishment for this was death.

The 'Maid' was Joan of Arc, whose role in liberating the city of Orléans in 1429 had returned courage back into the hearts of the embattled French. Even so, her capture soon after was a morale boost for the English, who immediately set out to vilify the woman who had done so much damage to their military campaigns. Shortly after the letter from the University of Paris was written, her trial took place. After the guilty verdict was handed down, Joan was executed in Rouen on May 31 1431, by being burned alive. Once her ashes had been scattered in the Seine River, Joan's detractors hoped her name would be erased from history, but her name has burned more brightly in the hearts and minds of the French ever since then. The humble farm girl turned the tide for the French in the closing years of the Hundred Years' War. Her claims that the divine voices she heard led France to victory (in the battles she led) and made her one of the most celebrated figures of late medieval history.

**Shakespeare's Women**

James I and Witchcraft (1566-1625)

Following on from the death of Queen Elizabeth I, she had no direct heir to take the throne of England. James VI of Scotland, who was the son of Mary Queen of Scots, became the King of England (James I) in 1603. Until this time, England and Scotland had been two individual sovereign states but, following on from the crowning of James I, the two countries became unified. This period of history is referred to as the Jacobean period.

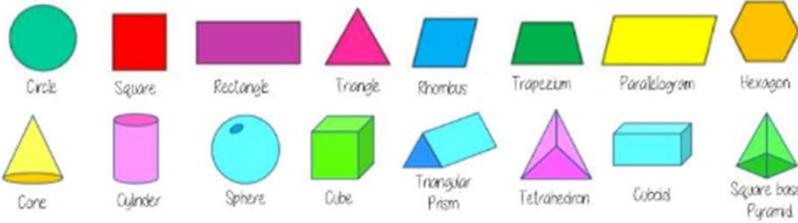
During James I's reign, the 'Golden Age' of Elizabethan drama continued, with writers such as William Shakespeare, John Donne and Ben Jonson contributed to a flourishing literary culture.

King James I's visit to Denmark, a country well familiar with witch-hunts, sparked an interest in his study of witchcraft, which he considered a branch of theology. He attended witch trials in North Berwick, which was the location of the first major persecution of witches in Scotland. Several people were convicted of using witchcraft to send storms against James' ship.

James became obsessed with the threat posed by witches and wrote Daemonologie in 1597, a text inspired by his personal involvement in opposition to the practice of witchcraft and that provided background material for Shakespeare's Macbeth. King James personally supervised the torture of women accused of being witches. In King James' time, most people believed in witches, the devil, evil spirits and magic. In both England and Scotland, women (and sometimes men) suspected of being witches were arrested, questioned and were often tortured into providing a confession. In England, witches were usually sentenced to be hanged.

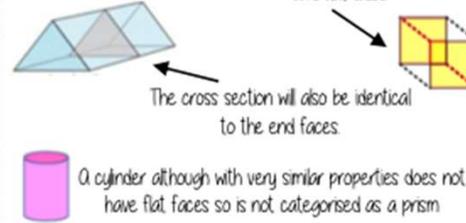
| Word        | Definition   |
|-------------|--|
| apocryphal  | of doubtful authenticity, although widely circulated as being true.  |
| Disciple    | personal follower of Christ during his life, especially one of the twelve Apostles.  |
| Ignominy:   | public shame or disgrace.  |
| Tyranny:.   | cruel, unreasonable, or arbitrary use of power or control  |
| Modesty:    | behaviour, manner, or appearance intended to avoid impropriety or indecency.   |
| Heretic:    | a person believing in or practising religious heresy. (Heresy: belief or opinion contrary to orthodox religious - especially Christian -doctrine). |
| 'Suffrage'  | means the right to vote in political elections.  |
| Feminism    | the advocacy of women's rights on the ground of the equality of the sexes  |
| Narrator    | a person who narrates something, especially a character who recounts the events of a novel or narrative poem.                                      |
| Protagonist | the leading character or one of the major characters in a play, film, novel, etc.  |
| Antagonist  | An antagonist is a character in a story who is presented as the chief enemy of the protagonist.  |
| Infantilise | treat (someone) as a child or in a way which denies their maturity in age or experience.   |
| Emasculate  | deprive (a man) of his male role or identity.  |

## Name 2D & 3D shapes



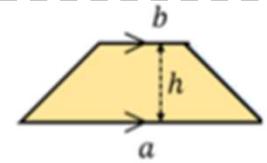
## Recognise prisms

A solid object with two identical ends and flat sides

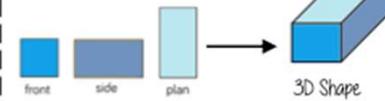


## Area of a trapezium

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



## Plans and elevations



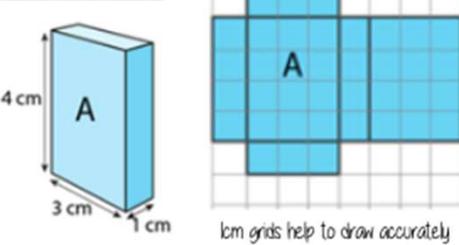
The direction you are considering the shape from determines the front and side views

## Area of a circle (Calculator)



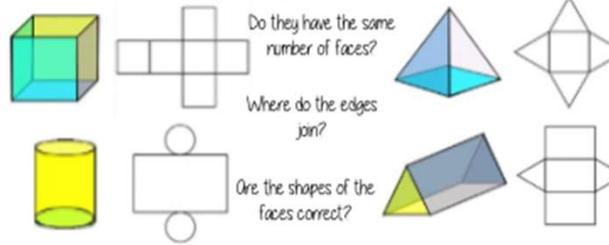
How to get  $\pi$  symbol on the calculator

## Nets of cuboids



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

## Sketch and recognise nets

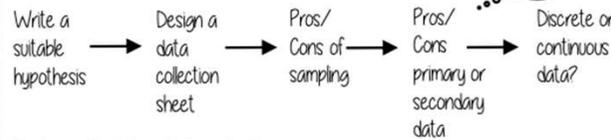


## Area - rectangles, triangles, parallelograms



A triangle is half the size of the rectangle it would fit in

## Set up a statistical enquiry



## Features of a data collection sheet

| Grouped or ungrouped categories | Data Title | Tally | Frequency |
|---------------------------------|------------|-------|-----------|
|                                 |            |       |           |

Total number of that group observed

## Design and criticise a questionnaire

The Question - be clear with the question - don't be too leading/judgemental  
e.g. How much pocket money do you get a week?

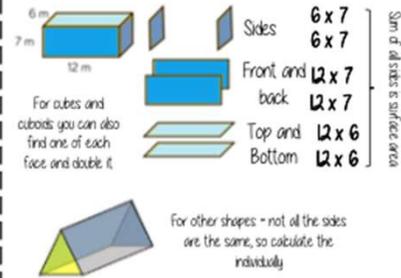
Responses - do you want closed or open responses? - do any options overlap? - Have you an option for all responses?

Zero option  £0  £0.01 - £2  £2.01 - £4  more than £4  More option

NOTE: For responses about continuous data include inequalities  $< x \leq$

## Surface area

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



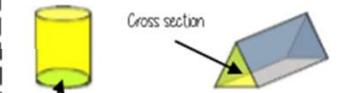
## Volumes

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



Cubes/ Cuboids - base x width x height

Remember multiplication is commutative

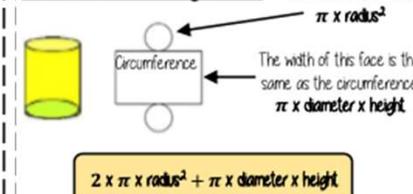


Prisms and cylinders - area cross section x height

Height can also be described as depth

Areas - square units  
Volumes - cube units  
Areas and volumes can be left in terms of  $\pi$

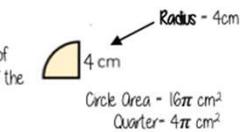
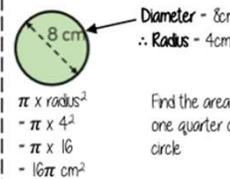
## Surface area - cylinders



## Area of a circle (Non-Calculator)

Read the question - leave in terms of  $\pi$  or if  $\pi \approx 3$  (provides an estimate for answers)

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



Area of a circle =  $\pi r^2$

Circumference of a circle =  $2\pi r$

## 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 |

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.

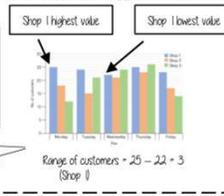
It is likely that the salaries above £240 are more senior staff members - their salary doesn't represent the average weekly wage of the majority of employees

Which average best represents the weekly wage?

## Find and interpret the range

The range is a measure of spread. A smaller range means there is less variation in the results - it is more consistent data. A range of 0 means all the data is the same value.

Difference between the biggest and smallest values



## Missing angles in regular polygons

Exterior angle =  $360 \div 8 = 45^\circ$   
 Interior angle =  $\frac{(8-2) \times 180}{8} = \frac{6 \times 180}{8} = 135^\circ$

Exterior angles in regular polygons =  $360^\circ \div \text{number of sides}$   
 Interior angles in regular polygons =  $\frac{(\text{number of sides} - 2) \times 180}{\text{number of sides}}$

## 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: 39.6 (1.d.p), Median: 38, Mode: no mode, Range: 16  
 James - Mean: 41.8 (1.d.p), Median: 32, Mode: 23, Range: 76  
 James has two extreme values that have a big impact on the range  
 James is less consistent than Lucy because his scores have a greater range.  
 "Lucy performed better on average because her scores have a similar mean and a higher median"

### Sum of interior angles

The angles enclosed by the polygon

Sum of the interior angles =  $(5 - 2) \times 180$   
 This shape can be made from three triangles. Each triangle has 180°  
 Sum of the interior angles =  $3 \times 180 = 540^\circ$

This is an **irregular** polygon - the sides and angles are different sizes

Remember this is **all** of the interior angles added together

## Properties of Quadrilaterals

**Square**  
 All sides equal size  
 All angles 90°  
 Opposite sides are parallel

**Rectangle**  
 All angles 90°  
 Opposite sides are parallel

**Rhombus**  
 All sides equal size  
 Opposite angles are equal

**Parallelogram**  
 Opposite sides are parallel  
 Opposite angles are equal  
 Co-interior angles

**Trapezium**  
 One pair of parallel lines

**Kite**  
 No parallel lines  
 Equal lengths on top sides  
 Equal lengths on bottom sides  
 One pair of equal angles

## Basic angle rules and notation

Acute Angles:  $0^\circ < \text{angle} < 90^\circ$

Right Angles:  $90^\circ$

Obtuse:  $90^\circ < \text{angle} < 180^\circ$

Reflex:  $180^\circ < \text{angle} < 360^\circ$

Straight Line:  $180^\circ$

Angle Notation: three letters ABC  
 This is the angle at B =  $113^\circ$   
 Line Notation: two letters EC  
 The line that joins E to C

Vertically opposite angles: Equal  
 Angles around a point:  $360^\circ$

## Parallel lines

Still remember to look for angles on straight lines, around a point and vertically opposite

Lines OF and BE are **transversals** (lines that bisect the parallel lines)

Corresponding angles often identified by their "F shape" in position

Alternate angles often identified by their "Z shape" in position

This notation identifies parallel lines

## Sum of exterior angles

Exterior angles all add up to  $360^\circ$

Using exterior angles

Interior angle + Exterior angle = straight line =  $180^\circ$   
 Exterior angle =  $180 - 165 = 15^\circ$

Number of sides =  $360^\circ \div \text{exterior angle}$   
 Number of sides =  $360 \div 15 = 24$  sides

## Alternate/ Corresponding angles

Because alternate angles are equal the highlighted angles are the same size

Because corresponding angles are equal the highlighted angles are the same size

## Co-interior angles

Because co-interior angles have a sum of  $180^\circ$  the highlighted angle is  $110^\circ$

As angles on a line add up to  $180^\circ$  co-interior angles can also be calculated from applying alternate/ corresponding rules first

## Triangles & Quadrilaterals

Side, Angle, Angle

Side, Angle, Side

Side, Side, Side

Link to steps **R**

## 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

## 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  $55 \div 5$   
**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

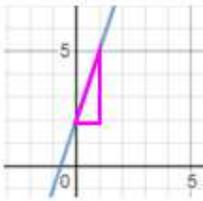
This can still be easier if the data is ordered first

4, 8, 8, 11, 24  
**Mode = 8**

## Lines, Linear Graphs and Quadratic Graphs

$y = 3x + 2$

|   |    |    |   |   |   |
|---|----|----|---|---|---|
| x | -2 | -1 | 0 | 1 | 2 |
| y | -4 | -1 | 2 | 5 | 8 |



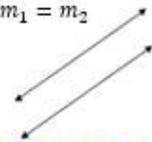
The gradient is 3 and the y-intercept is 2

$y = -2x + 5$

The gradient is -2 so it's going "downhill" and the y-intercept is 5

### Parallel lines

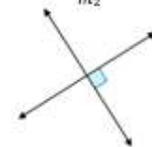
Their gradients are the same.  
 $m_1 = m_2$



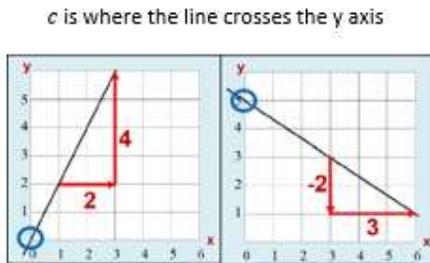
### Perpendicular lines

Their gradients are the opposite reciprocal.

$m_1 = -\frac{1}{m_2}$



$y = mx + c$   
m is the gradient, the  $\frac{\text{change in } y}{\text{change in } x}$   
Draw a triangle from left to right. If it's going downhill it will be negative.



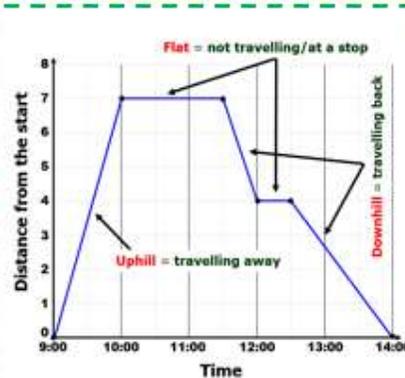
$y = \frac{4}{2}x + 0$       $y = -\frac{2}{3}x + 5$

What's the equation of a line parallel to  $y = 3x + 2$  that passes through the y axis at 4?

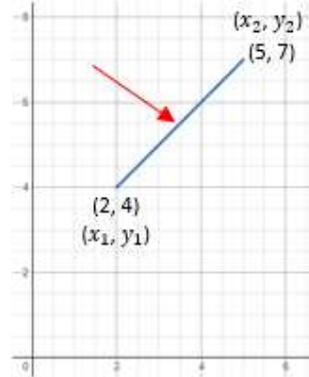
$y = 3x + 4$

What's the equation of a line perpendicular to  $y = 3x + 2$  that passes through the y axis at 4?

$y = -\frac{1}{3}x + 4$

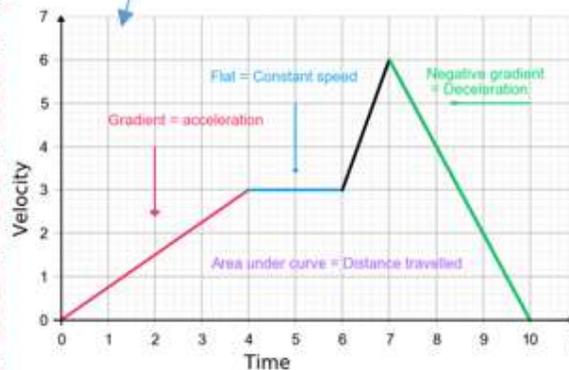


Midpoint (the half way point) for the line segment  $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$



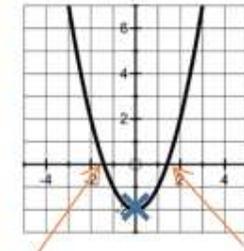
Midpoint for this line segment  $(\frac{2+5}{2}, \frac{4+7}{2})$   
 $= (\frac{7}{2}, \frac{11}{2})$   
 $= (3.5, 5.5)$

### Real life multi-segment straight line graphs



$y = x^2 - 2$

|   |    |    |    |    |   |
|---|----|----|----|----|---|
| x | -2 | -1 | 0  | 1  | 2 |
| y | 2  | -1 | -2 | -1 | 2 |



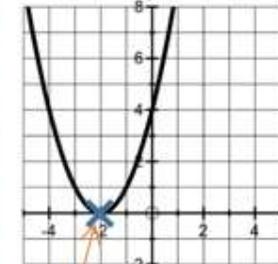
Where the graph crosses the x axis (where  $y = 0$ ), we have solutions.  
 $(x - \sqrt{2})(x + \sqrt{2}) = 0$   
 $\therefore x = \sqrt{2}$  and  $x = -\sqrt{2}$

The turning point  $\times$  is a minimum when  $ax^2$  is positive, or a maximum when  $ax^2$  is negative.

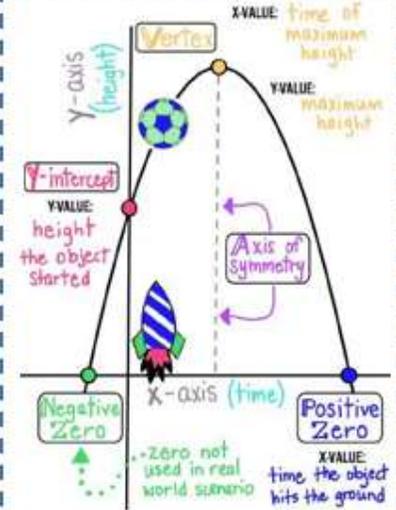
It's always half way between the roots (where it crosses the x axis). The turning point is on the line of symmetry.

$y = x^2 + 4x + 4$

|   |    |    |   |    |
|---|----|----|---|----|
| x | -4 | -2 | 0 | 2  |
| y | 4  | 0  | 4 | 16 |



Where the graph crosses the x axis (where  $y = 0$ ), we have solutions.  
 $(x + 2)(x + 2) = 0 \therefore x = -2$   
The turning point is in the same place.

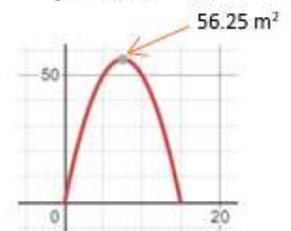


What's the maximum area you can get with 30 meters of railings?

$(15 - x)$

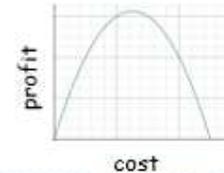


$y = x(15 - x)$   
 $y = 15x - x^2$

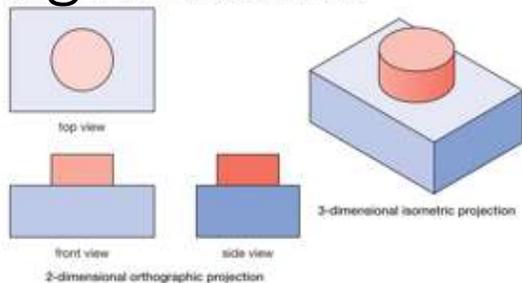


What's the sweet spot on price versus revenue?

How much would you pay?



The **Perimeter** for all shapes is the sides added. You might have to calculate the missing ones....



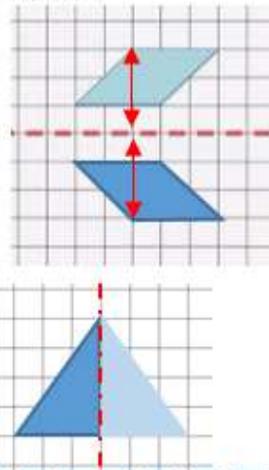
## Areas of Rectangles, Triangles and Parallelograms

**Rectangle**  
Base x Height

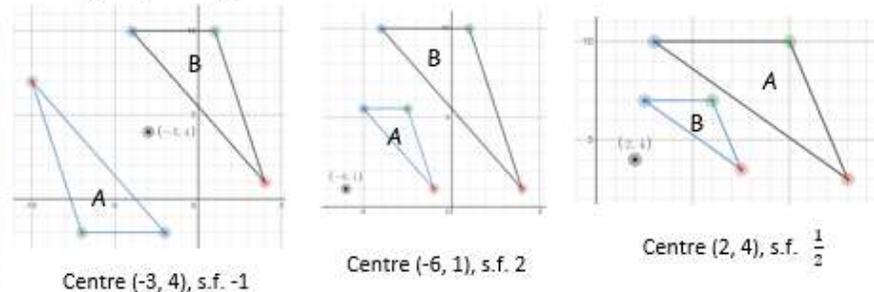
**Triangle**  
 $\frac{1}{2} \times \text{Base} \times \text{Perpendicular height}$

**Parallelogram**  
Base x Perpendicular height

**Reflection** (reflect!) with a mirror line; vertical, horizontal or diagonal.



**Enlargement** (make bigger or smaller or invert) by a scale factor (*s.f.*)  
 $s.f. > 1$ , the image will be bigger  
 $0 < s.f. < 1$ , the image will be smaller  
 $s.f.$  is negative, the image will be inverted



**Rotate** (turn the shape around) from a point, by an angle, in a clockwise or anti-clockwise direction

**Translation** (move) by a vector  $\begin{pmatrix} x & \text{distance} \\ y & \text{distance} \end{pmatrix}$

## Area of a Trapezium

$\frac{1}{2} (\text{Sum of the Parallel sides}) \times \text{Perpendicular height}$

Why?  
I'm glad you asked...  
Two congruent trapezium make a parallelogram

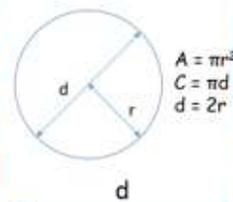
## Area of compound shapes

- Split the shape into more manageable shapes.
- Spot rectangles, parallelograms, trapezium, semi circles or quarter circles.
- Calculate the distances needed.
- Calculate each part.
- Add the individual areas together.

$\frac{1}{4} \times \pi \times 5^2 = 19.6 \text{ cm}^2$   
 $\frac{1}{2} \times 5 \times 5 = 12.5 \text{ cm}^2$   
 Base =  $17 - 5 - 5 = 5 \times 7 = 35 \text{ cm}^2$   
 $19.6 + 35 + 12.5 = 67.1 \text{ cm}^2$

## Circles

C = circumference  
 d = diameter  
 r = radius  
 $\pi = 3.141\dots$



$P = \frac{1}{2} \pi d + d$   
 $A = \frac{1}{2} \pi r^2$

## Bearings

Always:  
 • Measured from the north  
 • Three figures  
 • Clockwise

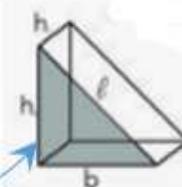
The bearing of B from A is 205°

Scale drawings - it's bigger in real life? (maps)

## Volume of a prism

$V = \text{Area of the CSA} \times \text{depth}$

CSA = every slice looks the same  
 Cross sectional area

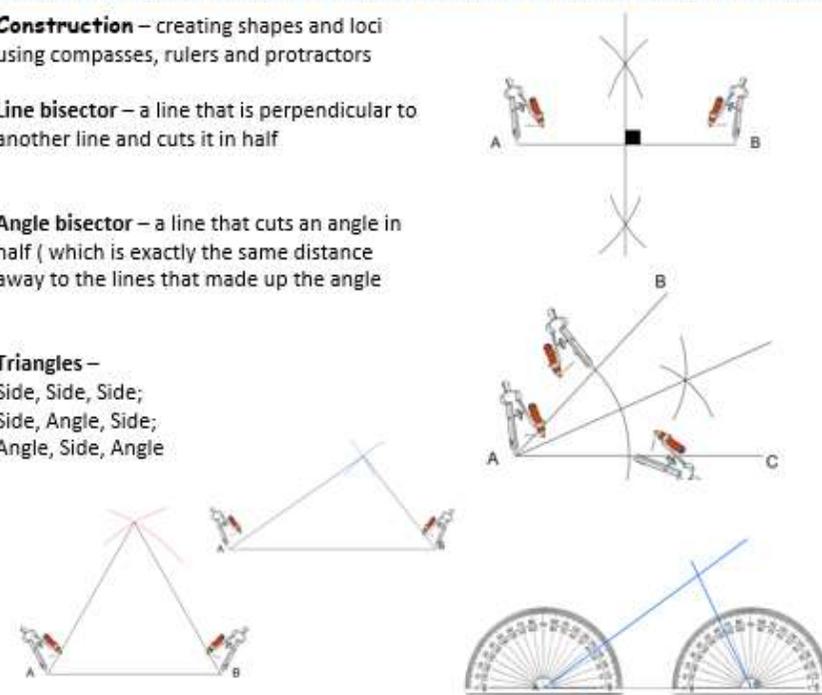


**Construction** – creating shapes and loci using compasses, rulers and protractors

**Line bisector** – a line that is perpendicular to another line and cuts it in half

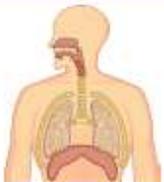
**Angle bisector** – a line that cuts an angle in half (which is exactly the same distance away to the lines that made up the angle)

**Triangles** –  
 Side, Side, Side;  
 Side, Angle, Side;  
 Angle, Side, Angle



# AQA GCSE Biology (Combined Science) Unit 2: Organisation

## Principles of Organisation

|  |   |   |  |   |
|--|---|---|--|---|
|  |  |  |  |  |
| cell   | tissue  | organ   | organ system   | organism  |
| Cells are the basic building blocks of all living things.                        | A group of cells with a similar structure and function is called a tissue.        | An organ is a combination of tissues carrying out a specific function.            | Organs work together within an organ system.                                       | Organ systems work together to form whole living organisms.                         |

## Food Tests (Required Practical)

| What are you testing for? | Which indicator do you use? | What does a positive result look like?                               |
|---------------------------|-----------------------------|--|
| sugar                     | Benedict's reagent          | Once heated, the solution will change from blue-green to yellow-red. |
| starch                    | iodine                      | Blue-black colour indicates starch is present.                       |
| protein                   | biuret                      | The solution will change from blue to pink-purple.                   |
| lipid                     | sudan III                   | The lipids will separate and the top layer will turn bright red.     |

## Effect of pH on the Rate of Reaction of Amylase (Required Practical)

Iodine is used to test for the presence of starch.

If starch is present, the colour will change to blue-black.

The **independent variable** in the investigation is the pH of the buffer solution.

The **dependent variable** in the investigation is the time taken for the reaction to complete (how long it takes for all the starch to be digested by the amylase).



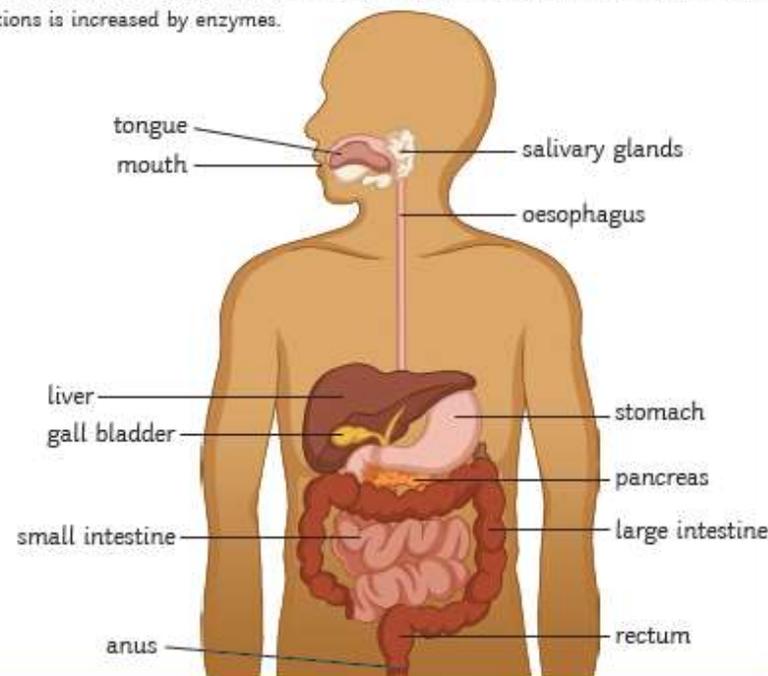
### Method:

1. Use the marker pen to label a test tube with the first value of pH buffer solution (pH 4) and stand it in the test tube rack.
2. Into each well of the spotting tiles, place a drop of iodine.
3. Using a measuring cylinder, measure 2cm<sup>3</sup> of amylase and pour into the test tube.
4. Using a syringe, measure 1cm<sup>3</sup> of the buffer solution and pour into the test tube.
5. Leave this to stand for five minutes and then use the thermometer to measure the temperature. Make a note of the temperature.

6. Add 2cm<sup>3</sup> of starch solution into the test tube, using a different measuring cylinder to measure, and begin a timer (leave the timer to run continuously).
7. After 10 seconds, use a pipette to extract some of the amylase/starch solution, and place one drop into the first well of the spotting tile. Squirt the remaining solution back into the test tube.
8. Continue to place one drop into the next well of the spotting tile, every 10 seconds, until the iodine remains orange.
9. Record the time taken for the starch to be completely digested by the amylase by counting the wells that were tested positive for starch (indicated by the blue/black colour change of the iodine). Each well represents 10 seconds of time.
10. Repeat steps 1 to 8 for pH values 7 and 10.

## The Digestive System

The purpose of the digestive system is to break down large molecules into smaller, soluble molecules, which are then absorbed into the bloodstream. The rate of these reactions is increased by enzymes.



# AQA GCSE Biology (Combined Science) Unit 2: Organisation

## Enzymes

An enzyme is a biological **catalyst**; enzymes speed up chemical reactions without being changed or used up.



This happens because the enzyme lowers the **activation energy** required for the reaction to occur. Enzymes are made up of chains of amino acids folded into a globular shape.

Enzymes have an **active site** which the **substrate** (reactants) fits into. Enzymes are very specific and will only catalyse one specific reaction. If the reactants are not the complimentary shape, the enzyme will not work for that reaction.

Enzymes also work optimally at specific conditions of pH and temperature. In extremes of pH or temperature, the enzyme will **denature**. This means that the bonds holding together the 3D shape of the active site will break and the active shape will deform. The substrate will not be able to fit into the active site anymore and the enzyme cannot function.

| Enzyme   | Reactant | Product                  |
|----------|----------|--------------------------|
| amylase  | starch   | sugars (glucose)         |
| protease | protein  | amino acids              |
| lipase   | lipid    | glycerol and fatty acids |

The products of digestion are used to build new carbohydrates and proteins and some of the glucose is used for respiration.

**Bile** is produced in the **liver** and stored in the **gall bladder**. It is an **alkaline** substance which **neutralises** the hydrochloric acid in the stomach. It also works to **emulsify** fats into small droplets. The fat droplets have a higher **surface area** and so the rate of their digestion by lipase is increased.

## The Heart and Blood Vessels

The **heart** is a large muscular organ which **pumps blood** carrying oxygen or waste products around the body. The **lungs** are the site of **gas exchange** where oxygen from the air is exchanged for waste carbon dioxide in the blood. Oxygen is used in the **respiration** reaction to release energy for the cells and carbon dioxide is made as a waste product during the reaction.



The three types of blood vessels, shown above, are each adapted to carry out their specific function.

**Capillaries** are narrow vessels which form networks to closely supply cells and organs between the veins and arteries. The walls of the capillaries are only **one cell thick**, which provides a short **diffusion pathway** to increase the rate at which substances are transferred.

The table below compares the structure and function of arteries and veins:

|                                   | Artery   | Vein  |
|-----------------------------------|--|---|
| direction of blood flow           | away from the heart                                      | towards the heart                           |
| oxygenated or deoxygenated blood? | oxygenated (except the pulmonary artery)                 | deoxygenated (except the pulmonary vein)    |
| pressure                          | high   | low (negative)                              |
| wall structure                    | thick, elastic, muscular, connective tissue for strength | thin, less muscular, less connective tissue |
| lumen (channel inside the vessel) | narrow   | wide (with valves)                          |

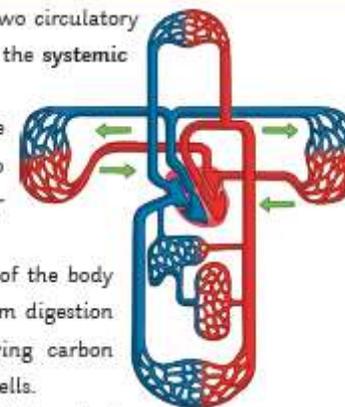
## The Heart as a Double Pump

The heart works as a **double pump** for two circulatory systems; the **pulmonary** circulation and the **systemic** circulation.

The pulmonary circulation serves the lungs and bring deoxygenated blood to exchange waste carbon dioxide gas for oxygen at the **alveoli**.

The systemic circulation serves the rest of the body and transports oxygen and nutrients from digestion to the cells of the body, whilst carrying carbon dioxide and other waste away from the cells.

The systemic circulation flows through the whole body. This means the blood is flowing at a much higher pressure than in the pulmonary circuit.



## The Heart as Pacemaker

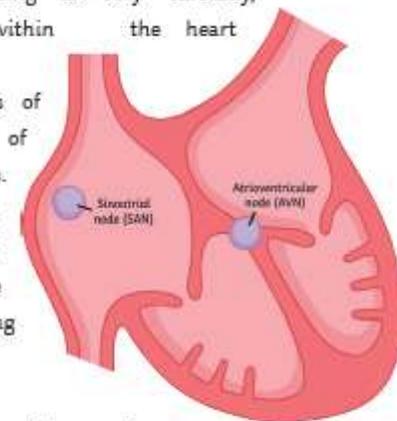
The rate of the heart beating is very carefully, and automatically, controlled within the heart itself.

Located in the muscular walls of the heart are small groups of cells which act as pacemakers.

They produce electrical impulses which stimulate the surrounding muscle to contract, squeezing the chambers of the heart and pumping the blood.

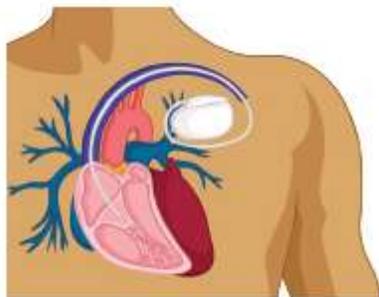
The **sino-atrial node (SAN)** is located near the right atrium and it stimulates the atria to contract.

The **atrio-ventricular node (AVN)** is located in between the ventricles and stimulates them to contract.



## AQA GCSE Biology (Combined Science) Unit 2: Organisation

Artificial pacemakers can be surgically implanted into a person if their heart nodes are not functioning correctly.



## Coronary Heart Disease

**Coronary heart disease** is a condition resulting from **blockages** in the **coronary arteries**. These are the main arteries which supply blood to the heart itself and they can become blocked by build-up of **fatty deposits**.

In the UK and around the world, coronary heart disease is a major cause of many **deaths**.

The main symptoms can include **chest pain**, **heart attack** or **heart failure**. Yet, not all people suffer the same symptoms, if any at all.

**Lifestyle factors** can increase the risk of a person developing coronary heart disease.

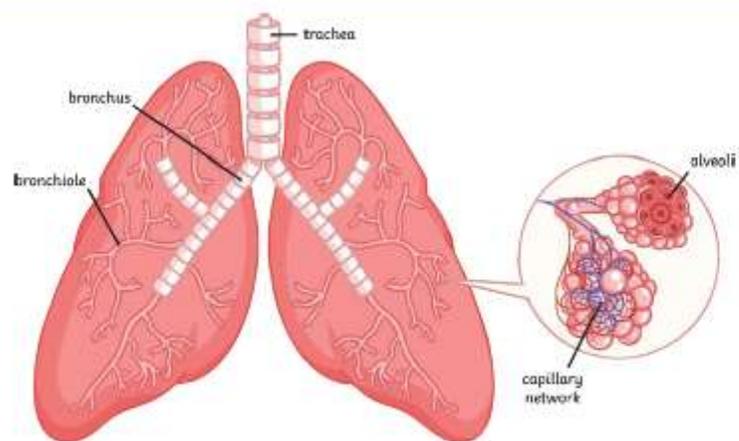
**Diet** – a high-fat diet (containing lots of saturated fat) can lead to higher cholesterol levels and this cholesterol forms the fatty deposits which damage and block the arteries.

**Smoking** – chemicals in cigarette smoke, including nicotine and carbon monoxide, increase the risk of heart disease. Carbon monoxide reduces the amount of oxygen which can be transported by the red blood cells and nicotine causes an increased heart rate. The lack of oxygen to the heart and increased pressure can lead to heart attacks.

**Stress** – prolonged exposure to stress or stressful situations (such as high pressure jobs) can lead to high blood pressure and an increased risk of heart disease.

**Drugs** – illegal drugs (e.g. ecstasy and cannabis) can lead to increased heart rate and blood pressure, increasing the risk of heart disease.

**Alcohol** – regularly exceeding unit guidelines for alcohol can lead to increased blood pressure and risk of heart disease.



## Blood

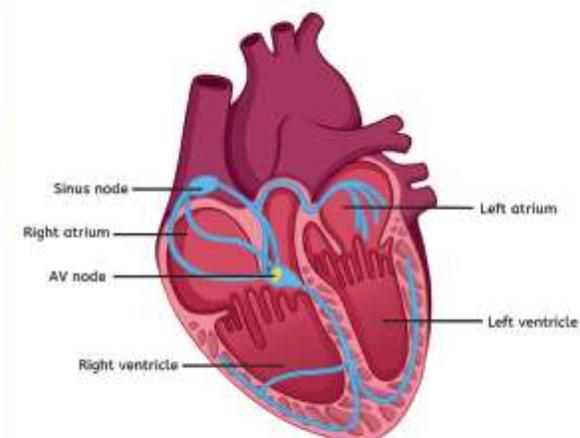
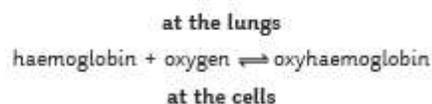
Blood is composed of red blood cells (erythrocytes), white blood cells and platelets, all suspended within a plasma (a tissue).

The **plasma** transports the different blood cells around the body as well as carbon dioxide, nutrients, urea and hormones. It also distributes the heat throughout the body.

**Red blood cells** transport oxygen attached to the

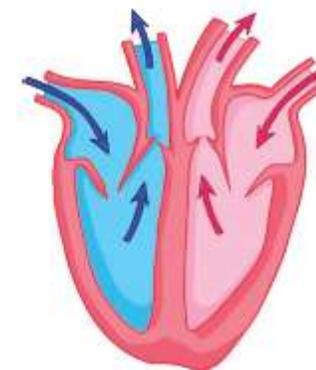
haem group in their structure. It has a biconcave shape to increase surface area and does not contain a nucleus so it can bind with more oxygen molecules.

**White blood cells** form part of the immune system and ingest pathogens and produce antibodies. **Platelets** are important blood clotting factors.



The **right atrium** receives deoxygenated blood via the **vena cava**. It is then pumped down through the valves into the **right ventricle**. From here, it is forced up through the **pulmonary artery** towards the **lungs** where it exchanges carbon dioxide for oxygen. The oxygenated blood then enters the **left atrium** via the **pulmonary vein** and down into the left ventricle. The muscular wall of the **left ventricle** is much thicker so it can pump the blood more forcefully out of the heart and around the entire body, via the **aorta**.

The blood only flows in **one direction**. This is because there are **valves** in the heart which close under pressure and prevent the backward flow of blood.



## AQA GCSE Biology (Combined Science) Unit 2: Organisation

## Rate Calculations for Blood Flow

The number of beats the heart performs each minute is called the **pulse** (or heart rate).

It is easily measured by counting the number of beats in a given time, e.g. 15s, and finding the total beats **per minute**.

Typically, a lower resting pulse rate indicates a greater level of physical **fitness**. During exercise, and for some time after, the pulse rate increases while the heart is working to provide more **oxygen** to the muscles.

**Cardiac output** is a measure of the volume of blood pumped by the heart each **minute**. **Stroke volume** is a measure of the volume of blood pumped from the heart each **contraction** (heart beat).

Cardiac output ( $\text{cm}^3/\text{min}$ ) = heart rate (bpm)  $\times$  stroke volume ( $\text{cm}^3/\text{beat}$ )

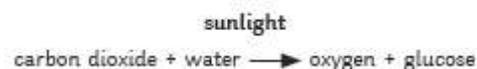
## Cancer

**Cancer** is the result of **uncontrolled** cell growth and division. The uncontrolled growth of cells is called a **tumour**.

| Benign Tumour  | Malignant Tumour   |
|--|--|
| <ul style="list-style-type: none"> <li>Usually grows slowly.</li> <li>Usually grows within a membrane and can be easily removed.</li> <li>Does not normally grow back.</li> <li>Does not spread around the body.</li> <li>Can cause damage to organs and be life-threatening.</li> </ul> | <ul style="list-style-type: none"> <li>cancerous</li> <li>Usually grows rapidly.</li> <li>Can spread around the body, via the bloodstream.</li> <li>Cells can break away and cause secondary tumours to grow in other areas of the body (metastasis).</li> </ul> |

## Plant Tissues, Organs and Systems

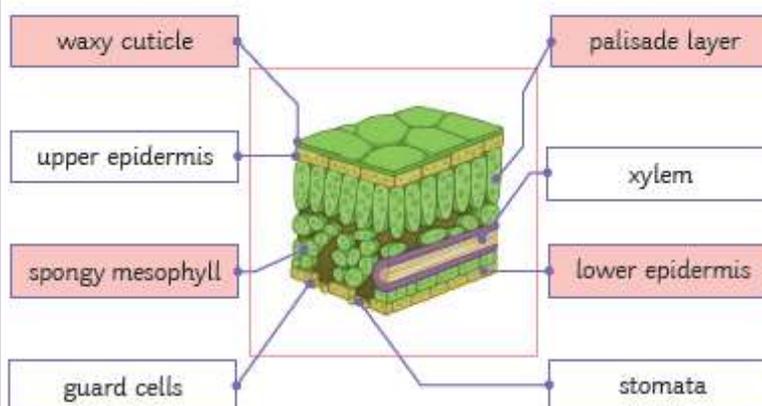
**Leaves** are plant organs and their main function is to absorb sunlight energy for use in **photosynthesis**. Within the cells are small organelles called **chloroplasts** which contain a green pigment called **chlorophyll**. This is the part of the plant which absorbs the sunlight and where photosynthesis occurs.



Leaves are adapted to carry out their function. Leaves are typically flat and thin with a large **surface area**. This means they have a maximum area to absorb the sunlight and carbon dioxide. The **thin** shape reduces the distance for **diffusion** of water and gases.

Leaves contain vessels called xylem and phloem. The **xylem** transport water and dissolved minerals toward the leaves. The **phloem** transport glucose and other products from photosynthesis around the plant.

The large **air spaces** between the cells of the spongy mesophyll layer allow for the diffusion of gases. **Carbon dioxide** enters the leaves and **oxygen** exits the leaves.



The **guard cells** are specially adapted cells located on the underside of the leaf. They are positioned in pairs, surrounding the **stomata** (a small opening in the epidermis layer). The guard cells change shape to open and close the stomata, controlling the rate of **gas exchange** in the leaf.

## Root Hair Cells

Plants absorb water by **osmosis** through the root hair cells of the roots. Dissolved in the water are important minerals for the plant's growth and development, which are absorbed by **active transport**.

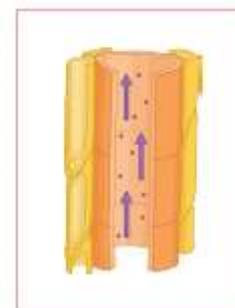


The **root hair cells** are adapted to their function with the following features:

- Finger-like projection in the membrane increases the **surface area** available for water and minerals to be absorbed across.
- The narrow shape of the projection can squeeze into small spaces between soil particles, bringing it closer and reducing the distance of the **diffusion pathway**.
- The cell has many **mitochondria**, which release energy required for the active transport of some substances.

## Xylem and Phloem

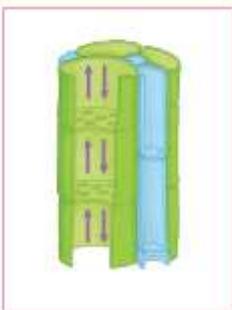
**Xylem** vessels transport **water** through the plant, from roots to leaves. They are made up of **dead**, lignified cells, which are joined end to end with no walls between them, forming a long central tube down the middle. The movement of the water, and dissolved minerals, along the xylem is in a **transpiration stream**.



Xylem vessels also provide **support and strength** to the plant structure. They are found in the middle of roots so they aren't crushed within the soil. They are found in the middle of the stem to provide strength and prevent bending. In the leaves, they are found in **vascular bundles** alongside the phloem and can be seen as the veins which network across the leaf.

## AQA GCSE Biology (Combined Science) Unit 2: Organisation

**Phloem** vessels transport **food** such as dissolved sugars and glucose from photosynthesis. The food is transported around the plant to where growth is occurring (root and shoot tips), as well as to the organs which store the food. The transport occurs in **all directions** throughout the plant. The cells making up the phloem tube are **living**, with small holes in the walls where the cells are joined.



## Transpiration and Translocation

**Transpiration** is the loss of water, by **evaporation** and **diffusion**, from the leaves of the plant. Water is a cohesive molecule and as it evaporates, there is less water in the leaf, so water from further back moves up to take its place. This, in turn, draws more water with it. This is the **transpiration stream**.

**Transpiration** occurs naturally as there is a tendency for water to diffuse from the leaves (where the concentration is relatively high) to the air around the plants (where the concentration is relatively low), via the **stomata**.

**Environmental factors** can change the rate at which transpiration occurs:

- Increased **light intensity** will increase the rate of transpiration because light stimulates the stomata to open. The leaf will also be warmed by the sunlight.
- Increased **temperature** will cause the water to evaporate more quickly and so increase the rate of transpiration.
- Increased **humidity** (moisture in the air) will reduce the rate of transpiration. Whereas if the air becomes drier, the rate increases. A greater concentration gradient will increase the rate of diffusion.
- If the **wind speed** increases, then the rate of transpiration also increases. This is because as the water surrounding the leaves is moved away more quickly, the concentration gradient is increased.
- If the **water content** in the soil is decreased, then the rate of absorption in the roots decreases. This causes the stomata to become flaccid and close, reducing transpiration. If the loss of turgor affects the whole plant, then it will wilt.

## Disease Interactions

Having one type of illness can often make a person more susceptible to another type of illness:

- immune disorders → increased risk of infectious disease
- viral infection of cells → increased risk of cancer
- immune reactions → can trigger allergies
- very poor physical health → increased risk of depression or other mental illness

There can often be correlations between some factors and types of illness or specific diseases.

For example, in the graph shown to the right, there is a positive correlation between the number of cigarettes smoked and the number of lung cancer deaths.

However, there are other factors which can contribute to the development of lung cancer e.g. working with asbestos, genetic predisposition.

This means that although the evidence in the graph gives a strong indication that smoking is a cause of lung cancer, it cannot be stated that 'smoking will cause lung cancer'. Not every person who smokes will develop lung cancer and not every person who develops lung cancer will be a smoker.

Therefore, it can be stated that **smoking increases the risk of lung cancer**.

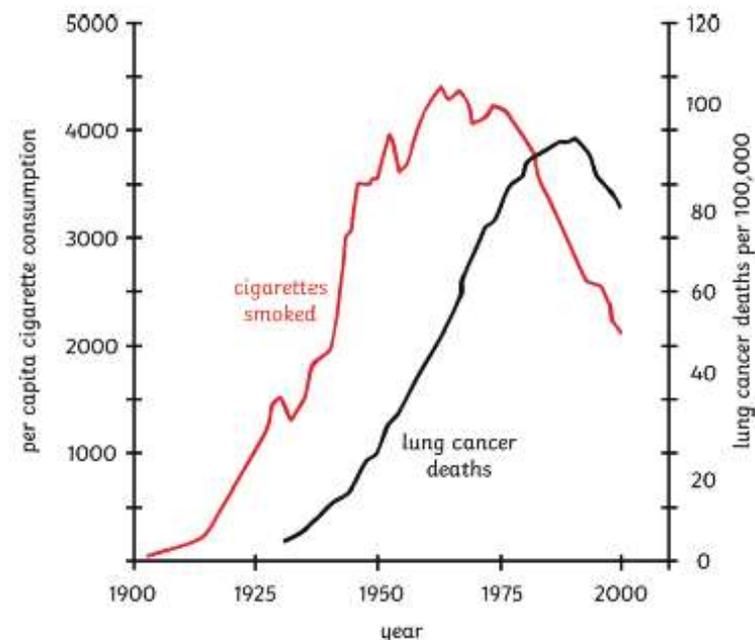
## Health and Disease

**Health** is the state of being free from illness or disease. It refers to **physical** and **mental** wellbeing.

Disease and lifestyle factors, such as diet, stress, smoking, alcohol consumption and the use of illegal drugs, can all impact the health of a person.

Some conditions are associated with certain lifestyle choices:

- Liver conditions are associated with poor **diet** and prolonged excessive **alcohol** consumption.
- Lung cancer is associated with **smoking**.
- Memory loss, poor physical health and hygiene are associated with the use of illegal or recreational **drugs**.
- Obesity and diabetes are associated with poor diet.
- Anxiety and depression are associated with **stress** and prolonged excessive alcohol consumption.



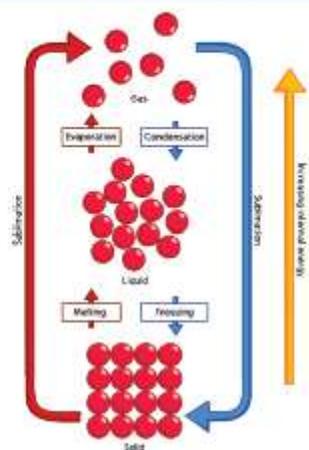
## AQA GCSE Biology (Combined Science) Unit 2: Organisation

### Heart Disease (Treatments)

There are a range of medical treatments for heart disease.

| Treatment        | Description  | Advantages   | Disadvantages   |
|------------------|--|--|---|
| statins          | Drugs used to lower cholesterol levels in the blood, by reducing the amount produced in the liver.   | <ul style="list-style-type: none"> <li>• Can be used to prevent heart disease developing.</li> <li>• Improved quality of life.</li> </ul>  | <ul style="list-style-type: none"> <li>• Long-term treatment.</li> <li>• Possible negative side-effects.</li> </ul>   |
| stents           | Mechanical device which is used to stretch narrow or blocked arteries, restoring blood flow.   | <ul style="list-style-type: none"> <li>• Used for patients where drugs are less effective.</li> <li>• Offers long-term benefits.</li> <li>• Made from metal alloys so will not be rejected by the patients body.</li> <li>• Improved quality of life.</li> </ul> | <ul style="list-style-type: none"> <li>• Requires surgery under general anaesthetic, which carries risk of infection.</li> </ul>  |
| heart transplant | The entire organ is replaced with one from an organ donor (a person who has died and previously expressed a wish for their organs to be used in this way). | <ul style="list-style-type: none"> <li>• Can treat complete heart failure in a person.</li> <li>• extended life</li> <li>• Improved quality of life.</li> <li>• Artificial plastic hearts can be used temporarily until a donor is found.</li> </ul>             | <ul style="list-style-type: none"> <li>• Requires major surgery under general anaesthetic, which carries risks.</li> <li>• Lack of donors available.</li> <li>• Risk of infection or transplant rejection.</li> <li>• Long recovery times.</li> </ul> |

## AQA GCSE Chemistry (Combined Science) Unit 2: Bonding, Structure and Properties of Matter



The three states of matter are **solid, liquid and gas**.

For a substance to change from one state to another, **energy must be transferred**.

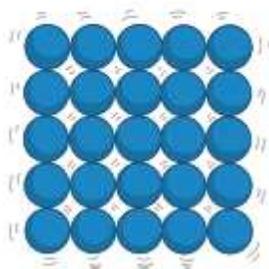
The particles **gain energy**. This results in the breaking of some of the **attractive forces** between particles during melting.

To evaporate or boil a liquid, more energy is needed to overcome the remaining chemical bonds between the particles.

Note the difference between **boiling** and **evaporation**. When a liquid **evaporates**, particles **leave the surface of the liquid only**. When a liquid **boils**, **bubbles of gas form throughout** the liquid before rising to the surface and escaping.

The amount of energy needed for a substance to change state is dependent upon the **strength** of the **attractive forces** between particles. The **stronger** the forces of attraction, the **more energy** needed to **break them apart**. Substances that have strong attractive forces between particles generally have **higher melting and boiling points**.

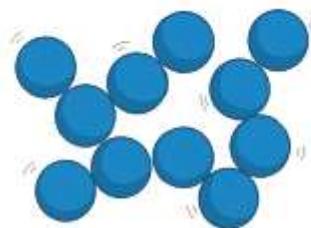
## Solid



The particles in a **solid** are arranged in a regular pattern. The particles in a solid **vibrate** in a fixed position and are **tightly packed together**. The particles in a solid have a **low amount of kinetic energy**.

**Solids** have a **fixed shape** and are unable to flow like liquids. The particles **cannot be compressed** because the particles are very close together.

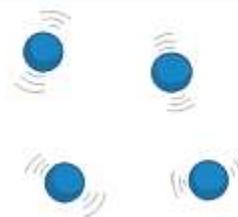
## Liquid



The particles in a **liquid** are randomly arranged. The particles in a liquid are able to **move around** each other. The particles in a liquid have a **greater amount of kinetic energy** than particles in a solid.

**Liquids** are able to **flow** and can take the shape of the container that they are placed in. As with a solid, liquids **cannot be compressed** because the particles are close together.

## Gas



The particles in a **gas** are randomly arranged. The particles in a gas are able to **move around very quickly** in all directions. Of the three states of matter, gas particles have the **highest amount of kinetic energy**.

**Gases**, like liquids, are able to **flow** and can fill the container that they are placed in. The particles in a gas are **far apart** from one another which allows the particles to move in any direction.

Gases can be **compressed**; when squashed, the particles have empty space to move into.

## Limitations of the Particle Model (HT only)

The chemical bonds between particles are not represented in the diagrams above.

Particles are represented as solid spheres – this is not the case. Particles like atoms are mostly empty space. Particles are not always spherical in nature.

## State Symbols

In chemical equations, the three states of matter are represented as symbols:

solid (**s**)

liquid (**l**)

gas (**g**)

aqueous (**aq**)

Aqueous solutions are those that are formed when a substance is dissolved in water.

## Identifying the Physical State of a Substance

If the given temperature of a substance is **lower** than the **melting point**, the physical state of the substance will be **solid**.

If the given temperature of the substance is **between** the **melting point** and **boiling point**, the substance will be a **liquid**.

If the given temperature of the substance is **higher** than the **boiling point**, the substance will be a **gas**.

## AQA GCSE Chemistry (Combined Science) Unit 2: Bonding, Structure and Properties of Matter

## Formation of Ions

Ions are charged particles. They can be either positively or negatively charged, for example  $\text{Na}^+$  or  $\text{Cl}^-$ .

When an element loses or gains electrons, it becomes an ion.

Metals lose electrons to become positively charged.

Non-metals gain electrons to become negatively charged.

Group 1 and 2 elements lose electrons and group 6 and 7 elements gain electrons.

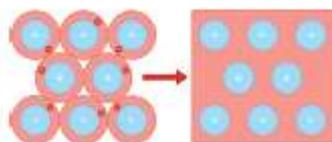
| Group | Ions | Element Example                                      |
|-------|------|--|
| 1     | +1   | $\text{Li} \rightarrow \text{Li}^+ + \text{e}^-$     |
| 2     | +2   | $\text{Ca} \rightarrow \text{Ca}^{2+} + 2\text{e}^-$ |
| 6     | -2   | $\text{Br} + \text{e}^- \rightarrow \text{Br}^-$     |
| 7     | -1   | $\text{O} + 2\text{e}^- \rightarrow \text{O}^{2-}$   |

## Metals and Non-metals

Metals are found on the left-hand side of the periodic table. Metals are strong, shiny, malleable and good conductors of heat and electricity. On the other hand, non-metals are brittle, dull, not always solids at room temperature and poor conductors of heat and electricity. Non-metals are found on the right-hand side of the periodic table.

## Metallic Bonding

Metallic bonding occurs between **metals only**. Positive metal ions are surrounded by a sea of **delocalised electrons**. The ions are tightly packed and arranged in rows.



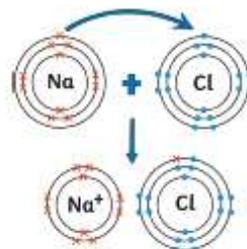
There are strong electrostatic forces of attraction between the positive metal ions and negatively charged electrons.

Pure metals are too soft for many uses and are often mixed with other metals to make alloys. The mixture of the metals introduces different-sized metal atoms. This **distorts the layers** and prevents them from sliding over one another. This makes it harder for alloys to be bent and shaped like pure metals.



## Ionic Bonding

Ionic bonding occurs between a metal and a non-metal. Metals lose electrons to become positively charged. Opposite charges are attracted by electrostatic forces – an ionic bond.



## Ionic Compounds

Ionic compounds form structures called giant lattices. There are **strong electrostatic forces of attraction** that act in all directions and act between the **oppositely charged ions** that make up the giant ionic lattice.



## Properties of Ionic Compounds

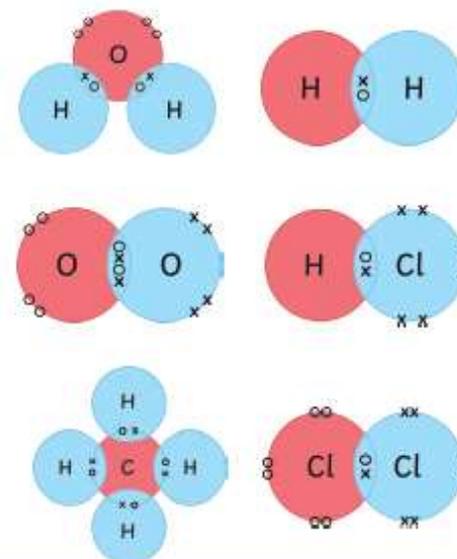
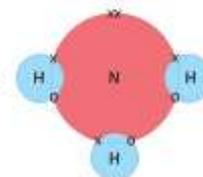
- High melting point – lots of energy needed to overcome the electrostatic forces of attraction.
- High boiling point
- **Cannot conduct electricity in a solid** as the ions are not free to move.
- Ionic compounds, when **molten** or in **solution**, can **conduct electricity** as the ions are free to move and can carry the electrical current.

## Covalent Bonding

**Covalent bonding** is the sharing of a pair of electrons between atoms to gain a full outer shell. This occurs between **non-metals only**. Simple covalent bonding occurs between the molecules below. Simple covalent structures have **low melting and boiling points** – this is because the **weak intermolecular forces** that hold the molecules together break when a substance is heated, not the strong covalent bonds between atoms. They **do not conduct electricity** as they do not have any free delocalised electrons.

Dot and cross diagrams are useful to show the **bonding in simple molecules**. The **outer electron shell** of each atom is represented as a circle, the circles from each atom overlap to show where there is a **covalent bond**, and the electrons from each atom are either drawn as **dots** or **crosses**. There are **two different types of dot and cross diagram** – one with a circle to represent the outer electron shell and one without.

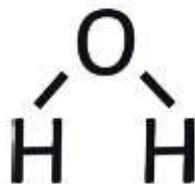
You should be able to draw the dot and cross diagrams for the following simple covalent structures: chlorine, oxygen, nitrogen, water, ammonia, hydrogen chloride and methane.



## AQA GCSE Chemistry (Combined Science) Unit 2: Bonding, Structure and Properties of Matter

## Structural Formulae

In this type of diagram, the element symbol represents the type of atom and the straight line represents the covalent bonding between each atom.

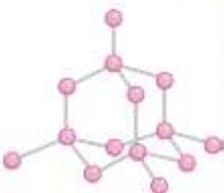


The structure of small molecules can also be represented as a 3D model.

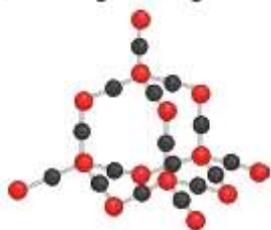


## Giant Covalent Structure – Diamond

Each carbon atom is bonded to four other carbon atoms, making diamond very strong. Diamond has a high melting and boiling point. Large amounts of energy are needed to break the strong covalent bonds between each carbon atom. Diamond does not conduct electricity because it has no free electrons.

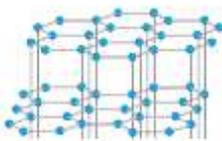


Silicon dioxide (silicon and oxygen atoms) has a similar structure to that of diamond, in that its atoms are held together by strong covalent bonds. Large amounts of energy are needed to break the strong covalent bonds therefore silicon dioxide, like diamond, has a high melting and boiling point.



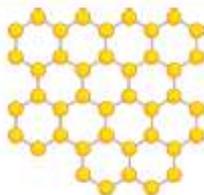
## Giant Covalent Structure – Graphite

Graphite is made up of layers of carbon arranged in hexagons. Each carbon is bonded to three other carbons and has one free delocalised electron that is able to move between the layers. The layers are held together by weak intermolecular forces. The layers of carbon can slide over each other easily as there are no strong covalent bonds between the layers. Graphite has a high melting point because a lot of energy is needed to break the covalent bonds between the carbon atoms. Graphite can conduct electricity.



## Giant Covalent Structure – Graphene

Graphene is one layer of graphite. It is very strong because of the covalent bonds between the carbon atoms. As with graphite, each carbon in graphene is bonded to three others with one free delocalised electron. Graphene is able to conduct electricity. Graphene, when added to other materials, can make them even stronger. Useful in electricals and composites.



## Nanoscience

Nanoscience refers to structures that are 1–100nm in size, of the order of a few hundred atoms. Nanoparticles have a high surface area to volume ratio. This means that smaller amounts are needed in comparison to normal sized particles. As the side length of a cube decreases by a factor of 10, the surface area to volume ratio increases approximately

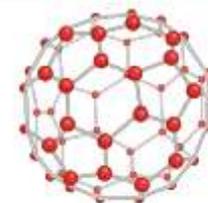
| Name of Particle                     | Diameter     |
|--------------------------------------|--------------|
| nanoparticle                         | 1–100nm      |
| fine particles (PM <sub>2.5</sub> )  | 100–2500nm   |
| coarse particles (PM <sub>10</sub> ) | 2500–10000nm |

## Polymers

Polymers are long chain molecules that are made up of many smaller units called monomers. Atoms in a polymer chain are held together by strong covalent bonds. Between polymer molecules, there are intermolecular forces. Intermolecular forces attract polymer chains towards each other. Longer polymer chains have stronger forces of attraction than shorter ones therefore making stronger materials.

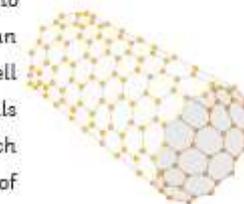
## Fullerenes and Nanotubes

Molecules of carbon that are shaped like hollow tubes or balls, arranged in hexagons of five or seven carbon atoms. They can be used to deliver drugs into the body.



Buckminsterfullerene has the formula C<sub>60</sub>.

Carbon Nanotubes are tiny carbon cylinders that are very long compared to their width. Nanotubes can conduct electricity as well as strengthening materials without adding much weight. The properties of carbon nanotubes make them useful in electronics and nanotechnology.



## Possible Risks of Nanoparticles

As nanoparticles are so small, it makes it possible for them to be inhaled and enter the lungs. Once inside the body, nanoparticles may initiate harmful reactions and toxic substances could bind to them because of their large surface area to volume ratio. Nanoparticles have many applications. These include medicine, cosmetics, sun creams and deodorants. They can also be used as catalysts.

Modern nanoparticles are a relatively new phenomenon therefore it is difficult for scientists to truly determine the risks associated with them.

AQA Physics (Combined Science) Unit 6.1: Energy

**Efficiency**

Non-renewable – coal, oil, gas - they will all run out, they damage the environment, but provide most of the energy.

Renewable – they will never run out, can be unreliable and do not provide as much energy.

| Energy Resource                            | Advantages   | Disadvantages  |
|--|--|--|
| solar – using sunlight                     | Renewable, no pollution, in sunny countries it is very reliable.                                       | Lots of energy needed to build, only works during the day, cannot increase power if needed.                                |
| geothermal – using the energy of hot rocks | Renewable and reliable as the rocks are always hot. Power stations have a small impact on environment. | May release some greenhouse gases and only found in specific places.   |
| wind – using turbines                      | Renewable, no pollution, no lasting damage to the environment, minimal running cost.                   | Not as reliable, do not work when there is no wind, cannot increase supply if needed.                                      |
| hydroelectric – uses a dam                 | Renewable, no pollution, can increase supply if needed.  | A big impact on the environment. Animals and plants may lose their habitats.   |
| wave power – wave powered turbines         | Renewable, no pollution.   | Disturbs the seabed and habitats of animals. Unreliable.   |
| tidal barrages – big dams across rivers    | Renewable, very reliable, no pollution.  | Changes the habitats of wildlife, fish can be killed in the turbines.  |
| biofuels                                   | Renewable, reliable, carbon neutral.   | High costs, growing biofuels may cause a problem with regards to space, clearance of natural forests.                      |
| non-renewable – fossil fuels               | Reliable, enough to meet current demand, can produce more energy when there is more demand.            | Running out, release CO <sub>2</sub> , leading to global warming, and also release SO <sub>2</sub> which causes acid rain. |

**Trends in energy resources** – most of our electricity is generated by burning fossil fuels and nuclear. The UK is trying to increase the amount of renewable energy resources. The governments are aware that non-renewable energy resources are running out; targets of renewable resources have been set. Electric and hybrid cars are also now on the market.

However, changing the fuels we use and building renewable power plants cost money. Many people are against the building of the plants near them and do not want to pay the extra in their energy bills. Hybrid and electric cars are also quite expensive.

## Year 9 French Term 3: Moi dans le monde

| Tu as le droit de... ?                                    | A        | You have the right to...?                                |
|---|----------|--|
| J'ai le droit de sortir avec mes copains                  | 1        | I have the right to go out with my friends               |
| si je rentre avant dix heures du soir. Cependant          | 2        | if I return before ten o'clock in the evening. However,  |
| je n'ai pas le droit de jouer à des jeux vidéo            | 3        | I am not allowed to play video games                     |
| si je n'ai pas fait mes devoirs, ce qui est énervant.     | 4        | if I have not done my homework, which is annoying.       |
| Quand j'étais plus jeune,                                 | 5        | When I was younger,                                      |
| mes parents étaient plus stricts,                         | 6        | my parents were more strict,                             |
| mais maintenant ils me laissent plus de liberté.          | 7        | but now they give me more freedom                        |
| donc on s'entend bien.                                    | 8        | so we get on well.                                       |
| <b>Quelles sont tes priorités ?</b>                       | <b>B</b> | <b>What are your priorities?</b>                         |
| Ce qui est important pour moi dans la vie                 | 9        | What is important for me in life                         |
| c'est mes amis et le sport                                | 10       | is my friends and sport                                  |
| car je suis très sociable et sportive.                    | 11       | because I am very sociable and sporty.                   |
| Par contre, ce qui me préoccupe                           | 12       | However, what worries me                                 |
| c'est l'état de la planète et le changement climatique    | 13       | is the state of the planet and climate change            |
| parce qu'on détruit la planète                            | 14       | because we are destroying the planet                     |
| et cela peut mener à la disparation des espèces.          | 15       | and that can lead to the extinction of species           |
| tels que les pandas et les tigres.                        | 16       | such as pandas and tigers.                               |
| <b>Tu vas l'acheter ?</b>                                 | <b>C</b> | <b>You're going to buy it?</b>                           |
| Normalement, si on produit est bon marché                 | 17       | Normally if a product is cheap                           |
| je l'achète, car le prix est la chose la plus importante. | 18       | I buy it, because the price is the most important thing. |
| Cependant, à l'avenir je vais acheter                     | 19       | However, in the future I am going to buy                 |
| des produits écologiques et du commerce équitable         | 20       | products 'eco friendly' and fair trade                   |
| car il faut protéger l'environnement                      | 21       | because one must protect the environment                 |
| et les droits des ouvriers.                               | 22       | and the rights of workers                                |
| Bien que ce soit plus cher, ça vaut la peine.             | 23       | Although it's more expensive, it's worth it.             |
| <b>Qu'est-ce qui te rend heureux/se ?</b>                 | <b>D</b> | <b>What makes you happy?</b>                             |
| Ce qui me rend heureux/se c'est                           | 24       | What makes me happy is                                   |
| d'être avec mes copains et de s'amuser ensemble.          | 25       | being with my friends and having fun together.           |
| Pour moi, l'amitié, c'est le bonheur.                     | 26       | For me friendship is happiness.                          |
| C'est important aussi d'avoir des bonnes notes            | 27       | It is also important to have good grades                 |
| car si je réussis mes examens,                            | 28       | because if I succeed in my exams                         |
| j'aurai un bon emploi et puis je serai riche !            | 29       | I will have a good job and then I will be rich !         |
| De plus, j'aime faire du bénévolat                        | 30       | Moreover, I like to do voluntary work                    |
| car on a une responsabilité d'aider les autres.           | 31       | because we have a responsibility to help others.         |

| Sentence builder 1 – L'environnement : Quels sont les problèmes / les solutions ?   |  |                                 |   |   |  |
|---|--|---------------------------------|---|---|--|
| <b>Pour moi</b><br>For me<br><br><b>Selon moi</b><br>In my view<br><br><b>À mon avis</b><br>In my opinion<br><br><b>Je dirais que</b><br>I would say that   | <b>le plus grand problème / le problème le plus sérieux</b><br>the biggest/most serious problem<br><br><b>pour la planète</b><br>for the planet<br><b>l'environnement</b><br>the environment<br><b>les gens</b><br>people<br><b>le monde</b><br>the world<br><br><b>un autre problème préoccupant inquiétant</b><br>another worrying problem | <b>c'est</b><br>is              | <b>la pollution de l'air</b><br>air pollution   | <b>parce qu'</b><br><br><b>parce que</b><br>because                             | <b>on détruit la planète.</b><br>we are destroying the planet.<br><b>ça contribue à l'effet de serre</b><br>it contributes to the greenhouse effect<br><b>la destruction de la couche d'ozone.</b><br>the destruction of the ozone layer.<br><b>c'est mauvais pour la santé</b> it's bad for your health   |
|   |  |                                 | <b>le réchauffement climatique</b><br>climate change  | <b>parce que</b><br>because   | <b>c'est catastrophique.</b> it's catastrophic.<br><b>cela peut mener à des inondations</b><br>this could lead to floods / wildfires / drought.<br><b>des incendies / de la sécheresse.</b>  |
|   |  |                                 | <b>la destruction des forêts tropicales</b><br>the destruction of the rainforests                       | <b>puisque</b><br>because/<br>since<br><br><b>étant donné que</b><br>given that | <b>les arbres nous donnent de l'oxygène</b><br>trees give us oxygen which is essential for life<br><b>ce qui est essentiel pour la vie,</b><br>and we cut them down every day.<br><b>et nous les coupons tous les jours.</b><br><b>cela pourrait mener à la disparition des espèces,</b><br><b>tels que les pandas.</b><br>this could lead to the extinction of species, such as pandas. |
|   |  |                                 | <b>le manque d'eau potable</b><br>lack of drinking water  | <b>car</b><br>because   | <b>beaucoup de personnes n'ont pas</b><br>a lot of people do not have<br><b>accès à cette ressource vitale</b><br>access to this vital resource<br><b>assez de nourriture</b> enough food<br><b>à cause de la pauvreté.</b> due to poverty.  |
| <b>Ce qui m'inquiète le plus/aussi c'est</b><br>What worries me the most/also is  | <b>la faim</b><br>hunger   |                                 |   |   |  |
| <b>On peut / on doit</b><br>we can / we must<br><b>On pourrait / on devrait</b><br>we could / we should<br><b>Il faut</b> one must<br><b>Il est important de</b> It's important to<br><b>J'essaie de</b> I try to<br><b>Je fais un effort pour</b><br>I make an effort to | <b>trier les déchets</b> sort rubbish<br><b>faire du recyclage</b> do recycling  | <b>au lieu de</b><br>instead of | <b>générer plus de déchets.</b><br>generating more rubbish.   |   |  |
|   | <b>éteindre la lumière en quittant une pièce</b><br>turn off the light when leaving a room<br><b>fermer le robinet le plus vite possible</b> turn off the tap ASAP   |                                 | <b>consommer / gaspiller</b> consuming / wasting<br><b>plus d'énergie / d'eau.</b> more energy / water. |   |  |
|   | <b>acheter des produits verts / réutilisables</b><br>buy green / reusable products   |                                 | <b>des produits jetables.</b> throwaway products.   |   |  |
|   | <b>privilégier les transports en commun / le covoiturage</b><br>choose public transport / carpooling   |                                 | <b>la voiture.</b> the car.   |   |  |

| Sentence builder 2 – Ethical / fair trade shopping ( <i>le commerce équitable</i> ) & volunteering ( <i>le travail bénévole / le bénévolat</i> ) |  |                                   |   |
|--|--|-----------------------------------|---|
| <b>Que penses-tu du 'commerce équitable' ?</b>   |  |                                   |   |
| <b>Pour moi</b><br>For me  | <b>le commerce équitable est</b><br>ethical / fair trade shopping is   | <b>important</b>                  | <b>parce que</b><br>because   |
| <b>Selon moi</b><br>In my view   |  | <b>essentiel</b>                  | <b>car</b><br>because   |
| <b>À mon avis</b><br>In my opinion   |  | <b>responsable</b><br>responsible | <b>puisque</b><br>since   |
| <b>Je dirais que</b><br>I would say that   |  | <b>obligatoire</b><br>obligatory  | <b>parce qu'</b><br>because   |
|  |  | <b>logique</b><br>logical         | <b>car</b><br>because   |
|  |  | <b>éthique</b><br>ethical         | <b>puisque</b><br>since   |
|  |  |                                   | <b>bien que ce soit plus cher, ça vaut la peine.</b> although it is more expensive, it is worth it.   |
|  |  |                                   | <b>les produits pas chers sont souvent fabriqués dans des conditions de travail inacceptables.</b><br>cheap products are often made in unacceptable conditions. |
|  |  |                                   | <b>sinon trop de travailleurs seront exploités / sous-payés.</b><br>if not too many workers will be exploited / underpaid.                                      |
|  |  |                                   | <b>c'est mieux d'acheter quelque chose de qualité.</b><br>it's better to buy something quality.   |
|  |  |                                   | <b>il faut forcer les grandes marques à garantir un salaire minimum.</b><br>one must force the big brands to guarantee a minimum salary.                        |
|  |  |                                   | <b>il faut réfléchir sur l'impact sur l'environnement.</b><br>one must reflect on the impact on the environment.  |
|  |  |                                   | <b>il faut respecter l'environnement et les droits de l'homme à la fois.</b><br>one must respect the environment and human rights at the same time.             |
| <b>Fais-tu du bénévolat ? Pourquoi ?</b>   |  |                                   |   |
| <b>De temps en temps</b><br>From time to time  | <b>je travaille avec</b> I work with   | <b>parce que</b><br>because       | <b>on a une responsabilité d'aider les autres.</b><br>we have a responsibility to help others.  |
| <b>Une fois par semaine</b><br>Once a week   | <b>les enfants à l'école</b> children at school  | <b>car</b><br>because             | <b>c'est important de participer à la vie en société.</b><br>it's important to participate in society life.   |
|  | <b>les animaux au refuge</b> animals at the shelter  | <b>puisque</b><br>since           | <b>j'aime développer des nouvelles compétences.</b><br>I like to develop new skills.  |
|  | <b>les sans-abris dans la rue</b> the homeless in the street   |                                   | <b>j'aime rencontrer de nouvelles personnes.</b><br>I like to meet new people.  |
|  | <b>les personnes âgées / les malades à l'hôpital</b><br>old people / sick people in the hospital                                       |                                   | <b>c'est une expérience enrichissante / gratifiante.</b><br>it's an enriching / rewarding experience.   |
|  | <b>je participe à un projet de conservation où je plante des arbres</b><br>I participate in a conservation project where I plant trees |                                   | <b>ça me donne plus de confiance en moi.</b><br>it gives me more self-confidence.   |

## Describing a photo

### 'Sur la photo il y a' + noun

(remember article – un/une/des – e.g. *des arbres, des bâtiments, des voitures*)

**People** - 'Sur la photo il y a' *un homme; une femme; un garçon, une fille, beaucoup de personnes...*

**Action** – 'ils/elles sont en train de' + infinitive verb (*sourire, faire, parler...*)

**Location** - ils/elles sont *au parc, en ville, dans la rue, au collège, dans un bureau...*

**Mood** - Ils sont contents

Elles sont contentes (they are happy)

**Weather** - Il fait beau (it is nice weather)

**Opinion** – J'aime cette photo parce que...

### 'The 4 Js': 3 tenses!!

- 1) J'aime + infinitive (present) *I like to...*
- 2) J'ai décidé de + infinitive (past) *I decided to...*
- 3) Je vais + infinitive (near future) *I am going to...*
- 4) Je voudrais + infinitive (future) *I would like to...*

### Infinitives

- 1) -ER
- 2) -IR
- 3) -RE

| PRESENT              | PERFECT PAST TENSE            | NEAR FUTURE                            |
|----------------------|-------------------------------|--|
| je joue (I play)     | j'ai joué (I have played)     | je vais jouer (I am going to play)     |
| je regarde (I watch) | j'ai regardé (I have watched) | je vais regarder (I am going to watch) |
| j'écoute (I listen)  | j'ai écouté (I have listened) | je vais écouter (I am going to listen) |
| je mange (I eat)     | j'ai mangé (I have eaten/ate) | je vais manger (I am going to eat)     |
| je lis (I read)      | j'ai lu (I have read)         | je vais lire (I am going to read)      |
| je fais (I do)       | j'ai fait (I did/have done)   | je vais faire (I am going to do)       |
| je bois (I drink)    | j'ai bu (I have drunk/drank)  | je vais boire (I am going to drink)    |
| je prends (I take)   | j'ai pris (I have taken/took) | je vais prendre (I am going to take)   |
| j'ai (I have)        | j'ai eu (I have had)          | je vais avoir (I am going to have)     |
| je suis (I am)       | j'ai été (I have been/was)    | je vais être (I am going to be)        |
| je vais (I go)       | je suis allée (I went)        | je vais aller (I am going to go)       |
| je sors (I go out)   | je suis sortie (I went out)   | je vais sortir (I am going to go out)  |
| je reste (I stay)    | je suis restée (I stayed)     | je vais rester (I am going to stay)    |

| PRESENT<br>(what you do) | IMPERFECT<br>(what you did/used to do) | CONDITIONAL<br>(what you would do) | FUTUR SIMPLE<br>(what you will do) |
|--------------------------|--|------------------------------------|------------------------------------|
| je suis (I am)           | j'étais (I was/used to be)             | je serais (I would be)             | je serai (I will be)               |
| j'ai (I have)            | j'avais (I had/used to have)           | j'aurais (I would have)            | j'aurai (I will have)              |
| je fais (I do)           | je faisais (I did/used to do)          | je ferais (I would do)             | je ferai (I will do)               |
| je vais (I go)           | j'allais (I went/used to go)           | j'irais (I would go)               | j'irai (I will go)                 |
| je joue (I play)         | je jouais (I used to play)             | je jouerais (I would play)         | je jouerai (I will play)           |
| je mange (I eat)         | je mangeais (I used to eat)            | je mangerais (I would eat)         | je mangerai (I will eat)           |
| c'est (it is)            | c'était (it was)                       | ce serait (it would be)            | ce sera (it will be)               |
| il y a (there is)        | il y avait (there was)                 | il y aurait (there would be)       | il y aura (there will be)          |

### Checking your writing

- Do you have 3 tenses – multiple correct examples?
- At least 3 opinions + reasons?
- Adjective endings correct?
- WOW phrases?

# Geography

Diagrams showing temperature change and ice volume change over hundreds of thousands of years, highlighting the differences between glacial and inter-glacial periods:

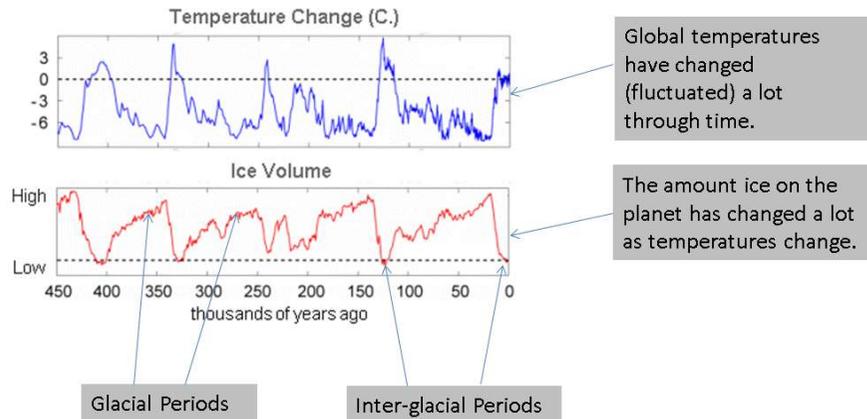
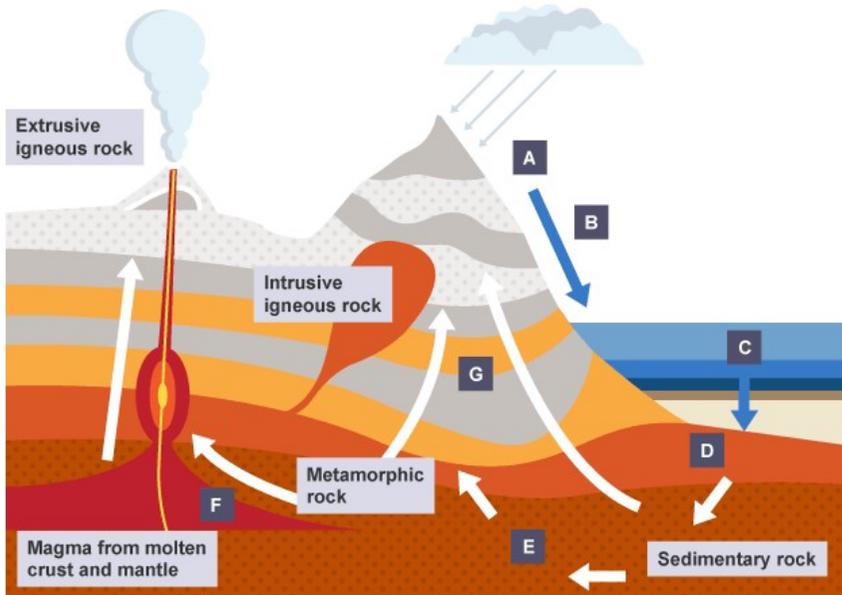


Diagram of the Rock Cycle:



- |  |  |                                     |
|--|--|-------------------------------------|
| <b>A</b> Weathering and erosion        | <b>D</b> Compaction and cementation              | <b>F</b> Melting                    |
| <b>B</b> Transportation and deposition | <b>E</b> Burial, high temperatures and pressures | <b>G</b> Slow uplift to the surface |
| <b>C</b> Sedimentation                 |  |                                     |

| Keyword(s)                  | Definition  |
|-----------------------------|---|
| <b>Geology</b>              | The branch of science which deals with the physical structure and substance of the earth.   |
| <b>Geological Time</b>      | The Earth is thought to be 4,600 million years old. Life is believed to have become dominant on earth 542 million years ago. The geological periods relate to events which have happened in the Earth's history. For example, during the <b>carboniferous period</b> there were tropical weather conditions in the UK and coal and limestone were formed. |
| <b>Glacial Period</b>       | A period in the earth's history where it was very cold and there were large volumes of ice on the earth's surface.  |
| <b>Inter-glacial Period</b> | A period in earth's history where it was warmer and there the volume of ice on the earth's surface was much lower.  |
| <b>Igneous</b>              | <b>Igneous rocks</b> are formed by magma from the molten interior of the Earth.   |
| <b>Sedimentary</b>          | <b>Sedimentary rocks</b> are formed from sediments that have settled at the bottom of a lake, sea or ocean, and have been compressed over millions of years. The sediment comes from eroded rocks carried there by rivers or ice, and from the skeletons of sea creatures.  |
| <b>Metamorphic</b>          | <b>Metamorphic rocks</b> have been subjected to tremendous heat and/or pressure, causing them to change into another type of rock.  |
| <b>Geological Features</b>  | The features (things we can see) that make up the physical structure and substance of the earth.  |
| <b>Gorge</b>                | A narrow valley between hills or mountains, typically with steep rocky walls.   |
| <b>Fault</b>                | A gently curved <b>fracture</b> in the rocks of Earth's crust, where compressional forces cause relative displacement of the rocks on the opposite sides of the <b>fracture</b> .   |
| <b>Valley</b>               | A low area of land between hills or mountains, typically with a river or stream flowing through it.   |

Image of Cheddar Gorge:



Image of a U-Shaped Valley:



Image of a Fault:



## Glaciers

|                              |   |
|------------------------------|---|
| Erosion:<br>Abrasion         | Abrasion occurs when the glacier wears down rock beneath it, using scree that is frozen into the ice, to leave behind a smoother, deeper valley.              |
| Erosion:<br>Plucking         | Plucking occurs when the glacier freezes onto sections of rock which it then removes as it moves down the valley, leaving behind a rough surface.             |
| Deposition:<br>Till          | Unsorted (all different shapes and sizes), deposited by a melting and retreating glacier.   |
| Deposition:<br>Outwash       | Sorted (organised by size, biggest material deposited closest to the glacier), deposited by streams that flow from the glacier (meltwater streams).           |
| Landform:<br>U-shaped valley | A glacier carves a U-shaped valley by eroding interlocking spurs on a V-shaped valley. A U-shaped valley is a deep valley with a flat bottom and steep sides. |
| Landform:<br>Corrie          | A corrie is an "armchair-shaped hollow", eroded out of the rock by a glacier. Sometimes it has a tarn in it.  |

| Keyword(s)                    | Definition   |
|-------------------------------|--|
| <b>Erosion</b>                | The removal of rock by ice, water, wind or gravity.  |
| <b>Weathering</b>             | The breakdown of rock in situ (on site).   |
| <b>Transportation</b>         | The movement (transportation) of rocks, sediment and other materials by a glacier or river.  |
| <b>Deposition</b>             | When a glacier or river drops what it has been carrying.   |
| <b>Arête</b>                  | An <b>arête</b> is a knife-edge ridge. It is formed when two neighbouring corries run back to back. As each glacier erodes either side of the ridge, the edge becomes steeper and the ridge becomes narrower, e.g Striding Edge found on Helvellyn in the Lake District. |
| <b>Glacial Trough</b>         | Glaciers cut distinctive <b>U-shaped</b> valleys with a flat floor and steep sides.  |
| <b>Freeze-Thaw Weathering</b> | A repeated process of water freezing and thawing, causing rocks to split.  |
| <b>Biological Weathering</b>  | Plants and animals can also have an effect on rocks. Roots burrow down, weakening the structure of the rock until it breaks away.  |
| <b>Chemical Weathering</b>    | Rainwater and seawater can be a weak acid. If a coastline is made up of rocks such as limestone or chalk, over time they can become dissolved by the acid in the water.  |
| <b>Mass Movement</b>          | Large movements of soil and rock debris down slopes.   |
| <b>Coastal Erosion</b>        | The loss or displacement of land along the coastline.  |

Diagram explaining the process of freeze-thaw weathering:

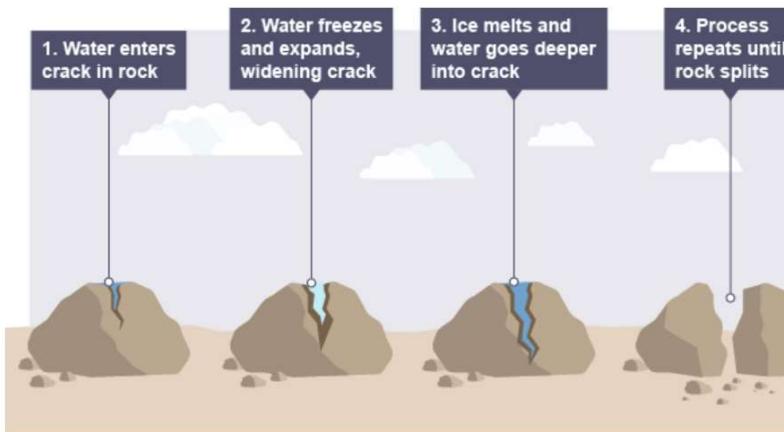


Diagram explaining the process of biological weathering:

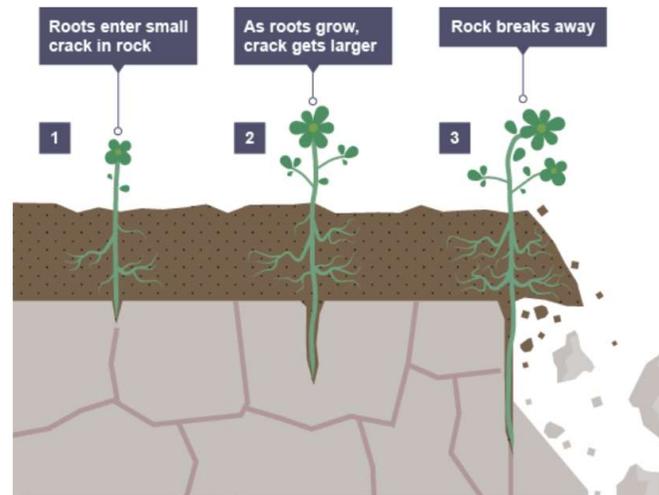
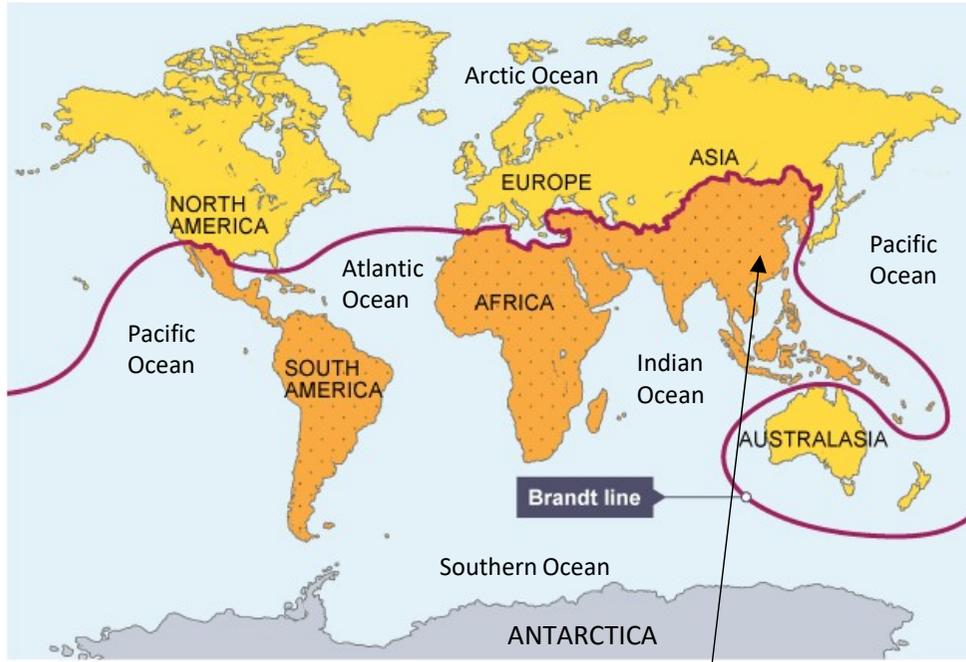


Image showing an example of chemical weathering:



Chemically-weathered limestone

Comparing Places:



| Keyword(s)                          | Definition   |
|-------------------------------------|--|
| <b>Development Indicator</b>        | Used to measure the quality of life in a particular country e.g. literacy rate, GDP per capita, infant mortality rate etc.         |
| <b>Life Expectancy</b>              | The average age that people die.   |
| <b>Gross Domestic Product (GDP)</b> | The total value of all the goods and services a country produces in a year. Measured in US\$ so that each country can be compared. |
| <b>GDP per capita</b>               | The GDP divided by the population. It gives you an idea of how well-off people are, on average. Measured in US\$.                  |
| <b>Population Density</b>           | A measurement of population per unit area e.g. how many people live in a square kilometre.   |
| <b>Public Transport</b>             | Buses, trains and other forms of transport that are widely available to the public.  |
| <b>Quality of Life</b>              | The standard of health, comfort, and happiness experienced by an individual or group.  |
| <b>Unemployment Rate</b>            | The percentage (%) of people without a job in an economy.  |
| <b>Population Growth</b>            | An increase in the number of people living in a particular place e.g. town, city or country.                                       |
| <b>Environmental Factors</b>        | Things to do with the surroundings or conditions in which a person lives e.g. air pollution in a city.                             |

Images of Beijing:

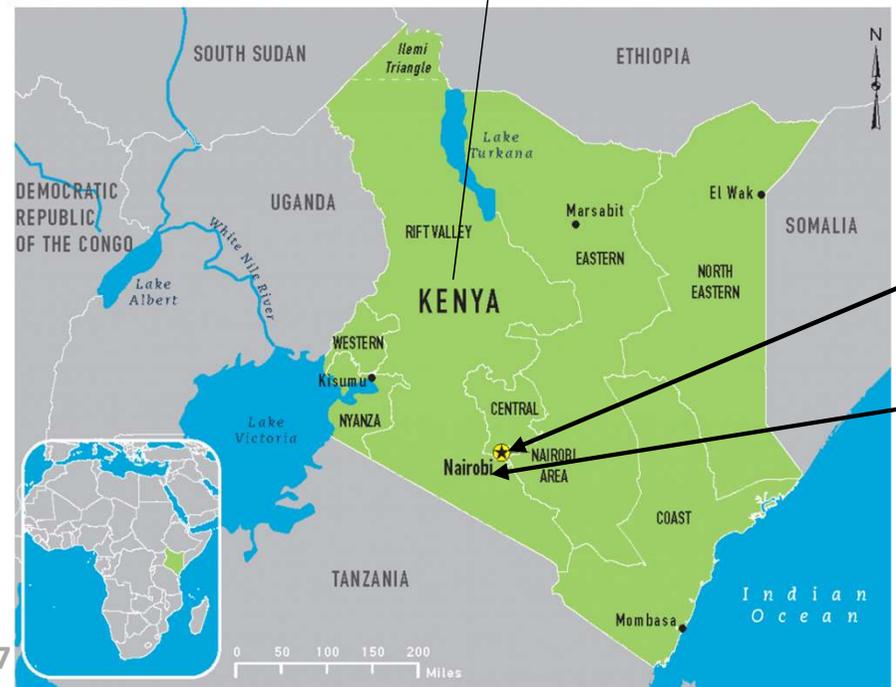


# Geography

## Comparing Places:



- Rich north
- Poor south



| Keyword(s)                     | Definition   |
|--------------------------------|--|
| <b>Tertiary Education</b>      | Education for people above school age, including college, university, and vocational courses.                                |
| <b>Children's Rights</b>       | In a broad sense, the <b>rights of children</b> to live free from hunger, abuse, neglect, and other inhumane conditions.     |
| <b>Educational Opportunity</b> | Opportunities that aim to enable individuals to acquire knowledge and certain skills that will support their life chances.   |
| <b>Evaluation</b>              | The process of judging or calculating the quality, importance, amount, or value of something.                                |
| <b>Comparative Analysis</b>    | A study that compares two things. In this case, the comparative analysis compares life in Nairobi, Kenya and Beijing, China. |

### Images of Nairobi:



### The Nairobi National Park – South of Nairobi:





# History

## Term Three. Year 9 History: The Holocaust

There were different groups of people who participated in/ were forced to participate in The Holocaust. These groups were:

**Perpetrators:** People who carried out illegal and immoral acts.

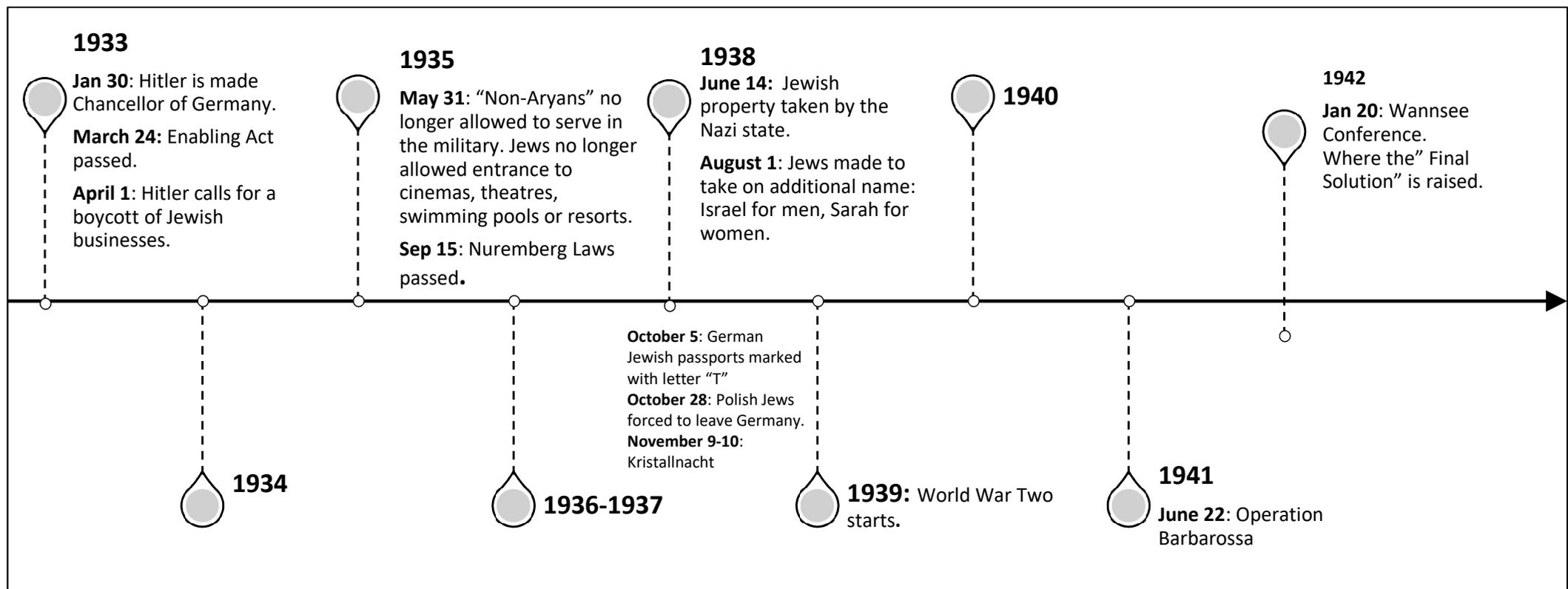
**Victims:** People who were harmed or killed by actions of the Perpetrators.

**Bystanders:** People who knew about the crimes being committed but did nothing about it.

**Resisters:** People who disobeyed the Nazi states and tried to help the victims. Some of the resisters were Jewish people inside of the concentration camps.

**Defining The Holocaust:** The word Holocaust literally means sacrificing by fire from Greek. The Holocaust is used to describe the systematic annihilation of Jewish people that took place between 1935 and 1945 across Nazi occupied Europe. The systematic destruction of Jewish people was escalated after the 1942 "Final Solution" was enacted. Other groups were targeted by the same regime including disabled people, the LGBTQ+ community, political opponents and Roma/ Sinti communities.

**Why were the Jewish people targeted?** In Europe there was a long history of Antisemitism before the Nazi Party took control of Germany in 1933. Antisemitism is a certain perception of Jews, which may be expressed as hatred toward Jews. Rhetorical and physical manifestations of antisemitism are directed toward Jewish or non-Jewish individuals and/or their property, toward Jewish community institutions and religious facilities. There are recordings of Antisemitism from 250 AD. Jewish people have been expelled from their homes; the religious buildings burnt-down and their communities attacked or they were forced to convert to other religions.



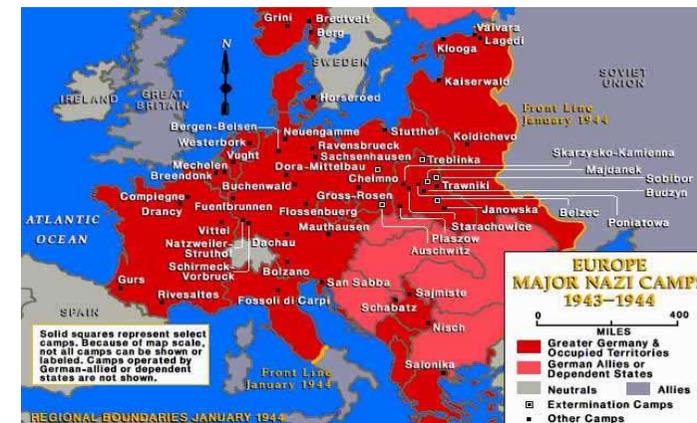


# History

**Ghettos:** Are areas of a city which were walled and where Jewish people were forced to live. The Nazis and their supporters built Ghettos across the areas that they occupied. The Ghettos were used to house Jewish people in inhumane conditions and to limit their ability to be apart of society. Everything happened inside the ghettos for example schooling took place inside the Ghettos walls and people were unable to move freely between the Ghetto and the outside city. Ghettos were frequently patrolled so that people could not escape. Ghettos were used to contain people often before they were taken to Concentration/ Death camps.

There were two primary ways that the Holocaust was perpetrated; in Concentration / Death Camps and by the Einsatzgruppen who committed the "Holocaust by Bullets". The three most deadly camps were: Auschwitz-Birkenau (1.5 million victims), Treblinka (900,000 victims) and Belzec (600,000 victims). The Holocaust by Bullets killed between 1.5 million and 2 million people, who were primarily Jewish.

| Key Vocabulary     | Definition   |
|--------------------|--|
| Holocaust          | The systematic destruction and annihilation of the Jewish people across Nazi occupied Europe.  |
| Genocide           | The systematic destruction, in part or in whole, of a group of people based on their religion, ethnicity, race or nationality. Genocide may also include the forcible removal of children from a group or the eradication of their culture   |
| Antisemitism       | A certain perception of Jews, which may be expressed as hatred toward Jews. Rhetorical and physical manifestations of antisemitism are directed toward Jewish or non-Jewish individuals and/or their property, toward Jewish community institutions and religious facilities.                                      |
| Ghetto             | Walled area of a city where minorities were imprisoned.  |
| Einsatzgruppen     | Paramilitary death squads who perpetrated the Holocaust by Bullets in Eastern Europe.  |
| Concentration Camp | internment centre for political prisoners and members of national or minority groups who are confined for reasons of state security, exploitation, or punishment, usually by executive decree or military order. They are different to Death or Extermination camps where people would be systematically murdered. |
| Kristallnacht      | The night of the broken glass was a pogrom against Jewish businesses in Germany carried out by paramilitary members and civilians between 9th-10 <sup>th</sup> of November.  |





# History

## Term Three. Year 9 History: Civil Rights.

| Key Events  |   |
|-------------|---|
| 1861-1865   | American Civil War, between the united states in the north and the confederate states in the south. |
| 14 May 1954 | Brown vs Board of Education ends segregation in schools based on race.                              |
| 1 Dec 1955  | Rosa Parks sparks the Montgomery bus boycott after refusing to give her seat up for a white man.    |
| 4 Sep 1957  | The Little Rock Nine students are blocked from entering a previously whites only school.            |
| 28 Aug 1963 | Over 250,000 people 'March on Washington'. Martin Luther King gives his I have a dream speech.      |
| 2 Jul 1964  | The Civil Rights Act of 1964 is signed.   |
| 21 Feb 1965 | Malcolm X assassinated  |
| 4 Apr 1968  | Martin Luther King is assassinated  |
| 11 Apr 1968 | The civil Rights Act of 1968 is signed  |
| 15 Jul 2013 | #BlackLivesMatter is used on Twitter for the first time.  |
| 25 May 2020 | George Floyd is murdered by Minneapolis police.   |

| Key People & Groups   |  |
|-----------------------|--|
| Dr Martin Luther King | A national leader for the civil rights movement, assassinated in 1968.   |
| Rose Parks            | Civil Rights Activist who refused to give up her seat on a segregated bus.   |
| Lyndon Johnson        | President (1963-1969) who passed the Civil Rights Acts of 1964 and 1968  |
| Malcolm X             | American Muslim leader and human rights activist. Assassinated in 1965.  |
| The Ku Klux Klan      | A white supremacist group who specifically target African Americans.   |
| Black Panther Party   | Was a political organization, founded in 1966 by Huey Newton and Bobby Seale, to challenge police brutality against the African American community.                        |
| Michael Brown         | Black teenager killed by white police officer during his arrest.   |
| Barack Obama          | The 44 <sup>th</sup> President of the United States of America and the first African American President.   |
| George Floyd          | Black man who was killed by white police officers in Minneapolis in 2020. His death sparked the largest demonstrations against race inequality in the USA since the 1960s. |

| Key Vocabulary | Definition   |
|----------------|--|
| Abolitionist   | A person who opposes (is against) slavery and wants to see it abolished.   |
| Boycott        | To avoid a certain store or service to make a political point.   |
| Civil Rights   | Rights that protect your ability to participate in the civil and political life of the society and state without discrimination or repression. |
| Integration    | Combining different groups of people.  |
| Lynching       | Murdering someone through means of violence; usually hanging.  |
| Jim Crow Laws  | A series of laws in southern states which discriminated against black people.  |
| Segregation    | Separating different groups of people.   |





# History

## Important Legal Documents and Decisions

|  |   |
|--|---|
| The Declaration of Independence (1776) | The document that set out the United State's Independence from the rule of Great Britain. States that "we hold these truths to be self evident that all men are created equal.. that they are endowed by their Creator with certain unalienable rights, that among Life, Liberty and the Pursuit of Happiness." |
| The United States Constitution (1789)  | Laws that govern the United States of America and guarantees the rights of its citizens.  |
| The Emancipation Proclamation (1863)   | During the American Civil War, President Lincoln issues this declaration stating that "all persons, held as slaves ... are and henceforth shall be free."   |
| Plessy vs Ferguson (1896)              | The ruling that separate but equal facilities could be provided by states and businesses. This allowed segregation and the Jim Crow Laws.   |
| Brown vs Board of Education            | Oliver brown took the school board of Topeka to court after his daughter was refused admission to a white school. The Supreme Court combined Brown's case with several others ruling that segregation was unfair and that separate did not mean equal.  |
| Civil Rights Act of 1964               | A law that made discrimination illegal in public places, led to the desegregation of schools and public facilities and made employment discrimination illegal.  |
| Civil Rights Act of 1986               | A second law that made it illegal to discriminate against someone when renting or buying houses or property.  |

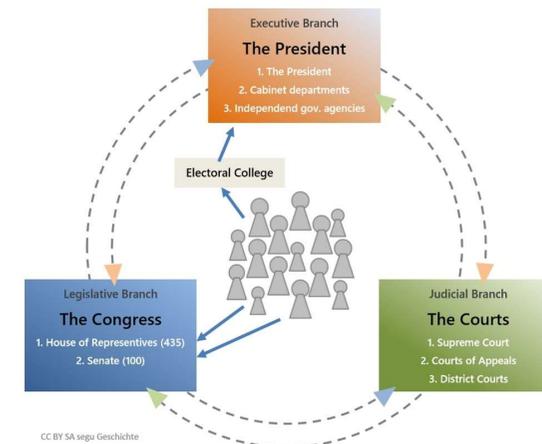
## Enquiry Questions

- What are Civil Rights and who has them?
- Why did people believe in segregation?
- How significant was the Montgomery Bus Boycott for the Civil Rights campaign?
- Was Martin Luther King's leadership the main reason for success in the Civil Rights campaign?
- Did the mass support of the Freedom Marches show things were changing in the 1960s?
- Did Black Power help or hinder the Civil Rights campaign?
- Was the Civil Rights Act of 1964 the beginning or the end of the fight for equality?
- How successful has the Civil Rights campaign been?

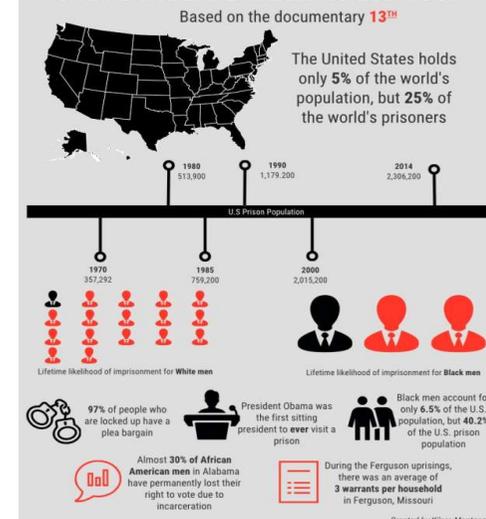
## Further Enquiry Resources

13<sup>th</sup> Documentary – Netflix Michelle Obama's Autobiography "Becoming".  
Podcasts from "This American Life" and "About Race" with Reni-Eddo Lodge

## System of Checks and Balances in the U.S. Government



## Mass Incarceration in the U.S.



Year 9  
Summer Term  
Hinduism

Knowledge Organiser

Key Terms

Hindu: A person who follows the religious tradition of Hinduism

God: In Hinduism, God is a being both within the world and beyond it. One who energises the universe. Hindus believe in one God but do not deny the existence of multiple Gods.

Brahman: The supreme God with three main aspects – called the Trimurti (see below)

Brahma: The creator

Vishnu: The preserver

Shiva: The destroyer

Trimurti: The three aspects of Brahman the Supreme God – Brahma the creator, Vishnu the preserver and Shiva the destroyer

Deity: A supernatural being (something 'more than' human, spiritual) considered to be divine and sacred

Dharma: The natural order of the universe – one's duty in respect of their position in society

Moral Code: The five yamas of ancient Hindu ethics are – non violence, non stealing, truth, celibacy/faithfulness, not being possessive

Duty: Something which a person is morally compelled to do as part of their everyday life

Mandir: The place of worship (temple) for Hindus

Puja: An act of worship/offering made as a part of Hindu rituals

Garbhagriha: Sometimes also called the 'womb room' it is the inner-most part of the temple where idols are securely stored

Ghanta: A ritual bell rung as part of Hindu rituals

Diwali: The Hindu festival of lights, new beginnings, and the triumph of good over evil

Lakshmi: Wife of Vishnu, she is the goddess of wealth, good fortune, youth and beauty



Year 9  
Summer Term  
Hinduism

Knowledge Organiser

Key Questions

What is Hinduism?

- Belief in **Samsara** – the continuous cycle of birth, life, death, and reincarnation
- Belief in only one God, but that God has many forms (confusingly, also called Gods)

What different forms does Brahman take?

- **Brahman** is the ultimate and supreme God. He has many forms. These are often referred to as the **trimurti**:
  - **Brahma** the creator
  - **Vishnu** the preserver
  - **Shiva** the destroyer
- There are hundreds of other deities (aspects) of Brahman that Hindus also pray to.

Should everyone live a 'moral life' like Hindus

- Hindus follow a moral code based on The Five **Yamas** of ancient Hindu beliefs/. These say that followers:
  - Do not steal
  - Do not use violence
  - Tell the truth
  - Be celibate (if unmarried) or faithful to your partner (if married)
  - Not be possessive or jealous of what other people have
- As a guide to life, if everybody followed these five rules, life would be better for everybody!

What happens in a Hindu Temple?

- People often worship as individuals rather than as a group
- Worship could involve making offerings to a **deity** – often something such as water, fruit, flowers etc.
- Worshippers repeat the names of their favourite god/goddess in a mantra
- In the Temple, the priest may recite the '**Vedas**' to the congregation, although it is permitted for any 'twice born' Hindu to do this.
- At the centre of a **mandir**/temple lies a **Garbhagriha**. This is sometimes called the 'womb room' and contains items of spiritual significance

What is celebrated at Diwali?

- The word 'Diwali' means 'rows of lighted lamps.'
- It is known as the 'festival of lights' because shops, homes, businesses and other buildings are decorated with oil lamps
- Although Diwali is linked to the story of **Rama and Sita**, for many, it better honours **Lakshmi**, the Goddess of wealth.
- As well as lighting lamps, Hindus might choose to:
  - Deep clean their homes
  - Wear new clothes
  - Exchange gifts (often sweets and dried fruits)
  - Decorate buildings
  - Let off fireworks



Year 9  
Summer Term  
Sikhism

Knowledge Organiser

Key Terms

Sikh: A follower of the Sikh tradition, Sikhism

Guru: A wise person. There were 10 Gurus who revealed Sikhism to the world

Guru Nanak: The founder of Sikhism. He was born in Punjab in 1469 and died in 1539. He was raised a Hindu and learnt a lot about Islam but could not find a 'spiritual place' in either religion.

Amritsar: A holy city to Sikhs. Home of the Golden Temple, one of the largest and most spectacular temples (gurdwara) in the Sikh tradition – the original Guru Granth Sahib is found here

'There is neither Hindu or Muslim': The idea that Guru Nanak promoted that you could be religious, but not follow the Hindu or Muslim traditions

Guru Granth Sahib: The Sikh holy book. It is considered as having the same status as a living guru

Waheguru: The Sikh name for God. Waheguru spoke to Guru Nanak and told him to teach others to rejoice in God's name

Guru Arjan: He was known for self-sacrifice. He collected the teachings of the first four gurus and published them in a book called the Adi Granth

Guru Gobind Singh: The ninth and final human guru. He told all Sikh men to add the word 'Singh' to their name as it means lion and they should be courageous. Women were to add 'Kaur' to their name as this means princess and they should be treated with respect.

Five K's: Five items that must be worn at all times by devoted Sikhs: Kesh (uncut hair), kangha (wooden comb), kara (steel bangle), kachera (cotton underwear), kirpan (ceremonial sword)

Nishan Sahib Flag: The Sikh holy flag which flies outside most Sikh gurdwaras and many Sikh homes

Gurdwara: A Sikh place of worship/temple

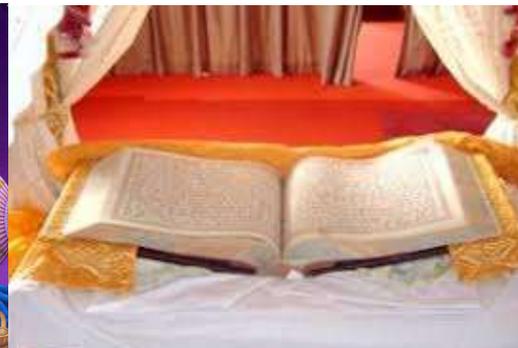
Darbar Sahib: The main meeting hall of a gurdwara. It is where the Guru Granth Sahib is often placed on a throne-like table

Takhat and Channi: The raised platform/throne on which the Guru Granth Sahib is placed, and the canopy which covers this

Pilgrimage: Many Sikhs try to undertake a pilgrimage to the holy city of Amritsar (to visit the Golden Temple) at some point in their lifetime

Community: A very important concept to Sikhs. They try to promote the idea that everyone is equal.

Langar: A community kitchen attached to a gurdwara which makes simple (vegetarian) food for anyone to consume. Sikhs believe everybody is equal, regardless of their race, religion, ethnicity, wealth etc. so anyone is invited to participate in the food from the langar kitchen. In some gurdwaras, everyone sits on the floor to eat to show nobody is 'higher' or more important than anyone else.



RELIGIOUS EDUCATION

What is Sikhism?

- A more modern religion than the others we have studied
- Founded by **Guru Nanak** (1469 – 1593)
- Most people in **Punjab** were either Hindu or Muslim at the time, Sikhism was a new religion for people who could not find their spiritual home in the other two

Who were the Sikh Gurus?

- **10 Gurus** –they were God’s messengers
- Guru Nanak was the first Guru, the founder of Sikhism (although he was born a Hindu)
  - He wanted to bring Hindus and Muslims together, whilst not being either Hindu or Muslim
  - He rejected the **caste system** (which divided Hindus into different groups) and promoted equality
- There were another eight human Gurus
- The 10<sup>th</sup> Guru is the **Guru Granth Sahib** – the Sikh holy book

What is the Guru Granth Sahib?

- It is the Sikh holy book and respected as if it were an important human
- It was created by **Guru Arjan**
- Sikhs believe that the messages within it are the word of **Waheguru** (God) and helps their souls to develop
- The hymns are mostly the words of the first five gurus, although there are also teachings from Hindus and Muslims included in it
- It’s treated with the greatest of respect and is placed on a throne-like table called a **takhat** and covered with a canopy called a **channi**. To show respect:
  - Worshippers must bow to the Guru Granth Sahib and are never to turn their back to it.
  - It is put ‘to bed’ at night time

Why are the Five K’s important to Sikhs?

- Symbols of **belonging**
- Adapted for modern-day life, for example, rather than carry a dagger, modern-day Sikhs may carry a replica or even something like a mobile phone case with a picture of a dagger on it instead!



What happens in a Gurdwara? Why is the Golden Temple so spectacular?

- It is the centre of Sikh community. Everyone is welcome in a **gurdwara**, regardless of who they are!
- A very important space
- Worship takes place in the **gurdwara**, as well as a variety of community events. Some have facilities such as libraries included in them.
- Any building whatsoever which contains the Sikh scriptures can be classed as a **gurdwara**. The most spectacular is the **Golden Temple of Amritsar**. A gold-covered gurdwara in the middle of a pristine lake. All are welcome and it houses one of the world’s largest community kitchens



What can Sikhs teach us about Community?

- Everyone is welcomed and everyone is loved
- Sikhs take their community **duty** very seriously
- Guru Nanak taught Sikhs that everyone should be equal
- **Langar** kitchens are found in most **gurdwaras**. They serve free food to anyone who would like to eat it. People eat on the same seats in rows or on the floor so as nobody is seen as having higher status than anyone else.
- The food is simple, **vegetarian** and nutritious
- Sikhs, wherever they live, seek to be actively involved in community work. Recently, they have fed stranded lorry drivers and made food bags for NHS workers in the Covid crisis.
- Hindus believed strongly in the **caste system** in the time of Guru Nanak. This separated them into groups based on their status. Guru Nanak thought this was **divisive** and taught that everyone has equal value in a **community**
- It is a great honour for a Sikh to use their talents to **serve** a community, for example by becoming a doctor or a nurse, or by doing voluntary work to help others

## MUSIC: COMPOSING FOR FILM

- Films have always been associated with music, from the **SILENT MOVIE** to **ANIMATIONS**; the **HOLLYWOOD GOLDEN AGE** to the **MUSICAL**.
- Many musical **GENRES** including; **POPULAR MUSIC** and **CLASSICAL** scores, as well as **WORLD MUSIC** and **ELECTRONICA**

### Keywords to Use:

- **Mickey-Mousing**

Music and Sound Effects that directly reflect the action on screen.

- **Sound Effect**

Creative non-musical sound to represent something on the screen

- **Soundscape**

The characteristic types of sound commonly heard in a given period or location

**In THREES – pick one keyword each and memorise its meaning. At the end of the lesson your team will need you to know this for the test!**

### Leitmotif: A History

- Originates from Motif ideas of Classical and Romantic Music
- Found within many Operas
- Wagner is most famous for using Leitmotifs in his Operas
- Debussy, Schoenberg and Dvorak are also known for their use of Leitmotif
- From early on, film music has used leitmotif to reflect character / time / place



### Keywords to Use:

- **Leitmotif**

A musical theme that recurs in a film soundtrack to reflect a character / time / place

- **Motif**

A short rhythmic or melodic unit

- **Opera**

An art form in which singers and musicians perform a dramatic work combining text and musical score

**In THREES – pick one keyword each and memorise its meaning. At the end of the lesson your team will need you to know this for the test!**

## MUSIC: COMPOSING FOR FILM

| <u>Creating Happy / Light Music</u>                             | <u>Creating Sad / Dark Music</u>                           |
|---|--|
| Rising Melodies: Tunes that get higher in pitch                 | Descending Melodies: Tunes that get lower in pitch         |
| High Pitch: High notes  | Low Pitch: Low notes                                       |
| Bright Timbres: Bright sounds                                   | Smooth Timbres: Smooth sounds                              |
| Lively Rhythms: Energetic, jumpy, fast moving, short notes etc. | Simple Rhythms: Slower moving, longer notes, uncomplicated |
| Loud Dynamics: Loud volume                                      | Soft Dynamics  |
| Fast Tempo  | Slow Tempo   |
| Major Scales / Chords   | Minor Scales / Chords<br>Diminished Scales / Chords        |

### KEY TERMS:

UNDERSCORING  
LEITMOTIFS FOR DIFFERENT CHARACTERS  
DIEGTIC/NON-DIEGETIC  
SOUND EFFECTS

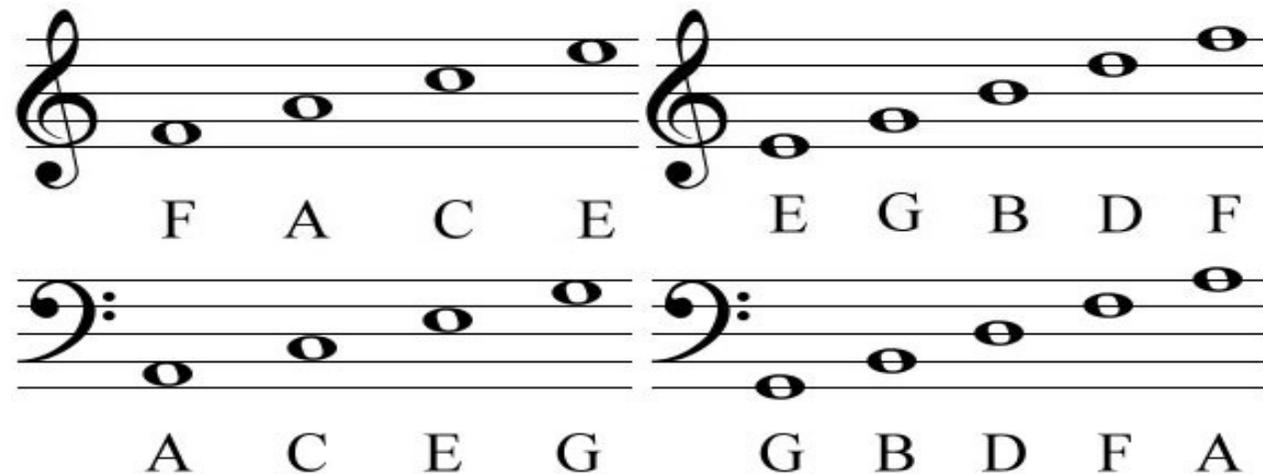


### ALSO THINK ABOUT:

MOOD ASPECTS OF CHARACTER DRAMATIC ACTION

### ELEMENTS TO USE:

MELODY RHYTHM TEXTURE TEMPO PITCH



# Art

## Colour Theory

**Primary colours** are the three main colours, they can't be made, but are used to mix all of the other colours

**Secondary colours** are made by mixing two primary colours

**Tertiary colours** are made by mixing a primary and a secondary colour

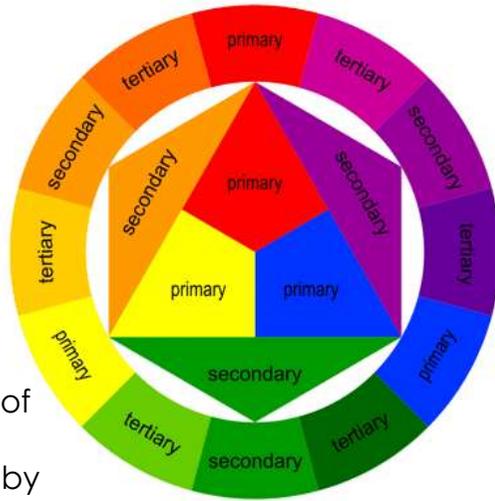
**Harmonious colours** are next to each other on the colour wheel

**Complementary colours** are opposite each other on the colour wheel

**Tint** – when you add white to a colour to make it lighter



**Shade** – when you add black to a colour to make it darker



**Making things look 3D:**  
To stop drawings looking flat use a range of tone and marks. Pressing harder and lighter and layering with your pencil creates different tones and adds depth.



**Mark Making:** To make drawings look more realistic try to use different marks on the surface. You can do this by changing the direction, pressure or length of your marks. Mark making can be used in conjunction with shading or separately.

| The Formal elements of Art |  |
|----------------------------|--|
| Tone                       | How light or dark something is   |
| Line                       | A mark which can be long, short, wiggly straight etc...                                  |
| Colour                     | What you see when light reflects off something. Red, blue and yellow are primary colours |
| Texture                    | How something looks or feels e.g. smooth or rough  |
| Pattern                    | A symbol or shape that is repeated   |
| Shape                      | A 2D area which is enclosed by a line e.g. a triangle                                    |
| Form                       | Something which has 3 dimensions e.g. a cube, sphere or a sculpture                      |

| Technique Keywords  |  |
|---------------------|--|
| <b>Media/Medium</b> | The materials and tools used by an artist to create a piece of art                                   |
| <b>Technique</b>    | The way an artist uses tools and materials to create a piece of art                                  |
| <b>Composition</b>  | Where you place objects on the page  |
| <b>Highlight</b>    | The bright or reflective area on an object or piece of art, this area is closest to the light source |
| <b>Shadow/Shade</b> | The darker areas within a piece of art or object   |
| <b>Proportion</b>   | The size relationship between different parts e.g. height compared to width                          |

# Art - Ocean & Plastic

In this topic you will be looking at the Ocean environment and plastic. You will explore the impact the effect this has on ocean animals and how to respond to this as an artist and create a meaningful piece of environmental art.

During this project you will be exploring the work of

**Alfred Basha:** an artist that creates surreal hybrid creatures using their habitat and outline to create original artworks.

**Andreas Lie:** this artist uses double exposure to manipulate photographs combining animals and their habitat

**Double Exposure:** is a photographic technique that mainly involves combining two exposures (pictures) to create a single image



## Grades of pencil

Pencils come in different grades, the softer the pencil, the darker the tone.

H=Hard B=Black

In art the most useful pencils for shading are 2B and 4B. If your pencil has no grade, it is most likely HB(hard black) in the middle of the scale.



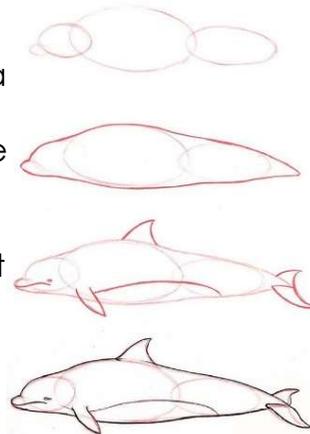
**Activist art** is a term used to describe art that is grounded in the act of 'doing' and addresses political or social issues.

|                    |  |
|--------------------|--|
| <b>Habitat</b>     | this is the natural environment of an animal/creature  |
| <b>Environment</b> | the surroundings or conditions in which a person, animal, or plant lives. We must protect the environment from pollution |
| <b>Pollution</b>   | this is a huge issue at the moment as waste is incorrectly disposed of   |
| <b>Recycling</b>   | we must do more of this to protect our oceans and the creatures that live within   |
| <b>Plastic</b>     | these items are often disposed of incorrectly and end up in the oceans and harm wildlife                                 |

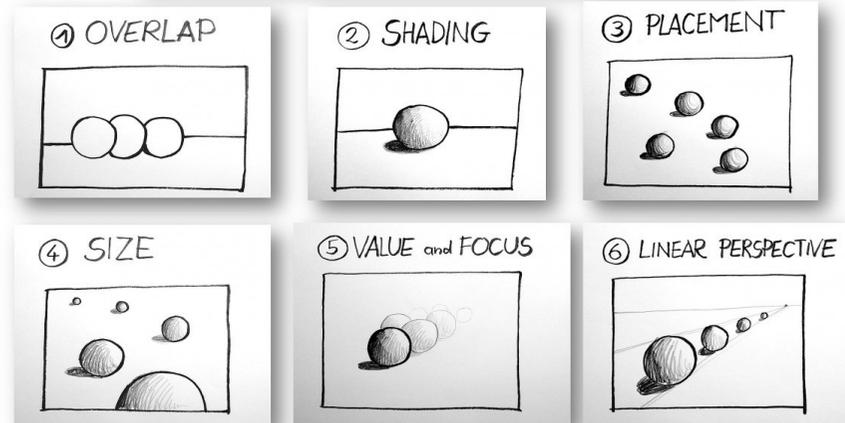
## Constructing a drawing

It is important to remember to build a drawing in stages:

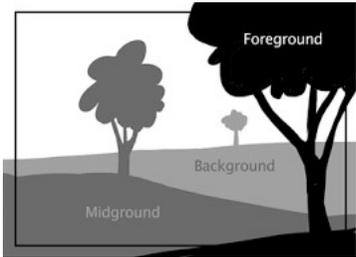
1. Plot out rough shapes (to ensure everything is in proportion) start with the bigger structures,
2. Refine line work (put the correct lines in)
3. Add details and smaller shapes
4. Plot out and apply shading or mark making



**Space** refers to the area within, around, above or below an object or objects. It is important to creating and understanding both two dimensional and three dimensional works of art.



# Art - Insects

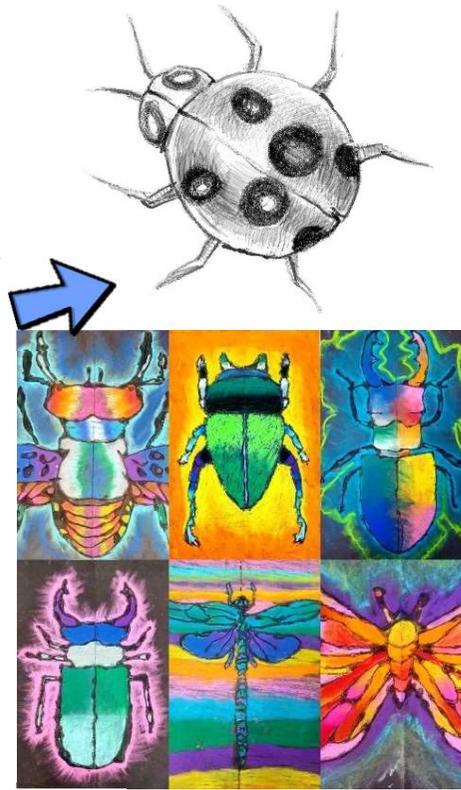


It is important to be able to identify the different layers in an image. When creating your own piece you will be building from background to middleground to foreground.

**In this project you will develop compositional skills and learn how to build up a background and image based on the stimulus of insects. You will be exploring colour theory and colour groups in this project.**



**Directional shading** is shading that follows the contours of an object. Using this method makes your work appear more realistic. Look at the insect, see how the shading changes direction and curves with the shape of the insect. Directional shading should be used all the time =, it is not exclusive to pencil shading, look at the way the oil pastel has been used.



## Things to help:

### Books

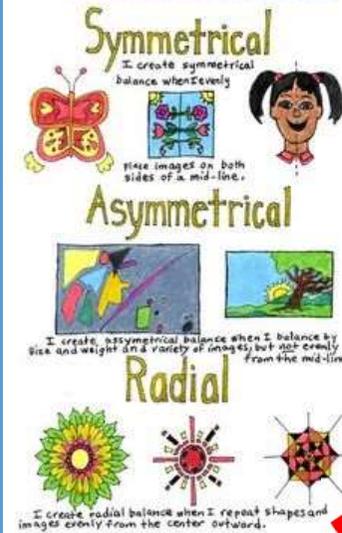
- **How to Draw Almost Everything: An Illustrated Sourcebook** – Chika Miyata
- **Keys to Drawing** – Bert Dodson
- **Drawing for the Absolute Beginner: A Clear & Easy Guide to Successful Drawing (Art for the Absolute Beginner – Mark and Mary Willenbrink**

### YouTube Tutorials

- **Drawing & Painting – The Virtual Instructor**
- **The Basics of Oil Pastels - How to use Oil Pastels (Lets create something)**

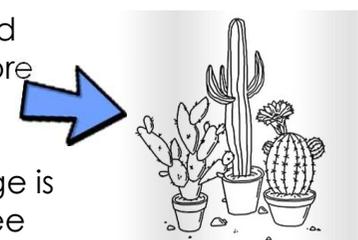
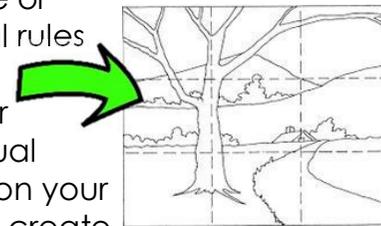
**Oil Pastel** are a new medium we will be using during this project. They are like wax crayons and produce a rich bright colour, they can be a little tricky to blend.

## BALANCE



**Composition** is the way that you place or position your objects, there are several rules that can be used.

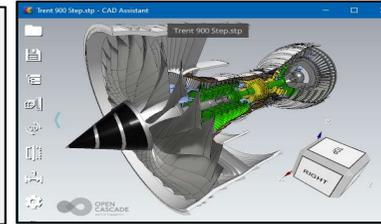
- **Rule of thirds:** You divide your paper horizontally and vertically into 9 equal sections, and by placing the focus on your image where the lines intersect you create a balanced composition.
- **The Rule of odds** suggests that an odd number of subjects in an image is more interesting to look at than an even number.
- **Balance** is where you ensure an image is 'balanced' look at the diagram to see different types of balance.



**Dominic Vonbern** is a designer, artist and author. Vonbern Has been active in the Swiss street art scene for over 24 years. He takes inspiration from street and pop art. He works today predominantly in the medium of spraying and colourful digital arts.

Design and Technology  
Bee Box

2D Design - CAD, CAM and CNC  
CAD Computer-Aided-Design

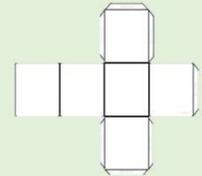


Nets- A pattern that you can cut and fold to make a model of a solid shape



CAM Computer-Aided-Manufacture

Net of a cube!



CNC means Computer-Numerical-Control



Hazard- Something that has the potential to cause harm, untidy cables between work spaces is a good example

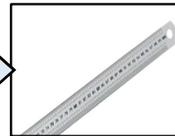
Tools and Equipment

Graphical tools

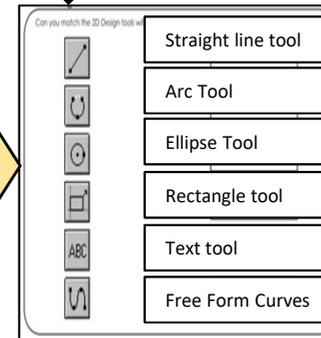
**Tolerances**  
**Tolerance** is the allowable variation for any given size in order to achieve a proper function

Example: If I ask for a piece of wood to be cut to 500mm long and there is a tolerance of +/- 2mm, it can be 502mm or 498mm long!  
This is what is known as a tolerance

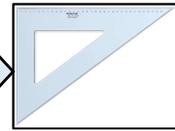
Steel Ruler- Used to draw very precise and accurate straight lines



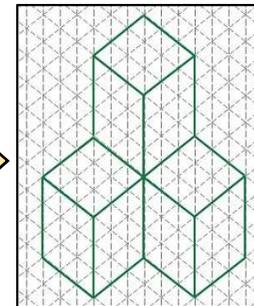
2D Design Tools Explained! These are the most common tools you will use in 2D Design



Set Square- Use for drawing 30 or 60 degree diagonal lines



Isometric drawing paper. Used to help you create drawings in 3D. Lines are 30 degrees



Isometric Drawing- **Isometric projection** is a method for visually representing three-dimensional objects in two dimensions in technical and engineering drawings

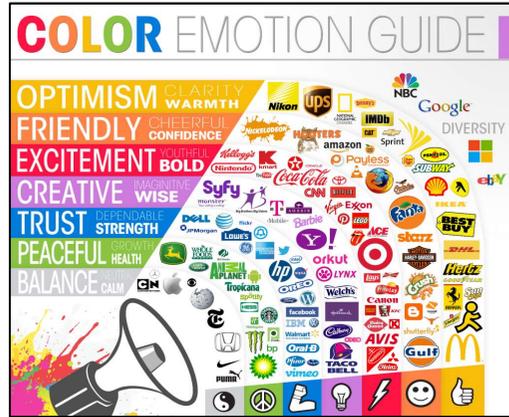
| TOLERANCING                 | SCALE | SIZE |
|-----------------------------|-------|------|
| 00 = ±0.2                   | 1:1   | A4   |
| 00.0 = ±0.1                 |       |      |
| 00.00 = ±0.05               |       |      |
| angular = ± 0°30            |       |      |
| <b>ALL DIMENSIONS IN MM</b> |       |      |
| <p>3rd ANGLE PROJECTION</p> |       |      |
| <b>DO NOT SCALE</b>         |       |      |

Design and Technology  
Bee Box

Pine Wood- Used indoor and outdoors for a range of cheap applications

Plywood- Strong man made board, made from layers glued together

Graphic Design - The art or skill of combining text and pictures in advertisements, magazines, or books.

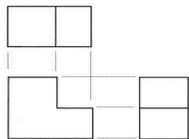


A Bug Hotel

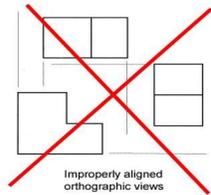
Scaled Drawings- Why use scaled drawings? A drawing that shows a real object with accurate sizes reduced or enlarged. We cant design a building as big as the Eifel tower so we have to draw it smaller. This is called a scaled drawing.

Orthographic Projection

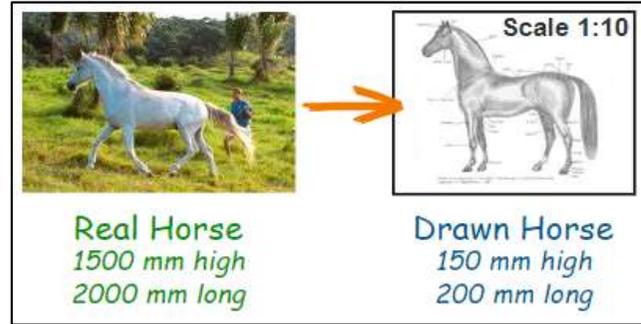
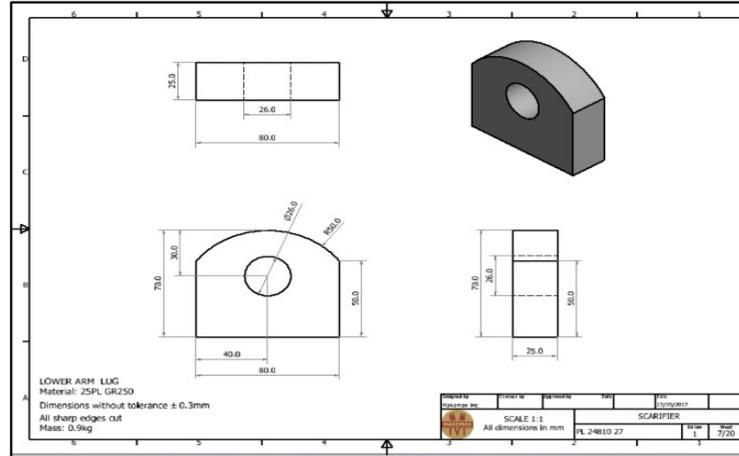
Views are aligned with one another (features project from one view to the next)



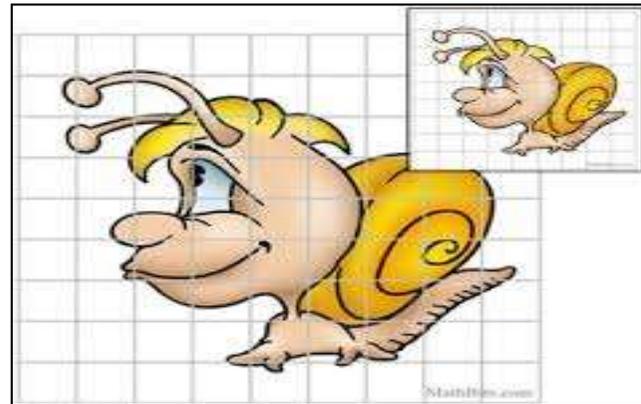
Properly aligned orthographic views



Improperly aligned orthographic views



Orthographic projection is a means of representing three-dimensional objects in two dimensions. It is a form of parallel projection, in which all the projection lines are orthogonal to the projection plane, resulting in every plane of the scene appearing in affine transformation on the viewing surface.





**Product analysis** involves investigating a **products** features, costs, availability, quality and other aspects. **Product analysis** is carried out by people who want to buy the product, by **product** managers attempting to understand competitors and by people who need inspiration to design and develop a new product. At school we use ACCESS FM to help us analyse a product. Below is an example of how it used.

**Market Research-** The action or activity of gathering information about consumers' needs and preferences.

**Customer-** What would you customer think of the product? Is it suitable for them? Does it fulfil their needs?

**Aesthetics-** Describe what the object looks like, you can discuss its colour, texture, features and more

**Cost-** Discuss the cost of the product, is it too expensive? too cheap? Would your client be happy with the price? Is it good value for money?

**Environment-** What location will your product be suitable for? Is your product environmentally friendly?



**Size-** What are the dimensions of your product? Is it just right? Too big? Too small?

**Function-** How does your product work? Are there any moving parts? What is it intended to do?

**Shape-** Describe the shape of your product, Is the shape suitable for your client? Could it be improved?

**Materials-** Describe the materials, What is the product made of? Are the materials suitable?

**ACCESSFM-** This is a useful tool used to analysis a product in detail

Design and Technology  
[Bee Box](#)

Sustainability

Sustainability- A way to avoid running out of natural resources in order to exist forever!



Project Planning Tools

The Gantt Chart- A chart in which a series of horizontal lines shows the amount of work done or production completed in certain periods of time in relation to the amount planned for those periods.

Project Planning Tools

Simple Gantt Chart for PowerPoint – 2 Weeks



www.presentationgo.com

The 6R's

Reduce Re-use Recycle Refuse Repair Refuse

Units of Measurement:

In the UK and Europe we use mm which is know as the metric system, Across America they use imperial measurements which are feet and inches.

Length 100millimetres (mm) = 10centimetres (cm) 1centimetre (cm) = 10mm 100cm = 1metre (m)  
1000metres (m) = 1kilometre (km)

Weight 1gram (g) = 1000mg 0.1kilogram (kg) = 100grams (g) 1kilogram (kg) = 1000grams (g)  
1tonne = 1000kilograms (kg)

Capacity 1litre = 1000millilitres (ml) 1litre (l) = 100centilitres (cl) 1centilitre (cl) = 10millilitres (ml)  
0.1litre (l) = 100millilitres (ml)

**Skills & Processes Used In Year 8**



**Kneading Bread Dough- Bread**

Strong flour used for bread dough is high in a protein called gluten. This must be kneaded by hand to make it elastic and stretchy.



**Proving Bread Dough – Cinnamon Rolls**

Once the dough has been kneaded, it must be left to prove. This is where the yeast (a biological raising agent) ferments, creating carbon dioxide gas which makes the dough grow and rise.



**Frying off – Bolognese, chicken tikka, chicken and bacon pasta**

A method for cooking raw meat until it is sealed and cooked through. It should be brown on the outside with no pink left on the inside.



**Blind Baking – Savoury Flan/Quiche**

Baking a pastry case before adding a filling to dry it out and stop a soggy bottom (baking beads to weigh it down). Coagulation of egg.



**Rubbing In – Jam Tarts, Savoury Flan**

Combining fat and flour by 'rubbing in' with your fingertips before binding together with water to make pastry dough



**Binding, Coating, Shaping – Fish cake**

Combining all ingredients together, shaping into a patty, coating in flour, egg and breadcrumbs before cooking.



**Melting method – Flapjack and cheesecake**

Melting is a physical process that results in the phase transition of a substance from a solid to a liquid. We boil a small amount of water in a saucepan and place a glass bowl with the ingredients we want to melt above.



| Keyword                  | Meaning   |
|--------------------------|---|
| <b>Aeration</b>          | Adding air/gas to a mixture, e.g. by whisking.  |
| <b>Blind Baking</b>      | A method of baking pastry without any filling to dry it out.  |
| <b>Coagulation</b>       | When liquid protein foods are cooked and turn from liquid to solid. E.g. egg in quiche.                           |
| <b>Convenience Foods</b> | Ready made foods that can be used to save time. E.g. puff pastry. More expensive than making from scratch though. |
| <b>Glazing</b>           | Brushing with egg or milk before baking to give a shine. E.g. scones, pastry.                                     |
| <b>Simmering</b>         | When water or food in a saucepan bubbles gently (stays below boiling point).                                      |
| <b>Kneading</b>          | Working bread dough with the hands to stretch the gluten so it is elastic (helps the yeast to make bread rise).   |
| <b>Lamination</b>        | Thin layers of fat and dough in puff/flaky pastry. These separate when baked to form the flaky layers.            |
| <b>Proving</b>           | Leaving bread dough to develop and rise.  |
| <b>Yeast</b>             | A biological raising agent used in bread and beer.  |

**Equipment**

**Pastry brush** used for glazing



**Frying pan** used for frying off meat (can also be done in a saucepan)



**Garlic crusher**



**Electric whisk** used to mechanically aerate mixtures



**Colour Coded Chopping Boards**



**Chefs Knife** - a large all purpose knife



**Baking beans** used for blind baking pastry

**Vegetable Knife** - a small knife for preparing fruits and vegetables



The government recommends **8 top tips for healthy eating**. Following these guidelines you will give you a **balanced diet**, which leads to **good health**.



All the **foods** on the **Eatwell Guide** give us a range of **different nutrients** which all do **different jobs** in our body.  
Remember lots of foods provide more than 1 nutrient.

**eatwell** 8 TIPS for HEALTHY EATING

- 1 Base your meals on starchy foods
- 2 Eat lots of fruit and veg
- 3 Eat more fish – including a portion of oily fish each week
- 4 Cut down on saturated fat and sugar
- 5 Eat less salt – no more than 6g a day for adults
- 6 Get active and try to be a healthy weight
- 7 Drink plenty of water
- 8 Don't skip breakfast

| Nutrient  | Food Examples   | Main Function in Body   |
|---|---|---|
| <b>Macronutrients - We need these in large amounts.</b> |   |   |
| <b>Starchy Carbohydrates</b>                            | Cereals, bread, rice, potatoes, pasta etc.  | Give us slow release energy. (wholegrain versions are higher in fibre).                 |
| <b>Protein</b>  | Meat, fish, eggs, nuts, seeds, pulses, lentils.                                   | Growth, repair and maintenance of muscles.  |
| <b>Fat</b>  | Butter, lard, margarine, sunflower oil, olive oil etc.                            | Insulates our vital organs (heart, lungs etc) and keeps us warm.                        |
| <b>Micronutrients - We need these in small amounts.</b> |   |   |
| <b>Vitamins</b>   | Fruits and vegetables.  | Help our immune system fight off illnesses and help us release energy from other foods. |
| <b>Minerals</b>   |   |   |
| <b>Other Essential Nutrients</b>                        |   |   |
| <b>Dietary Fibre (NSP)</b>                              | Wholegrain cereals, fruit/vegetables, nuts/seeds etc                              | Helps our digestive system remove waste and avoid constipation.                         |
| <b>Water</b>  | Keeps us hydrated, controls body temperature, helps digestion, gets rid of waste. |   |

**Healthy Food Swaps**



Changing just a few eating habits can make a big difference to your diet and is the healthiest way to lose weight. Eat less fat, salt, sugars, processed foods and high calorie foods. Swap them for something healthier, such as more fruit and vegetables (5 a day).

Find out more: [www.nhs.uk/change4life/food-facts](http://www.nhs.uk/change4life/food-facts)

| <b>Main Major Health Issues Linked to Poor Diet</b> |  |
|---|--|
| <b>Anaemia</b>                                      | Too few <b>red blood cells</b> caused by a lack of <b>iron</b> in the diet.                  |
| <b>Diabetes (Type 2)</b>                            | Caused by too much <b>processed sugar</b> , obesity and lack of exercise.                    |
| <b>Heart Disease (CHD)</b>                          | Arteries get blocked by fatty deposits. Linked to <b>saturated fats</b> and <b>obesity</b> . |
| <b>Obesity</b>                                      | Having too much <b>body fat</b> because of an <b>incorrect energy balance</b> .              |
| <b>Osteoporosis</b>                                 | Bone disease. Brittle <b>bones</b> due to a lack of <b>calcium</b> . Affects elderly people. |
| <b>Tooth Decay</b>                                  | Plaque builds up on the teeth. Made worse by eating too much <b>sugar</b> .                  |

Where does our food come from, how is it produced and why do we need to know?



**Red Tractor** is a food assurance scheme showing the food has been farmed, processed and packed in the **UK**. It is **traceable**, safe to eat and has been produced responsibly.



The **animals** have access to outdoor space and can live naturally. The **welfare** standards are high.



Foods that have this label mean the **animals** have had a good life and have been treated with respect



This means the food has been produced without using any chemicals. Only **natural fertilisers and pesticides** are used to help the crops grow.



The **farmer** gets a **fair price** for his produce and fair working and living conditions.



Using **sustainable methods** of fishing to prevent the decline in number of **fish** in our seas.

**Foods:**

**Milk, cheese, yoghurt, poultry**

**Foods:**

**Eggs, meat**

**Foods:**

**Eggs, meat & fish**

**Foods:**

**Eggs, chicken, fruit and vegetables**

**Foods:**

**Sugar, bananas, coffee, tea**

**Foods:**

**Fish, seafood**

# The school food standards



## Fruit and vegetables

- One or more portions of vegetables or salad as an accompaniment every day.
- One or more portions of fruit every day.
- A dessert containing at least 50% fruit two or more times each week.
- At least three different fruits and three different vegetables each week.



## Starchy food

- One or more wholegrain varieties of starchy food each week.
- One or more portions of food from this group every day.
- Three or more different starchy foods each week.
- Starchy food cooked in fat or oil no more than two days each week.\*
- Bread - with no added fat or oil - must be available every day.



## Milk and dairy

- A portion of food from this group every day.
- Lower fat milk must be available for drinking at least once a day during school hours.



## Healthier drinks

- Free, fresh drinking water at all times. The only drinks permitted are:
  - Plain water.
  - Lower fat milk or lactose reduced milk.
  - Fruit or vegetable juice.
  - Plain soya, rice or oat drinks enriched with calcium; plain fermented milk drinks.
  - Combinations of fruit or vegetable juice with plain water.
  - Combinations of fruit juice and lower fat milk or plain yoghurt, plain soya, rice or oat drinks enriched with calcium; cocoa and lower fat milk; flavoured lower fat milk, all with less than 5% added sugars or honey.
  - Tea, coffee, hot chocolate.
- Combination drinks are limited to a portion size of 330ml.



## Foods high in fat, sugar and salt

- No more than two portions of food that has been deep-fried, batter-coated, or breadcrumb-coated, each week.\*
- No more than two portions of food which include pastry each week.\*
- No snacks, except nuts, seeds, vegetables and fruit with no added salt, sugar or fat.\*
- Savoury crackers or breadsticks can be served at lunch with fruit or vegetables or dairy food.
- No confectionery, chocolate or chocolate-coated products.\*
- Desserts, cakes and biscuits are allowed only at lunchtime.
- They must not contain any confectionery.
- Salt must not be available to add to food after it has been cooked.\*
- Any condiments must be limited to sachets or portions of no more than 10g or one teaspoonful.\*



## Meat, fish, eggs, beans and other non-dairy sources of protein

- A portion of food from this group every day.
- A portion of meat or poultry on three or more days each week.
- Oily fish once or more every three weeks.
- For vegetarians, a portion of non-dairy protein on three or more days each week.
- A meat or poultry product no more than once each week in primary schools and twice each week in secondary schools\*

## Food provided outside lunch

- Fruit and/or vegetables available in all school food outlets.
- No savoury crackers and breadsticks.
- No cakes, biscuits, pastries or desserts.

\* This Standard applies across the whole school day, including breakfasts, morning breaks, tuck shops, and after school clubs. Information from 'The School Food Plan' website.

**CHILDREN'S FOOD TRUST**  
Eat Better Do Better





**Food miles** - The distance food travels from **Farm To Fork**



Some is local



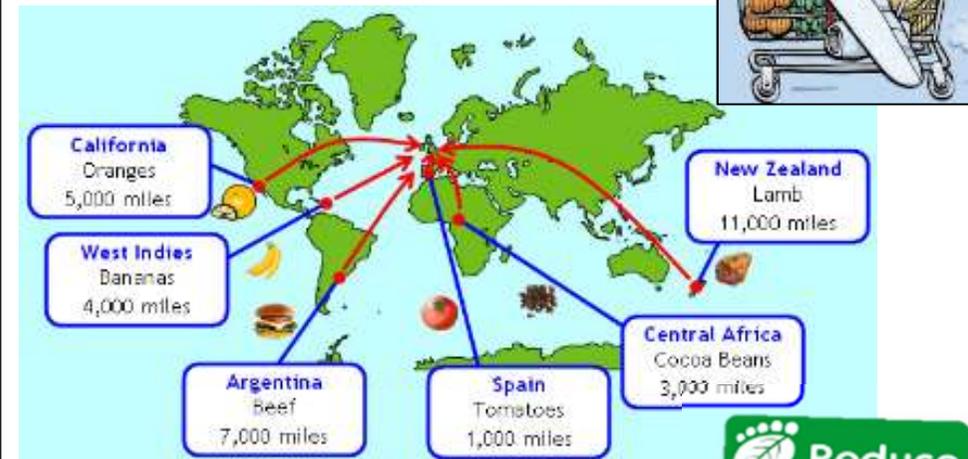
Some comes by lorry from all over the UK or Europe



**Food miles**

How far does our food travel to get to us?

Some is flown here from all over the world



The higher the **food miles** the bigger the environmental issues for our planet



**4 C's** Food hygiene is necessary in order to make food which is safe to eat. This involves

more than just being clean. A simple way to remember all the important areas where safety could be an issue are the **4Cs**:

- **Cooking**
- **Cleaning**
- **Chilling**
- **Cross Contamination**



| Keyword                    | Meaning  |
|----------------------------|--|
| <b>Ambient Foods</b>       | Foods that can be safely stored at room temperature.   |
| <b>Aeration</b>            | Adding <b>air</b> to a mixture to help it rise (e.g. cakes, batters, yorkshire puddings).  |
| <b>Bacteria</b>            | A <b>micro-organism</b> that grows on food. Some of these are harmless but <b>pathogenic bacteria</b> can cause food poisoning.  |
| <b>Coagulation</b>         | When heat is applied to a liquid protein food making it become solid. E.g. Egg.  |
| <b>Cross Contamination</b> | When bacteria passes from one food to another or from people to food. Can lead to food poisoning.  |
| <b>Food Spoilage</b>       | When bacteria causes food to decay. Food will start to smell, lose texture or flavour.   |
| <b>Food Poisoning</b>      | Caused by eating food infected with bacteria. Symptoms include sickness, fever and diarrhoea.  |
| <b>High Risk Foods</b>     | Foods where bacteria grows quickly and can lead to food poisoning. The majority of high risk foods are animal protein foods (meat, fish, dairy, meat stocks/gravies). The only exception is cooked rice. |
| <b>Mould</b>               | A type of micro-organism. Grows on foods such as berries when they are starting to decay. Also used in food production to make foods such as blue cheese or soy sauce.                                   |

**Food Packaging Date Marks**

| Date Mark                 | Description   | Food Examples  |
|---------------------------|---|--|
| <p><b>Use By</b></p>      | A safety date. Used on high risk foods that usually need to be stored in the fridge. If you eat the food after this date you risk food poisoning. | <p>Meat<br/>Fish<br/>Seafood<br/>Cheese<br/>Milk<br/>Cream</p> |
| <p><b>Best Before</b></p> | A quality date. Food can still be eaten after but the quality will be reduced. E.g. cereals or biscuits will not be as crunchy.                   | <p>Bread<br/>Cereals<br/>Sugar<br/>Flour<br/>Pasta</p>         |

**Raising Agents**

**Biological** – Yeast, used in bread making.



**Mechanical** –

- folding,
- beating,
- whisking,
- sieving,
- creaming,
- rubbing in.



**Chemical** - Bicarbonate of soda, baking powder, S.R.flour.



**Steam** – Used in choux pastry, Yorkshire puddings, soufflés.



| Keyword     | Definition   |
|-------------|--|
| Drive       | The part of the race where the athlete keeps low and has short powerful strides. |
| Maximal     | The largest amount possible.   |
| Pace        | The speed at which someone moves.  |
| Power       | The speed at which strength can be used.   |
| Angle       | The direction something is released at.  |
| Stride      | The length of step.  |
| Relay       | To send something from one person to another.                                    |
| Performance | The way in which an activity is completed.                                       |

### Sprinting technique

The sprint start:  
 'On your marks' – set feet with lead leg in front  
 'Set' – move forward with weight on shoulders raising hips  
 'Go' – push out off lead leg driving legs and arms forward  
 Keep head down and body at 45 degree angle  
 Sprint technique  
 Running on toes and lifting knees high  
 Use of 'drive' when getting out of the blocks  
 A straight arm action  
 Stand tall after 'drive' phase



### Middle distance and long distance

Middle distances such as 800m and 1500m and long distance e.g. 500m and 100m usually focus on pacing  
 Pacing is where you don't set off too fast in order to have enough energy to finish the race strongly.

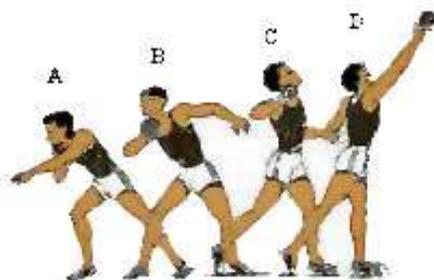
### Throwing

Javelin technique  
 Grip the javelin in the middle  
 Turn sideways and extend arm backwards  
 The javelin tip should be next to your cheek  
 To throw, bring arm forwards so javelin moves in a straight line  
 Lean back and rotate chest  
 Release at 45 degree angle



### Throwing

Shot putt technique  
 Hold shot in fingers against your neck 'clean palm, dirty neck'  
 Face backwards  
 Align toe, knee and chin, and have a high elbow  
 Rotate, opening out chest, releasing at 45 degrees



## Athletics

### Jumping

Long jump technique  
 Mark out your run up to stop your stuttering  
 Jump of lead leg [strongest leg]  
 Use arms to project body forward  
 Stretch legs as if jumping over a box  
 Push forwards on landing



### Jumping

High jump technique  
 The Fosbury Flop is the most effective way to complete the high jump:  
 Approach on a curve  
 Take off outside leg, driving the other leg as high as you can  
 Rotate in the air to land on your back with feet facing the ceiling



# Softball Y7

## Knowledge Organiser



**Keywords:** Arm action: pitching motion: official: Athletic stance: Attack the ball: Backhand:;

**Scoring System:** The aim of the game is to score more RUNS than the opposition, and a run is scored when a player on the batting team advances around all three bases and back to the home base (called HOME PLATE) from whence she started. Unless you hit the ball so far that you can run around all the bases before it's returned (a HOME RUN), you'll probably have to stop at one or more bases on your way around and wait for the next batter to hit the ball so you can advance further. Team with the most runs wins the game.

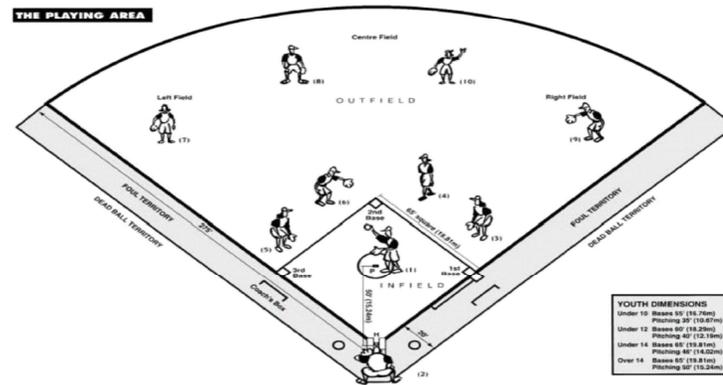
### Players:

Most slowpitch softball is played by mixed teams, where men and women play together, usually in a 5:5 ratio. However, this ratio sometimes varies, and slowpitch is sometimes played by single-sex teams as well.

### How to get someone out

1. If the ball the batter has just hit is caught without first bouncing.
2. The ball is thrown to a base before a runner gets there.
3. A player running between bases is tagged by the ball (touched by the ball or the glove of the defending player).
4. If three strikes are called by the umpire.
5. They run more than 3ft (0.9m) out of the base line to avoid being tagged.

**Softball playing area:** A softball playing area is contained within a 90-degree angle, and is usually called a DIAMOND, because the central part of the playing field – the INFIELD - is diamondshaped. The OUTFIELD extends outward from the infield to a boundary, either actual or notional.



### Skills and Techniques

**Catching:** The right catching skills allow a player not only to catch the ball without getting hurt but also to position. T.P's; Bring hands to chest as you catch, eyes on ball, cushion catch. Pairs to experiment with low and high catches

**Throwing:** Throwing is one of the two most important defensive skills a player must learn in softball.

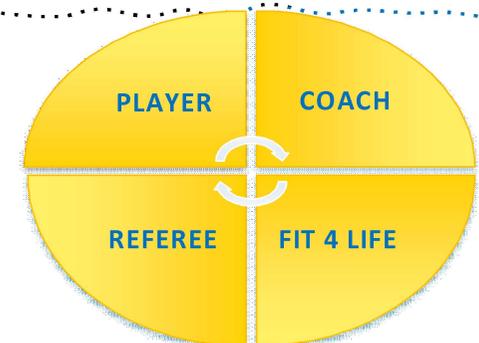
**Batting:** Hitting is probably the most challenging and enjoyable skill to learn in softball. Teaching points; Stance & Grip, bat back in preparation, follow through

**Fielding Tactics:** To understand the fielders roles and base responsibilities. To perform and replicate a combination of skills to outwit opponents in a game situation

**Pitching:** Teaching points; grip, step into bowl, must pass between shoulder and knee

### Rules:

1. Two teams (of nine players) alternate turns at batting and fielding (often called defense).
2. The aim for the team batting is to advance a runner around all bases to the home plate to score runs.
3. The defending team tries to defend its bases by getting three outs and not allowing the batting team to score.
4. The team that scores the most runs in seven innings wins. (A tiebreaker procedure comes into play if the scores are tied after the seventh innings.)
5. Each team's innings ends when three of its batters have been ruled out and then the team that was defending goes in to bat.



# Knowledge Organiser

## Rounders



### What is Rounders?

- A sport with two teams with a maximum of **15 players**. No more than 9 players on the field at any one time.
- Games are played on a square shaped pitch, divided by posts and boxes.
- Score points by hitting the ball. One point or half a point (Rounder) depending on where the player gets to in the field.
- The bowler bowls the ball to the batter who hits the ball forward on the Rounders Pitch. The batter then runs to as many posts as possible before the fielders return the ball to touch the post the batter is heading for.
- Players are assigned "positions".
- If the batter reaches the 2nd or 3rd post in one hit, the batting team scores  $\frac{1}{2}$  a Rounder. If the batter reaches 4th post in one hit, the batting team scores a Rounder
- Games are usually played over 2 innings with the aim of the game to score the most rounders. This is normally 30 "good balls".
- The play should be recorded on an accompanying scoresheet.



### Health and Safety

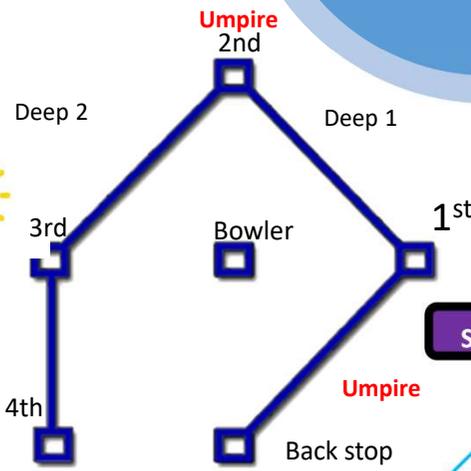
Before a game, the **umpire** will check not only the pitch but also the players to make sure that:-

- All shoe laces are tied- to stop the player from tripping over
- All hair is tied back- so that no hair gets in the way of your face which could result in you being unable to see.
- All jewellery is removed (including earrings and piercings)- to stop a risk of injury such as piercings being pulled out or necklaces getting caught round necks
- The pitch is safe. No water or rubbish. The posts are secure.
- The ball and the bat, are the right specification.
- Spiked footwear is prohibited. But football boots and astro shoes can be worn.
- Gum shields, shin pads and fingerless gloves CAN be worn.
- It is common to wear rounders uniform, including a skort and matching top.
- You might need to apply sun cream in warm weather.



Running Totals and final scoring

### Pitch Layout



**TOP TIP**  
Bats and balls should be kept dry, to maintain a good grip.

The game is split into two innings

You can play in an adult team at age 13!

### FAB FACTS!

You can play with three types of bats.

Wooden, aluminum and plastic.

Invented in Tudor times.

### Scoring Card

Scoring for individuals

Score Sheet

| Team | Players Name | No | Performance | Score |
|------|--------------|----|-------------|-------|
|      | 1            |    |             |       |
|      | 2            |    |             |       |
|      | 3            |    |             |       |
|      | 4            |    |             |       |
|      | 5            |    |             |       |
|      | 6            |    |             |       |
|      | 7            |    |             |       |
|      | 8            |    |             |       |
|      | 9            |    |             |       |
|      | 10           |    |             |       |
|      | 11           |    |             |       |
|      | 12           |    |             |       |
|      | 13           |    |             |       |
|      | 14           |    |             |       |
|      | 15           |    |             |       |

Good balls

|    |    |    |    |    |
|----|----|----|----|----|
| 30 | 29 | 28 | 27 | 26 |
| 25 | 24 | 23 | 22 | 21 |
| 20 | 19 | 18 | 17 | 16 |
| 15 | 14 | 13 | 12 | 11 |
| 10 | 9  | 8  | 7  | 6  |
| 5  | 4  | 3  | 2  | 1  |

Players Out

|   |   |   |   |
|---|---|---|---|
| 9 | 8 | 7 | 6 |
| 5 | 4 | 3 | 2 |
| 1 |   |   |   |

RUNNING TOTALS

Balls remaining

Players Out

### Key Words

- Batting Team**– This is the team who are batting, normally 9 players.
- Fielding Team**–This is the team who are in field, normally 9 players.
- “OUT”** – This means you have been caught or stumped out.
- “IN”** –This means the umpire has deemed you are in.
- Obstruction** – This is where a player gets in the way of another player, normally in field. The player who is obstructed get  $\frac{1}{2}$  rounder.
- Wait at first** –You have hit the ball backwards, you have to wait at first post.
- Ball** – These can be hard or softer, you need to catch the ball to get someone out.
- Bat** –There are three types of batt you can use. This is used to hit the ball.
- Post** – These are normally white and used to ‘stump’ the ball.
- Stump**: This is the motion of the ball touching the base or post.
- Rounder**- This means you have scored 1 (point) called a rounder.
- Half a Rounder**-This means you have scored  $\frac{1}{2}$  (point) called a rounder.

### Exit Routes and Club Information

Solihull Outdoor/Indoor Rounders League  
Location: West Midlands  
Lead Contact: Clair Andrews  
Email: [clairandrews@leagues4you.co.uk](mailto:clairandrews@leagues4you.co.uk)

**Rounders England**  
PO Box 4458  
Sheffield  
S20 9DP  
T: 0114 248 0357  
E: [enquiries@roundersengland.co.uk](mailto:enquiries@roundersengland.co.uk)



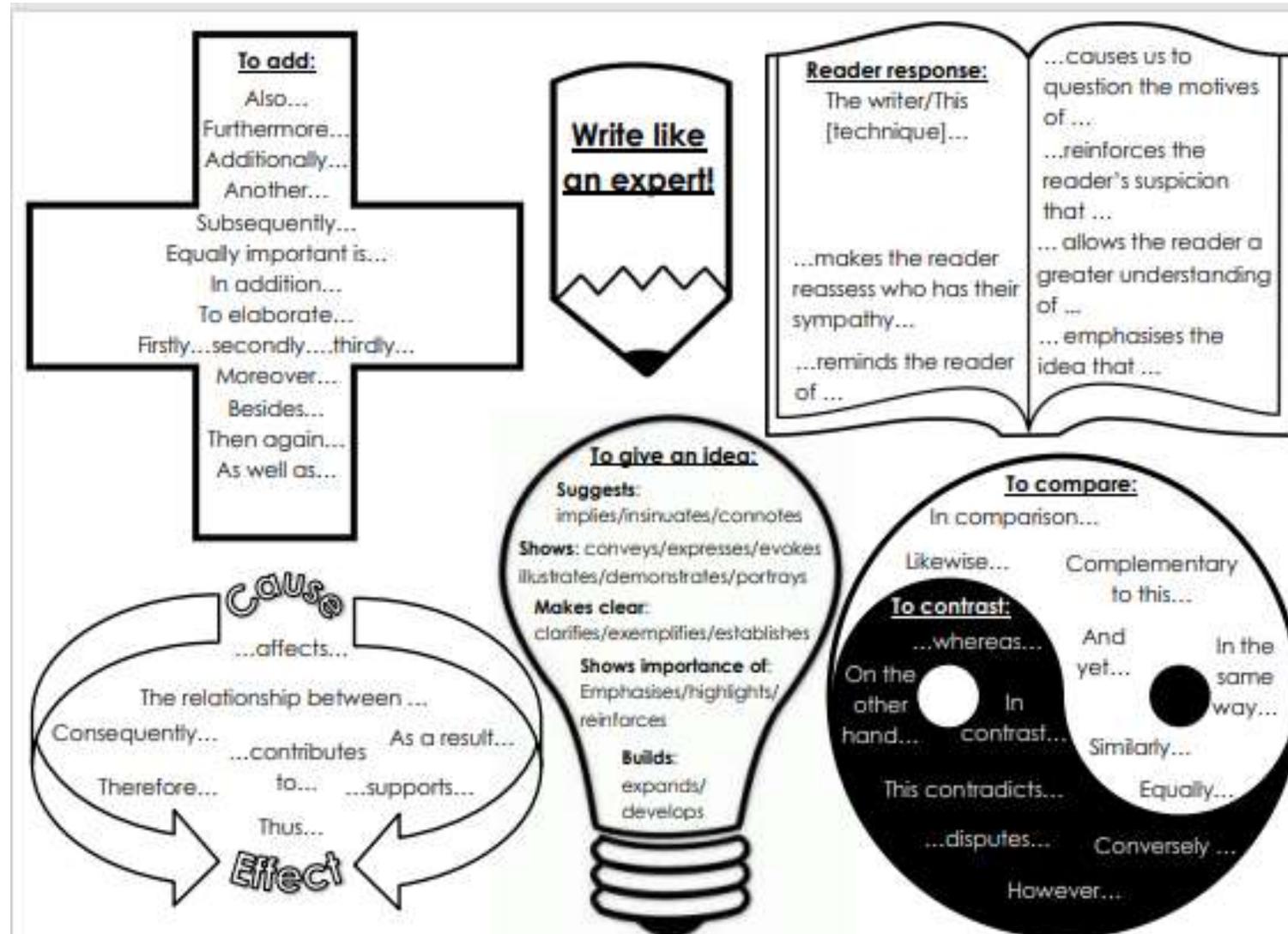
# Write

Writing needs the following to also be effective:

- Be precise
- Well structured
- Choice of vocabulary



- Punctuation
- Written in the correct style and format
- Grammatically correct



## Sentence Types Knowledge Organiser

| Key terminology               | Definition  |
|-------------------------------|---|
| Main clause                   | A group of words which contains a verb and makes sense on its own.                |
| Subordinate/ dependent clause | A clause which does not make sense on its own (it is reliant on the main clause). |
| Co-ordinating conjunction     | Link words or phrases that join two equal clauses.                                |
| Subordinating conjunction     | Link words or phrases that join clauses where one is dependent on the other.      |

| Sentence Types   | Definition   |
|------------------|--|
| Simple           | A sentence containing one main clause.   |
| Complex          | A sentence containing a main clause and at least one subordinate/dependent clause.       |
| Compound         | A sentence containing two main clauses joined by a conjunction.                          |
| Complex compound | A sentence containing two main clauses and one or more subordinate or dependent clauses. |
| Minor            | A word, phrase or a clause which is an incomplete sentence but functions as a sentence.  |



| Noun Type  | Description  | Example                       |
|------------|--|-------------------------------|
| Proper     | Refers to names of people or places.   | James, England                |
| Abstract   | Refers to states, feelings and ideas which do not have a physical existence. | Love, anger, justice          |
| Concrete   | Refers to objects with a physical existence.                                 | Table, chairs                 |
| Collective | A noun that identifies a group of individuals                                | Government, family, community |

| Pronouns      | Description   | Example                      |
|---------------|---|------------------------------|
| Personal      | Can replace a noun and identify in terms of person.                       | I, you, she, he, they        |
| Demonstrative | Orientates the reader/ listener to an idea either nearby or further away. | This, these, that, those     |
| Indefinite    | Refers to a person or object that is non specific                         | Someone, anybody, everything |

| Verbs               | Description   | Example                          |
|---------------------|---|----------------------------------|
| Dynamic/ material   | Shows actions or events   | Hit, jump, wash                  |
| Stative/ Relational | Identifies states of being  | Be, appear, seem, become         |
| Auxiliary           | A verb that forms tense or mood of other verbs                    | Be, do, have                     |
| Modal auxiliary     | A verb that shows degree of certainty, probability or possibility | Should, must, might, could, will |

| Adjectives  | Description  | Example                             |
|-------------|--|-------------------------------------|
| Base        | The basic form of an adjective                     | Big, interesting, happy             |
| Comparative | A form used to compare two instances by adding -er | Bigger, more interesting, happier   |
| Superlative | Identifies the best example                        | Biggest, most interesting, happiest |

| Determiners | Description  | Example                          |
|-------------|--|----------------------------------|
| Articles    | Shows if something is definite or indefinite               | The (definite) a/an (indefinite) |
| Possessives | Shows ownership  | My, her, your, our               |
| Quantifiers | Shows either specific or non specific quantities of a noun | One, some, any a few             |

| Adverbs   | Description                      | Example                        |
|-----------|----------------------------------|--------------------------------|
| Manner    | Answer the question 'how?'       | Carefully, quickly             |
| Place     | Answer the question 'where?'     | Here, outside                  |
| Time      | Answer the question 'when?'      | Yesterday, today,              |
| Frequency | Answer the question 'how often?' | Daily, always, usually, seldom |

| Conjunctions   | Description  | Example                       |
|----------------|--|-------------------------------|
| Co-ordinating  | Links words, phrases or clauses together where equal | And, but, or yet              |
| Sub-ordinating | Links clauses where one is dependent on the other    | Because, although, while, for |