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Plot summary

Act I scene i – The three witches gather to in a thunder storm to meet Macbeth

Act I scene ii – Duncan hears reports of the battle in which Macbeth proves himself a hero and also of the treachery of the Thane of Cawdor.

Act I scene iii – Macbeth & Banquo meet the witches and hear the predictions that he will be Thane of Cawdor and the next king. Ross arrives to confirm that Macbeth is the new Thane of Cawdor.

Act I scene iv – Duncan decides to make his son Malcolm the heir to his throne and tells Macbeth that he will visit his castle.

Act I scene v – Lady Macbeth reads a letter from her husband about the events so far and makes up her mind to murder Duncan.

Act I scene vi – Duncan arrives at Macbeth's castle and is welcomed by Lady Macbeth.

Act I scene vii – Macbeth decides he cannot go through with the plot but Lady Macbeth persuades him to change his mind.

Act II scene i – Banquo feels uneasy about what might happen in the night. Macbeth makes his way to Duncan's room to kill him and sees a ghostly dagger floating in the air before him.

Act II scene ii – Macbeth forgets to leave the bloody daggers in Duncan's room after the murder and Lady Macbeth is forced to take charge and put them back.

Act II scene iii – The next morning Duncan's body is discovered by Macduff; Macbeth conveniently kills the servants in pretend rage; Duncan's sons, Malcolm & Donalbain, flee the castle.

Act II scene iv – Macduff reports that suspicion for the murder has fallen on the king's sons; Macbeth has travelled to Scone to be crowned.

Act III scene i – Macbeth is now king, but Banquo is suspicious about how the witch's predications have come true. Macbeth arranges to have him murdered.

Act III scene ii – Lady Macbeth tries to get her husband to talk to her about his plans but he refuses.

Act III scene iii – Banquo is murdered but his son, Fleance, escapes.

Act III scene iv – At a feast that night, Macbeth sees the ghost of Banquo. Lady Macbeth tries to calm him down but when this fails cancels the feasts and sends the courtiers away.

Act III scene v – The witches discuss events so far; Hecate, the ruler of the witches, predicts his downfall.

Act III scene vi – suspicion of Macbeth is growing; Macduff has left for England to rouse support against him.

Act IV scene i – The witches tell Macbeth he cannot be harmed by anyone 'born of a woman' and that he will be safe until Birnam Wood moves to the castle at Dunsinane. Macbeth decides to murder Macduff's family.

Act IV scene ii – Macbeth's murderers kill Lady Macduff and her children.

Act IV scene iii – Macduff discovers his family's murder and, with Malcolm, leads an army to attack Macbeth.

Act V scene i – Lady Macbeth is sleep walking and trying to wash an imaginary blood spot from her hands.

Act V scene ii – Malcolm's army is at Birnam Wood and hear reports that Macbeth's supporters are deserting him.

Act V scene iii – Macbeth is besieged but puts his trust in the witches' prophecy.

Act V scene iv – Malcolm orders his army to cut down branches from Birnam Wood to disguise the number of soldiers.

Act V scene v – Macbeth is told of his wife's death and about the news that Birnam Wood seems to be approaching. He resolves to die fighting.

Act V scene vi – ix – Macbeth is killed by Macduff (who reveals he was delivered by caesarean and so not properly 'born'). Malcolm becomes the new king of Scotland and order is restored.

Key characters	Key themes	Historical context	Stylistic features and symbols
<p>Macbeth Thane of Glamis Lady Macbeth his wife Banquo Macbeth's best friend Fleance Banquo's son Duncan King of Scotland Malcolm Duncan's eldest son Macduff – Thane of Fife Lady Macduff his wife Donalbain Duncan's younger son Ross, Lennox, Angus Scottish nobles The witches – supernatural beings who predict events in the play. Hecate ruler of the witches</p>	<p>Ambition seen as a purely negative quality. Guilt - the play shows the terrible consequences of murdering a king. Kingship vs tyranny – Duncan and Macbeth embody the qualities of a good king and a tyrant respectively. Order vs chaos Natural order is disrupted then re-established. Fate Masculinity/femininity</p>	<ul style="list-style-type: none"> <i>Macbeth</i> was most likely written in 1606, early in the reign of James I, who had been James VI of Scotland before he succeeded to the English throne in 1603. Only a century earlier, England had suffered under the massive disorder of the Wars of the Roses. Civil disorder was now seen as the ultimate disaster, and also as an ungodly state. The play pays homage to the king's Scottish lineage. Additionally, the witches' prophecy that Banquo will found a line of kings is a clear nod to James's family's claim to have descended from the historical Banquo. The theme of bad versus good kingship, embodied by Macbeth and Duncan, respectively, would have resonated at the royal court, where James was busy developing his English version of the theory of the divine right of kings. The play was first performed not long after the Gunpowder Plot. Shakespeare shows the murderers of a king tormented by their own guilt and driven to their doom. It was believed that kings were appointed by 'divine right' and were anointed by God. To kill a king was considered the worst sin and a terrible crime. <i>Macbeth</i> is a tragedy and the character of Macbeth is a tragic hero 	<p>Blood – a symbol of guilt and violence The supernatural – belief in witchcraft was widespread and Shakespeare uses prophecy, hallucinations, ghosts and magic to give the play a menacing, unnatural feel. Oxymoron – opposites & contradiction recur throughout the play Pathetic fallacy – unnatural events are usually echoed by unnatural weather Alliteration Blank verse – non rhyming lines written in iambic pentameter (iam= a beat <i>du duh</i>; pent = five) Soliloquy – where a character speaks their thoughts aloud to the audience Monologue – a long speech by a single character Dramatic irony – when the audience knows more than a character or characters do</p>

Key Quotations

The witches: Fair is foul, and foul is fair, Hover through the fog an filthy air. (Act I, Scene i)

The witches: When shall we three meet again in thunder, lightning, or in rain? When the hurlyburly 's done, When the battle 's lost and won. (Act I, Scene i)

Captain: For brave Macbeth—well he deserves that name— Disdaining fortune, with his brandished steel, Which smoked with bloody execution, Like valour's minion carved out his passage (Act I, Scene ii)

Macbeth: So foul and fair a day I have not seen (Act I, Scene III)

Banquo: And oftentimes, to win us to our harm, the instruments of darkness tell us truths (Act I scene iii)

Macbeth: Stars hide your fires let not light see my black and deep desires. (Act I, Scene IV)

Lady Macbeth: Yet do I fear thy nature; It is too full o' the milk of human kindness. (Act I, Scene V)

Lady Macbeth: Look like the innocent flower, but be the serpent under't. (Act I, Scene V)

Lady Macbeth: Come, you spirits Tat tend on mortal thoughts, un-sex me here And fill me from the crown to the toe topfull Of direst cruelty (Act I, Scene v)

Macbeth: If it were done, when 'tis done, then 'twere well It were done quickly. (Act I, Scene vii)

Macbeth: I have no spur To prick the sides of my intent, but only Vaulting ambition which o'erleaps itself And falls on th'other. (Act I, Scene vii)

Macbeth: I dare do all that may become a man; Who dares do more is none. (Act I, Scene vii)

Lady Macbeth: Screw your courage to the sticking-place, and we'll not fail. (Act I, Scene vii)

Macbeth: False face must hide what the false heart doth know. (Act I, scene vii)

Macbeth: Is this a dagger which I see before me, The handle toward my hand? (Act II, Scene I)

Macbeth: Will all great Neptune's ocean wash this blood clean from my hand? No, this my hand will rather the multitudinous seas incarnadine, making the green one red. (Act II, Scene ii)

Donalbain: Where we are there's daggers in men's smiles. The near in blood, The nearer bloody. (Act II, Scene iii)

Banquo: Thou hast it now, King, Cawdor, Glamis, all., as the weird sisters promis'd, and I fear Thou hast play'd most foully for't (Act III scene i)

Lady Macbeth: What's done is done. Macbeth: We have scorched the snake, not kill'd it. (Act III, Scene ii)

Macbeth: O full of scorpions is my mind, dear wife! (Act III, Scene ii)

Macbeth: I am cabin'd, cribb'd, confin'd, bound in saucy doubts and fears. (Act III, scene IV)

Macbeth: Thou canst not say I did it; never shake thy gory locks at me! (Act III, scene IV)

The witches: By the pricking of my thumbs, Something wicked this way comes. (Act IV, Scene i)

Malcolm: Angels are bright still, though the brightest fell. Though all things foul would wear the brows of grace, Yet grace must still look so. (Act IV, Scene iii)

Lady Macbeth: Out, damned spot! out, I say! (Act V, Scene i).

Macbeth: To-morrow, and to-morrow, and to-morrow, Creeps in this petty pace from day to day, To the last syllable of recorded time; And all our yesterdays have lighted fools The way to dusty death. Out, out, brief candle! Life's but a walking shadow, a poor player, That struts and frets his hour upon the stage, And then is heard no more. It is a tale Told by an idiot, full of sound and fury, Signifying nothing. (Act V, Scene v)

Macbeth: I bear a charmed life which must not yield To one of woman born. Macduff: Macduff was from his mother's womb untimely ripp'd. (Act V, Scene viii)

Malcolm: Of this dead butcher and his fiend-like queen (Act V, Scene ix)

Year 11 Term 1 Knowledge Organiser

Symbolism

Ravens - Because of its black plumage, croaking call and diet of [carrion](#), the raven is often associated with loss and ill omen. Yet its symbolism is complex. As a talking bird, the raven also represents [prophecy](#) and insight. Ravens in stories often act as [psychopomps](#) (creatures in many religions who are used to escort people from the mortal world to the afterlife), connecting the material world with the world of [spirits](#).

Breastfeeding/Breast milk - Breastfeeding is symbolic of giving or receiving, nurturing, and sustenance. It represents motherly love, as well as physical and emotional support and well being.

Crowns – The “crown” of a person can refer to the top of their head. However, a **crown** is a traditional symbol. Usually worn by a monarch or by a deity, the crown traditionally represents power, legitimacy, victory, triumph, honour, and glory.

Heaven and Hell - As symbolic expressions found in various religious traditions, heaven and hell suggest polar components of a religious vision: a state of bliss and/or an abode of deity or sacred reality on the one hand, and a state of spiritual impoverishment and/or an abode of evil or demonic spirits on the other. As a spatial referent, Heaven is generally considered to be "above," informed by the human experience of the sky as the expansive space or dome encompassing the earth and also including the sun, moon, and stars. Just as Heaven is "above" the earth, so then is deity "higher" than the human or earthly plane for those traditions in which Heaven is viewed as the abode of deity. On the contrary, Hell is generally regarded as a realm "below," a meaning reflected in the derivation of the English *hell* from the [Old English](#), *helan*, with a root meaning of "hide," "cover," or "conceal." Thus, Heaven is often symbolized by light or brightness as a realm of bliss, whereas Hell is characterized as dark or shadowy, a realm of anguish and suffering.

Serpent - The serpent is a universal and complex symbol. It can represent death, destruction, evil, a penetrating legless essence, and/or poison. In the Christian tradition, Satan (in the guise of the serpent) instigated the fall by tricking Eve into breaking God's command. Thus the serpent can represent temptation, the devil, and deceit. The snake is phallic so could

Key Vocabulary

Tyrant	a cruel and oppressive ruler.	Heir	Someone who will inherit property or titles when someone else dies
Fiend	an evil spirit or demon	Ambiguity	Phrases with more than one possible meaning
Thane	A Scottish nobleman	Primogeniture	the right of succession belonging to the firstborn child
Regicide	The murder of a king	Hamartia	A fatal flaw (in Macbeth's case, Ambition) that leads to the downfall of the tragic hero
Infanticide	The murder of a child	Machiavellian	Cunning, scheming and unscrupulous in politics
Diabolical	Characteristic of absolute evil	Peripeteia	The turning point in a drama after which the plot moves steadily to its denouement.
Hubris	Excessive pride and ego	Prophecy	A prediction of what will happen in the future.
Valiant	Brave and heroic	Despotic	Controlling and Tyrannical

Simplify:

$$9x + 3y + 4x + 2y$$

$$9x + 3y + 4x + 2y$$

Highlight the like terms. Since I have two sets of like terms, I used two different colors.

$$9x + 4x + 3y + 2y$$

Rewrite like terms side by side.

$$13x + 5y$$

Combine like terms. (Add or subtract the coefficients of the like terms.)

To solve an equation, find the value that makes the equation true.

Solve $2x + 3 = 13$

This means: $x \times 2 + 3 = 13$

To solve, we reverse the process:

$$x \times 2 + 3 = 13$$

$$x \times 2 + 3 = 13$$

$$2x + 3 = 13$$

$$2x = 10$$

$$2x = 10$$

$$x = 5$$

Use the opposite (inverse) operation and undo in reverse order.

We have solved the equation when we get to a single value of x (here, x = 5).

Solve $4x + 6 = 14$

$$4x + 6 = 14$$

$$4x = 8$$

$$x = 2$$

Adding Fractions

Adding Fractions with Like Denominators

Add the numerators.
Denominator is unchanged.

$$\frac{1}{7} + \frac{3}{7} = \frac{1+3}{7} = \frac{4}{7}$$

Adding Fractions with Unlike Denominators

Rewrite with common denominator

$$\frac{1}{8} + \frac{2}{3}$$

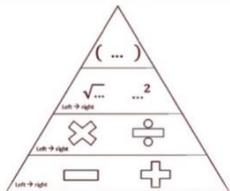
Add the numerators

$$3 \times \frac{1}{8} + \frac{2}{3} \times 8$$

$$\frac{3}{24} + \frac{16}{24}$$

$$\frac{19}{24}$$

Order of Operations



Example 1

$$(4 \times 7) + 3$$

So we need to evaluate the brackets first, $4 \times 7 = 28$

$$\text{This is now } 28 + 3 = 31$$

Example 2

$$(6 + 4 - 3)^2 \times 4$$

So we need to evaluate the brackets first and we work left to right; $6 + 4 - 3 = 7$

$$\text{This is now } 7^2 \times 4 = 49 \times 4 = 196$$

Example 3

$$4 - 8 \times 2 + 12 \div 4$$

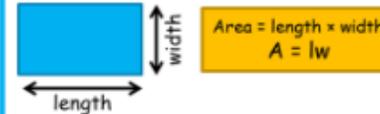
So first we do the multiplication/division left to right; $4 - 16 + 3$

Now we do the addition/subtraction from left to right; $-12 + 3 = -9$

Substituting into formulae

Once we have found out or written a formula, this gives us a **rule** or **method** to work with. We can then **substitute** in the values we know to get an answer.

Here is the formula for the area of a rectangle:



If we know that the **length = 5cm** and **width = 4cm**...

Or $l = 5, w = 4$...

We can substitute these values in to find the area.

$$A = lw = 5 \times 4 = 20 \text{ (cm}^2\text{)}$$

This formula calculates Body Mass Index (BMI).

$$\text{BMI} = \frac{\text{weight}}{\text{height}^2} = \frac{w}{h^2}$$

It is one way to measure whether a person is a healthy weight or not (a BMI between 18.5 and 25 is considered healthy).

If a person was 1.6m tall, ($h = 1.6$) and weighed 60 kg... ($w = 60$)

$$\text{BMI} = \frac{w}{h^2} = \frac{60}{1.6^2} = \frac{60}{2.56} = 23.4375$$

Watch Out!

Think BIDMAS: We need to calculate the power before we do the division.

A BMI of 23.4(ish) is healthy. This person would not need to lose weight (but should be careful not to gain too much more).

Solving with unknowns both sides

To solve an equation with unknown letters on both sides, add or subtract to get the unknown on **one side of the equation** only.

Solve $4x + 3 = 2x + 9$

Remove 2x by subtracting it from both sides.

$$4x + 3 = 2x + 9$$

$$- 2x$$

$$2x + 3 = 9$$

$$- 3$$

$$2x = 6$$

$$\div 2$$

$$x = 3$$

Here, $4x - 2x$ just leaves $2x$

The equation is then solved just like a normal two-step equation.

Solve $3x + 6 = 7x - 2$

$$3x + 6 = 7x - 2$$

$$- 3x$$

$$6 = 4x - 2$$

$$+ 2$$

$$8 = 4x$$

$$\div 4$$

$$2 = x$$

Solve $5x - 4 = x + 8$

$$5x - 4 = x + 8$$

$$- 1x$$

$$4x - 4 = 8$$

$$+ 4$$

$$4x = 12$$

$$\div 4$$

$$x = 3$$

Top Tip

To avoid getting negative x terms, always remove the smaller number of xs from both sides.





on a calculator

39% of 82
 0.39×82

Change to a decimal and multiply

fraction to %

$\frac{15}{20} = \frac{75}{100} = 75\%$
OR
 $15 \div 20 \times 100 = 75\%$

Percentages

%

without a calculator

- 50% - half
- 25% - half and half
- 75% - 50% + 25%
- 10% - divide by 10
- 5% - half 10%
- 20% - double 10%

increasing

Increase £60 by 12%

$12\% \text{ of } 60 = 0.12 \times 60 = \text{£}7.20$
New amount = $\text{£}60 + \text{£}7.20 = \text{£}67.20$

ADD

decreasing

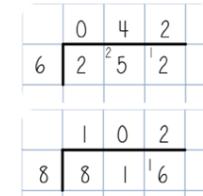
decrease £60 by 12%

$12\% \text{ of } 60 = 0.12 \times 60 = \text{£}7.20$
New amount = $\text{£}60 - \text{£}7.20 = \text{£}52.80$

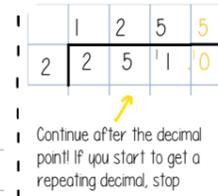
SUBTRACT

Written Methods for Division

SHORT DIVISION:



SHORT DIVISION with remainders:



Continue after the decimal point! If you start to get a repeating decimal, stop

LONG DIVISION:



This method relies on you being comfortable with multiples of your divisor in this case, 6!

Significant figures

If something is **significant**, it is big or important. The **most significant** thing is the biggest or most important thing.

3268

- 3 is worth the most in this number (3 thousand). It is the **first significant figure**.
- 2 is worth 2 hundred, and is the **second significant figure**.
- 6 is worth 6 tens, and is the **third significant figure**.
- 8 is worth 8 units, and is the **fourth and least significant figure**.

3268 rounded to 1 sig. fig.

$3268 \rightarrow 3000$

1 sf 3000

Look at the next digit. 2 is less than 5 - stay at 3000

3268 rounded to 2 sig. fig.

$3268 \rightarrow 3300$

2 sf 3200

Look at the next digit. 6 rounds up - go to 3300

Estimating

Billy can write 24 words a minute. Estimate how long it took him to write 643 words.

When estimating, we first need to round EVERY number in the question to one significant figure.

We round 24 to 1 s.f. 20
We round 643 to 1 s.f. 600
 $643 \div 24 \approx 600 \div 20 = 30 \text{ minutes}$

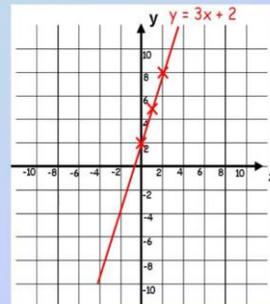
Fraction	Percent	Decimal
1	100%	1.0
1/2	50%	0.5
1/3	33.3%	0.33
1/4	25%	0.25
1/5	20%	0.2
1/6	16.6%	0.166
1/8	12.5%	0.125
1/10	10%	0.1
1/12	8.3%	0.083

Plotting Straight Line Graphs

- To plot a graph, you need to know at least 3 points

Plot a graph of the equation;

$y = 3x + 2$

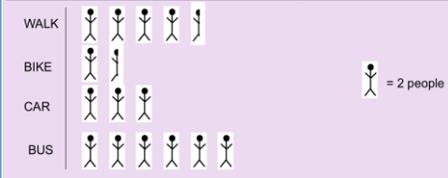


Choose any values for x, what y value will
 $x = 0 \rightarrow y = 2$ (0, 2)
 $x = 1 \rightarrow y = 5$ (1, 5)



Pictograms

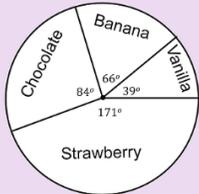
Method of Travel	Tally	Frequency
Walk		9
Bike		3
Car		6
Bus		12



Pie Charts

The information in the pie chart shows sales of 120 ice-creams sold from an ice-cream van on one Saturday afternoon in the summer. Calculate the number of each type sold.

Ice cream	Frequency	Angle
Banana	22	66°
Vanilla	13	39°
Strawberry	57	171°
Chocolate	28	84°
Total	120	360°



Check they add up to make the total!

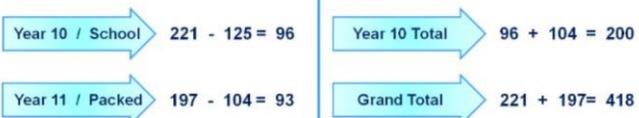
÷ 3

Two Way Tables

Two way tables present data which is split into different categories.

Example 2: This two way table shows the Lunch options for the pupils in a school. Complete the totals in the missing boxes.

	Year 10	Year 11	Totals
School Lunch	96	125	221
Packed Lunch	104	93	197
Totals	200	218	418



Triangular Prism

$$V = B \cdot h$$

$$SA = P \cdot h + 2 \cdot B$$

$$B = \frac{b \cdot h}{2}, P = b \cdot h + \ell$$

Rectangular Prism

$$V = B \cdot h$$

$$SA = P \cdot h + 2 \cdot B$$

$$B = b \cdot h, P = 2b + 2h$$

Cube

$$V = s \cdot s \cdot s = s^3$$

$$SA = 6 \cdot s \cdot s = 6s^2$$

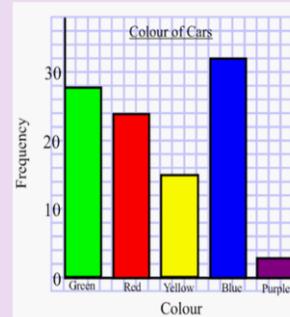
Surface Area is measured in square units

Volume is measured in cubic units

Shape	Area	Terms
Circle	$\pi \times r^2$	r = radius of the circle
Triangle	$\frac{1}{2} \times b \times h$	b = base h = height
Square	a^2	a = length of side
Rectangle	$l \times w$	l = length w = width
Parallelogram	$b \times h$	b =base h =vertical height
Trapezium	$\frac{1}{2}(a+b) \times h$	a and b are the length of parallel sides h = height

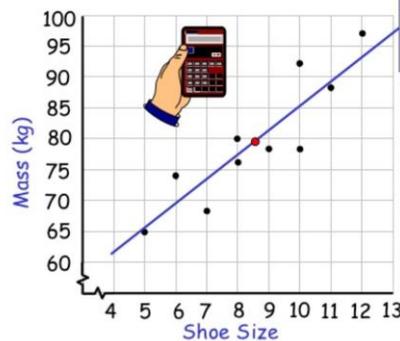
Rules for a bar chart

- Frequency on vertical axes
- Labels on axes
- Right scales
- Space between bars
- Bars with equal widths
- Title



(1). The table below shows the shoe size and mass of 10 men.
(a) Plot a scatter graph for this data and draw a line of best fit.

Size	5	12	7	10	10	9	8	11	6	8
Mass	65	97	68	92	78	78	76	88	74	80



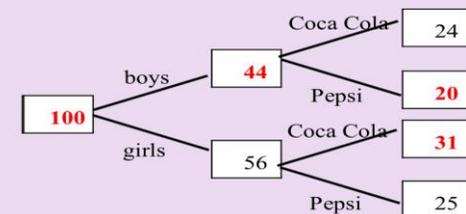
(b) Draw a line of best fit and comment on the correlation.

If you have a calculator you can find the mean of each set of data and plot this point to help you draw the line of best fit. Ideally all lines of best fit should pass through:
(mean data 1, mean data 2)
In this case: (8.6, 79.6)

Representing data

Frequency trees

100 people were asked whether they prefer Coca Cola or Pepsi. Complete the frequency tree to show the information.



Solving with unknowns both sides

To solve an equation with unknown letters on both sides, add or subtract to get the unknown on one side of the equation only.

Solve $4x + 3 = 2x + 9$

Remove $2x$ by subtracting it from both sides.

$$4x + 3 = 2x + 9$$

$$- 2x$$

$$2x + 3 = 9$$

$$- 3$$

$$2x = 6$$

$$\div 2$$

$$x = 3$$

Here, $4x - 2x$ just leaves $2x$

The equation is then solved just like a normal two-step equation.

Top Tip

To avoid getting negative x terms, always remove the smaller number of x s from both sides.

Solve $3x + 6 = 7x - 2$

$$3x + 6 = 7x - 2$$

$$- 3x$$

$$6 = 4x - 2$$

$$+ 2$$

$$8 = 4x$$

$$\div 4$$

$$2 = x$$

Solve $5x - 4 = x + 8$

$$5x - 4 = x + 8$$

$$- 1x$$

$$4x - 4 = 8$$

$$+ 4$$

$$4x = 12$$

$$\div 4$$

$$x = 3$$

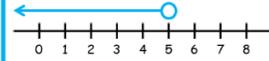
Inequalities on a number line

An open circle means that the value is **not included**:

$x > 2$ x is greater than 2

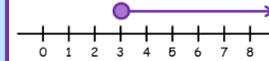


$x < 5$ x is less than 5

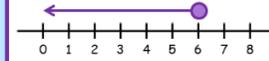


A filled in circle means that the value is **included**:

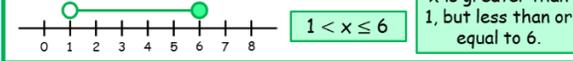
$x \geq 3$ x is greater than or equal to 3



$x \leq 6$ x is less than or equal to 6



If x is **between** two values, use **two circles**:



x is greater than 1, but less than or equal to 6.

Substituting into formulae

Once we have found out or written a formula, this gives us a **rule** or **method** to work with. We can then **substitute** in the values we know to get an answer.

Here is the formula for the area of a rectangle:



If we know that the **length = 5cm** and **width = 4cm**...

Or $l = 5, w = 4$...

We can substitute these values in to find the area.

$A = lw = 5 \times 4 = 20 \text{ (cm}^2\text{)}$

This formula calculates Body Mass Index (BMI).

$BMI = \frac{\text{weight}}{\text{height}^2} = \frac{w}{h^2}$

It is one way to measure whether a person is a healthy weight or not (a BMI between 18.5 and 25 is considered healthy).

If a person was **1.6m** tall, ($h = 1.6$) and weighed **60 kg**.. ($w = 60$)

$BMI = \frac{w}{h^2} = \frac{60}{1.6^2} = \frac{60}{2.56} = 23.4375$

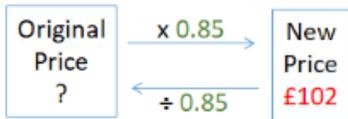
Watch Out! Think BIDMAS: We need to calculate the power before we do the division.

A BMI of 23.4(ish) is healthy. This person would not need to lose weight (but should be careful not to gain too much more).

Reverse Percentage

A jacket costs **£102** after a discount of **25%**. What is the original price of the jacket?

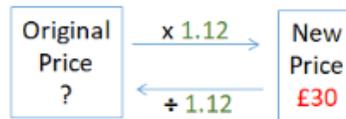
$100\% - 25\% = 85\% = 0.85$



Original price = $\text{£}102 \div 0.85 = \text{£}120$

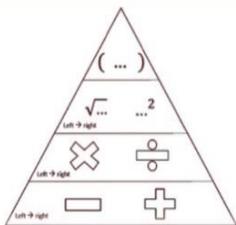
The price of a ticket costs **£30** inclusive of **12%** tax. What is the pre-tax cost of the ticket?

$100\% + 12\% = 112\% = 1.12$



Original price = $\text{£}30 \div 1.12 = \text{£}26.79$

Order of Operations



Example 1

$(4 \times 7) + 3$

So we need to evaluate the brackets first; $4 \times 7 = 28$

This is now $28 + 3 = \underline{31}$

Example 2

$(6 + 4 - 3)^2 \times 4$

So we need to evaluate the brackets first and we work left to right; $6 + 4 - 3 = 7$

This is now $7^2 \times 4 = 49 \times 4 = \underline{196}$

Example 3

$4 - 8 \times 2 + 12 \div 4$

So first we do the multiplication/division left to right; $4 - 16 + 3$

Now we do the addition/subtraction from left to right: $-12 + 3 = \underline{-9}$

Solving Quadratic Equations by Factorising

Some quadratic equations can be solved by factorising.

Example 1: Solve $x^2 + 11x + 28 = 0$

First factorise the quadratic expression

$(x + 7)(x + 4) = 0$

For the equation to equal 0, then either ...

$x + 7$ must equal 0

or

$x + 4$ must equal 0

If $x + 7 = 0$ then $x = -7$

If $x + 4 = 0$ then $x = -4$

$x = -7$ or $x = -4$



Finding the equation of the line

Example 1

Gradient = $\frac{4}{2} = 2$

Y intercept = 0

Equation: $y = 2x + 0$ or $y = 2x$

Example 2

Gradient = $-\frac{2}{3}$

Y intercept = 5

Equation: $y = -\frac{2}{3}x + 5$

Remember

Best way to find out a **gradient**

- 1) Draw a triangle, going from left to right
- 2) Change in y and change in x?
- 3) Use the formula:

Gradient = $\frac{\text{The change in y}}{\text{The change in x}}$

Remember

The **y intercept** is the point on the y axis where the straight line cross the y axis

Remember

$y = mx + c$

m is gradient c is y-intercept

TYPES OF GRAPHS

Knowing and being able to sketch the various types of graphs in Mathematics is vital. The following examples are standard graphs with their given names.

LINEAR GRAPH

QUADRATIC CURVE

CUBIC CURVE

EXPONENTIAL CURVE

LOGARITHMIC CURVE

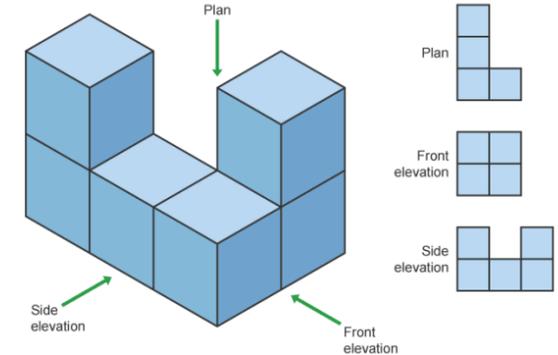
RECIPROCAL CURVE

Plans and Elevations

Plans and elevations help us plan and design structures. Architects use these when designing buildings.

- The view from the top (looking down on the structure) is called the plan.
- The views from the front and sides of the structure are called elevations. (The front view is the front elevation and the side view is the side elevation).

Example



Proportion

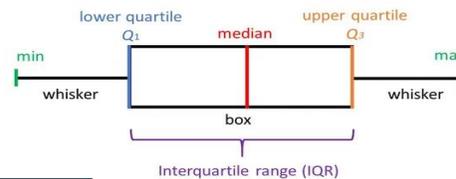
Direct Proportion

$y \propto x$
 $y = kx$ for a constant k

Inverse Proportion

$y \propto \frac{1}{x}$
 $y = \frac{k}{x}$ for a constant k

Box Plot



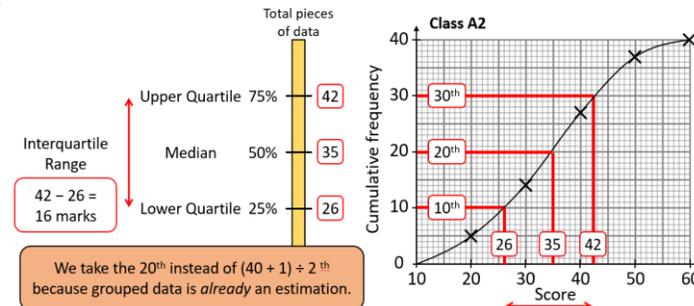
A cumulative frequency graph allows us to measure the spread of data.

By finding the value at each **quartile** (quarter) of the data, we can find the **median** and the spread of the **middle 50%**.

This measure eliminates extreme values.

Score	Students (Frequency)	Cumulative Frequency
11-20	5	5
21-30	9	14
31-40	13	27
41-50	10	37
51-60	3	40

Cumulative Frequency



Geometry – Bearings

Angle clockwise from North

075°

310°

Always 3 digits

75° → 075°

4° → 004°

Sentence Structure Important

The bearing of B from A is 075°

Lines North are Parallel

Co-Interior Angles

105° + θ° = 180°
θ° = 180° - 105° = 75°

Angles around a point

105° + φ° = 360°
φ° = 360° - 105° = 255°

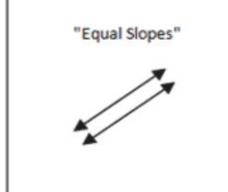
The bearing of A from B is 255°

Relationship with Slopes (m)

$m_1 = m_2$

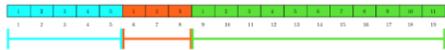
Line 1	Line 2
$\frac{1}{3}$	$\frac{1}{3}$
5	5
$-\frac{2}{7}$	$-\frac{2}{7}$

Parallel Lines

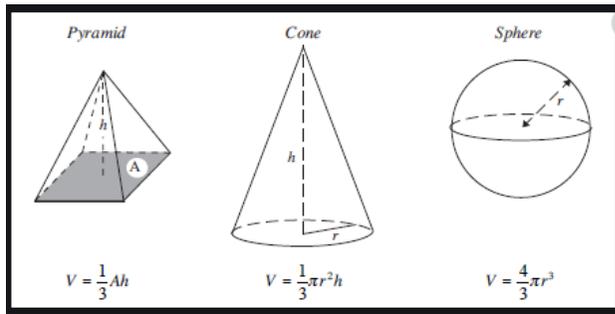




Ratios as fractions



5 : 3 : 11 Ratio
 $\frac{5}{19}$ $\frac{3}{19}$ $\frac{11}{19}$ Fraction

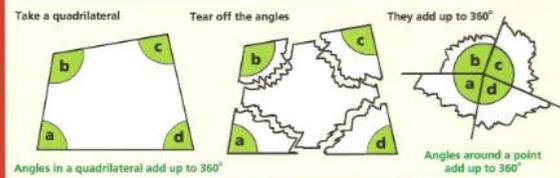


Volume of 3D shapes

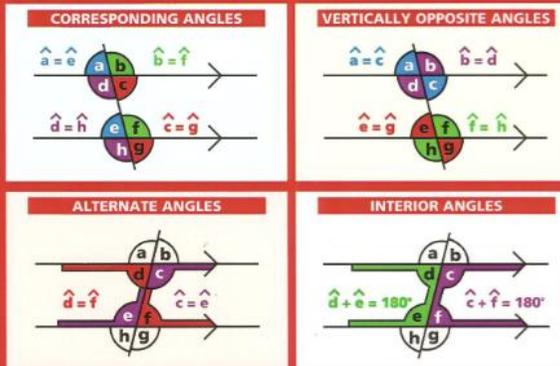
Properties of Quadrilaterals

Shape name	Drawing	Properties
Square		<ul style="list-style-type: none"> Four equal sides Four right angles Opposite sides parallel Diagonals bisect each other at right angles Four lines of symmetry Rotational symmetry of order four
Rectangle		<ul style="list-style-type: none"> Two pairs of equal sides Four right angles Opposite sides parallel Diagonals bisect each other Two lines of symmetry Rotational symmetry of order two
Rhombus		<ul style="list-style-type: none"> Four equal sides Two pairs of equal angles Opposite sides parallel Diagonals bisect each other at right angles Two lines of symmetry Rotational symmetry of order two
Parallelogram		<ul style="list-style-type: none"> Two pairs of equal sides Two pairs of equal angles Opposite sides parallel Diagonals bisect each other No lines of symmetry Rotational symmetry of order two
Kite		<ul style="list-style-type: none"> Two pairs of adjacent sides of equal length One pair of equal angles Diagonals intersect at right angles One line of symmetry
Arrowhead		<ul style="list-style-type: none"> Two pairs of adjacent sides of equal length One pair of equal angles Diagonals intersect at right angles outside the shape One line of symmetry
Trapezium		<ul style="list-style-type: none"> One pair of parallel sides Isosceles quadrilaterals of this kind have one line of symmetry.

ANGLE PROPERTIES



ANGLE PROPERTIES OF PARALLEL LINES



POLYGONS

A POLYGON IS A MANY - SIDED FIGURE

A polygon is called regular when all its sides and angles are equal and irregular when the angles and sides are not all equal.

INTERIOR ANGLE SUM

NUMBER OF SIDES	3	4	5	6	7
NUMBER OF TRIANGLES	1	2	3	4	5
SUM OF INTERIOR ANGLES	180°	360°	540°	720°	900°

NOTICE THE PATTERN, there are always 2 fewer triangles than sides.

EXTERIOR ANGLE SUM

The exterior angles of ANY POLYGON add up to 360°

In a REGULAR POLYGON each exterior angle = $\frac{360^\circ}{\text{No. of angles}}$

Interior angle + exterior angle = 180° (Angles on a straight line)

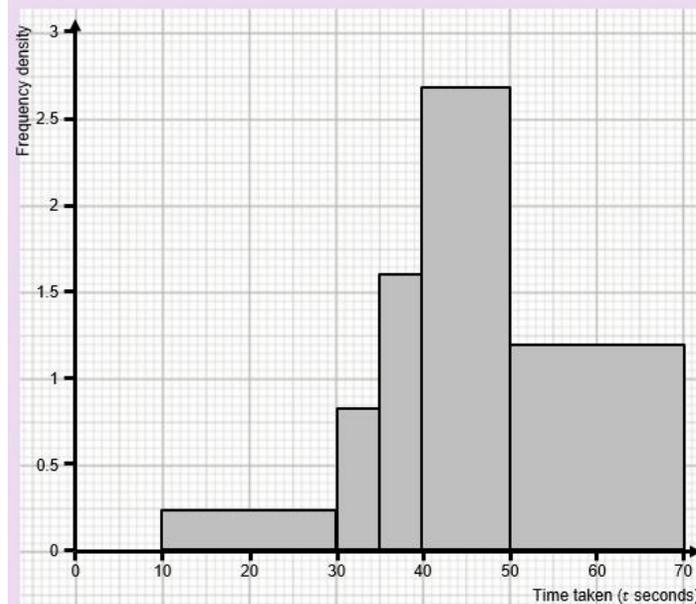
Types of Triangles

By Side	By Angle
 Equilateral Triangle has three equal sides	 Acute triangle has three angles < 90°
 Isosceles Triangle has two equal sides	 Right triangle has one angle = 90°
 Scalene Triangle has no equal sides	 Obtuse triangle has one angle > 90°

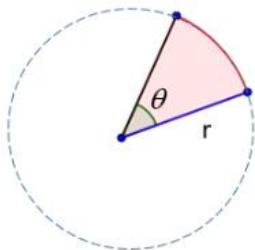
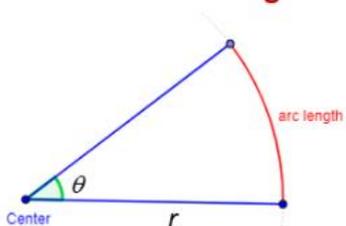


Histogram

Time taken (t seconds)	Frequency	Class width	Frequency density
10 < t ≤ 30	5	20	0.25
30 < t ≤ 35	4	5	0.8
35 < t ≤ 40	8	5	1.6
40 < t ≤ 50	27	10	2.7
50 < t ≤ 70	24	20	1.2



Arc Length and Area of Sector



If θ is measured in degrees then

$$\text{arc length} = \frac{\theta}{360^\circ} \times 2\pi r$$

If θ is measured in degrees then

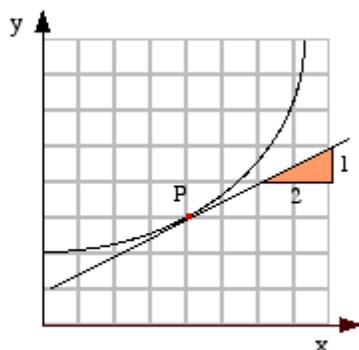
$$\text{area of sector} = \frac{\theta}{360^\circ} \times \pi r^2$$

Rules of indices

Rule	Example
$a^m \times a^n = a^{m+n}$	$2^5 \times 2^3 = 2^8$
$a^m \div a^n = a^{m-n}$	$5^7 \div 5^3 = 5^4$
$(a^m)^n = a^{m \times n}$	$(10^3)^7 = 10^{21}$
$a^1 = a$	$17^1 = 17$
$a^0 = 1$	$34^0 = 1$
$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$	$\left(\frac{5}{6}\right)^2 = \frac{25}{36}$
$a^{-m} = \frac{1}{a^m}$	$9^{-2} = \frac{1}{81}$
$a^{\frac{x}{y}} = \sqrt[y]{a^x}$	$49^{\frac{1}{2}} = \sqrt{49} = 7$

The **gradient of a curve** at any point is given by the gradient of the tangent at that point.

The **gradient of a curve** is different at each point on the curve.



$$\text{Gradient of curve at P} = \text{Gradient of tangent at P} = \frac{1}{2}$$

Perpendicular lines

Perpendicular Lines

"Opposite Reciprocal Slopes"



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

Line 1	Line 2
$\frac{1}{3}$	$-\frac{3}{1}$
5	$-\frac{1}{5}$
$-\frac{2}{7}$	$\frac{7}{2}$

Accuracy and calculations

Operation	Minimum value	Maximum Value
Addition	LB + LB	UB + UB
Subtraction	LB - UB	UB - LB
Multiplication	LB x LB	UB x UB
Division	LB/UB	UB/LB

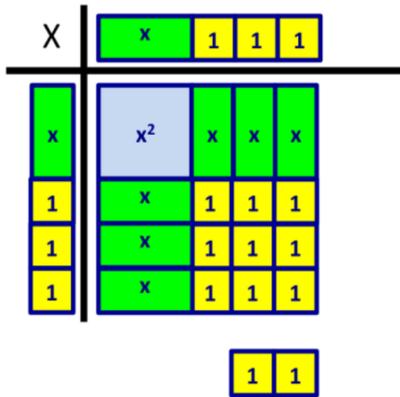
Nothing that is measured can be 100% accurate. Whether you are using a ruler, a protractor, a thermometer or a set of kitchen scales, there will always be an error of \pm half the unit of accuracy used.

Quantity given to the nearest...	Minimum value	Maximum Value
0.1 (to 1 decimal place)	Given value - 0.05	Given value + 0.05
Whole Number	Given value - 0.5	Given value + 0.5
Ten	Given value - 5	Given value + 5
Hundred	Given value - 50	Given value + 50
Thousand	Given value - 500	Given value + 500



Completing the square

Write $x^2 + 6x + 11$ in the form $(x + a)^2 + b$



Both factors are the same so you need to share your x terms equally between columns and rows.

The remainder 1s left over is the b term.

$$(x + 3)^2 + 2$$

Recurring Decimals to Fractions

- Let x = recurring decimal.
- Let n = the number of recurring digits.
- Multiply the recurring decimal by 10ⁿ.
- Subtract (1) from (3) to eliminate the recurring part.
- Solve for x, expressing your answer as a fraction in its simplest form.

Examples:

$$0.\dot{7} \text{ (one recurring digit)}$$

$$x = 0.7777\dots$$

$$10x = 7.777\dots$$

$$10x - x = 7$$

$$9x = 7$$

$$x = \frac{7}{9}$$

$$1.2\dot{5}\dot{6} \text{ (two recurring digits)}$$

$$x = 1.25656\dots$$

$$100x = 125.6565\dots$$

$$100x - x = 125.6565\dots - 1.256565\dots$$

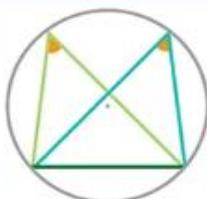
$$99x = 124.4$$

$$x = \frac{124.4}{99} = \frac{1244}{990} = \frac{622}{495}$$

CIRCLE THEOREMS

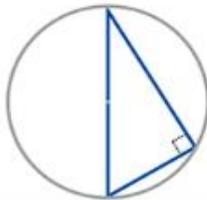
TIGER MOON
THE TIGER MOON TRADING COMPANY LTD

Angles in the same segment and standing on the same chord are always equal.

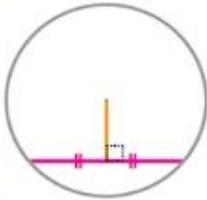


Circles have a number of different angle properties, these are described as Theorems.

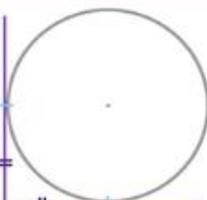
The angle in a semi-circle is always 90°.



A line drawn from the centre of a circle to the mid-point of a chord is perpendicular to the chord at 90°.



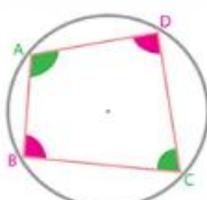
Tangents from a common point (A) to a circle are always equal in length. **AB = AC**



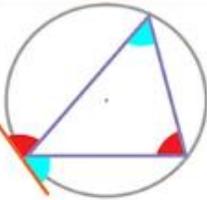
The angle at the centre of a circle is twice the angle at the circumference.



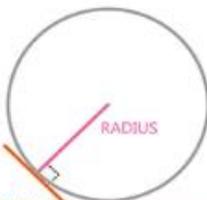
ABCD is a cyclic quadrilateral, all vertices lie on the circumference of the circle. Opposite angles add up to 180°. **A+C=180° B+D=180°**



The angle between the tangent and the side of the triangle is equal to the interior opposite angle.



The angle between the tangent and the radius is always 90°.



KEY WORDS:

- SUBTENDED
- CIRCUMFERENCE
- TANGENT
- PERPENDICULAR
- OPPOSITE
- ANGLE
- CHORD
- SEGMENT

AQA Biology (Combined Science) Unit 7: Ecology Knowledge Organiser

Keywords

Biodiversity - the variety of living organisms.

Carrion - decaying flesh and tissue of dead animals.

Community - made up of the populations of different species living in a habitat.

Competition - the negative interaction between two or more organisms which require the same limited resource.

Consumers - feed on other organisms for their energy. Can be primary, secondary or tertiary.

Decomposers - organisms which feed on dead and decaying organisms. They break down the biomass and release nutrients into the soil.

Deforestation - the removal and destruction of trees in forest and woodland.

Ecosystem - the interaction between the living organisms and the different factors of the environment.

Global warming - the increase of the average global temperature.

Habitat - where a living organism lives.

Interdependence - the interaction between two or more organisms, where it is mutually beneficial.

Population - the number of individual organisms of a single species living in a habitat.

Predators - organisms which kill for food.

Prey - the animals which are eaten by the predators.

Producers - convert the sun's energy into useful compounds through photosynthesis. They are green plants or algae.

Scavengers - organisms which feed on dead animals (carrion).

Species - organisms of similar morphology which can interbreed to produce fertile offspring.

Abiotic and Biotic Factors

Abiotic factors are the non-living factors of an environment. E.g. moisture, light, temperature, CO₂, wind, O₂ or pH.

Biotic factors are the living factors of an environment. E.g. predators, competition, pathogens, availability of food.

Adaptations

Adaptations are specific features of an organism which enable them to survive in the conditions of their habitat.

Adaptations can be structural, behavioural or functional:

- **Structural adaptations** are features of the organism's body e.g. colour for camouflage.
- **Behavioural adaptations** are how the organism behaves e.g. migration to a warmer climate during colder seasons.
- **Functional adaptations** are the ways the physiological processes work in the organism e.g. lower metabolism during hibernation to preserve energy.

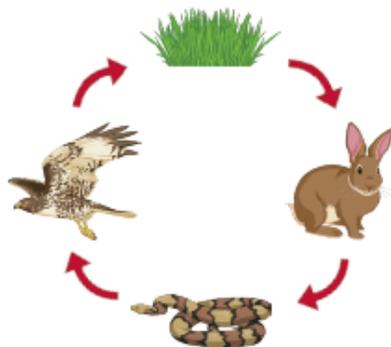
A plant or animal will not physically change to adapt to its environment in its lifetime. Instead, there is natural variation within the species and only organisms whose features are more advantageous in the environment survive. The survivors then go on to reproduce and pass on their features to some of their offspring. The offspring who inherit these advantageous features are better equipped to survive.

Charles Darwin described this process as 'survival of the fittest'.



Food Chains

The source of all energy in a food chain is the sun's radiation. It is made useful by plants and algae which produce organic compounds through photosynthesis.

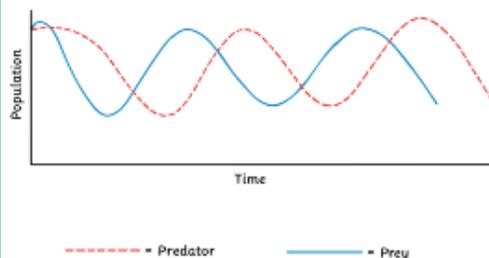


The living organisms use the energy to produce biomass and grow.

When a living organism is consumed, some of the biomass and energy is transferred. Some of the energy is lost.

Remember: the arrow in a food chain indicates the direction of the flow of energy.

Populations of predators and prey increase and decrease in cycles. The size of the predator population depends on the size of the prey population and vice versa. Overall, there is a stable community.



Competition

Species will compete with one another and also within their own species to survive and to reproduce.

Mutualism occurs when both species benefit from a relationship.

Parasitism occurs when a parasite only benefits from living on the host.

Animals compete for resources such as food, water and space/shelter. They may also compete within their own species for mates.

Plants compete for resources including light, water, space and minerals. All these resources are needed for photosynthesis so the plant can make its own food. Plants do not need to compete for food.

Deforestation and Land Use

Humans use land for buildings, quarrying, mining, agriculture and landfill. As the human population increases and we take more land, there is less space for other organisms to live.

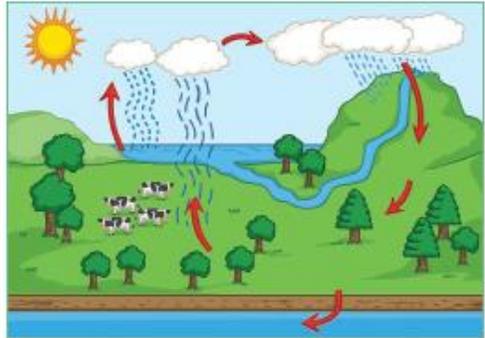
Deforestation (to use wood as a fuel/material or to clear space for other uses) destroys habitats where other organisms live.

Peat bogs are produced when decomposition occurs over a very long time. Peat stores a lot of carbon and can be extracted for use by gardeners or as an energy source. Burning peat releases a lot of carbon dioxide into the atmosphere which contributes to the greenhouse effect.

Trees absorb carbon dioxide for photosynthesis, so as they are cut down and removed, less carbon dioxide is taken from the atmosphere. Furthermore, when the trees are burned, they release carbon dioxide back into the atmosphere. The excess carbon dioxide can lead to global warming and the changes to the ecosystem cause reduced biodiversity.

AQA Biology (Combined Science) Unit 7: Ecology Knowledge Organiser

Water Cycle



Convection is the movement caused within a fluid as the hotter, less dense material rises and colder, denser material sinks under the influence of gravity. This results in the transfer of heat.

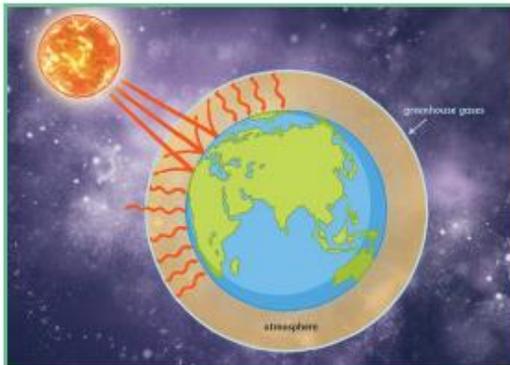
Evaporation occurs when heat energy from the surroundings (or a heat source) is transferred to water particles as kinetic energy. The particles begin to move more rapidly and can turn from a liquid into a gas.

Condensation occurs when moving particles transfer kinetic energy to the surroundings. The particles begin to move even more slowly and can turn from a gas into a liquid.

Precipitation occurs when rain, snow, sleet, or hail falls to (or condenses on) the ground.

Transpiration is the process by which water is carried through plants from roots to the stomata on the underside of leaves and it evaporates into the surroundings.

Global Warming



The **greenhouse effect** is the natural process where some of the Sun's radiation is trapped within the insulating layer of the atmosphere. This maintains a temperature suitable to support life on Earth.

Most of the radiation from the Sun is absorbed by the Earth when it reaches the surface. The rest of the infrared radiation is reflected from the surface and absorbed by the greenhouse gases and clouds in the atmosphere. This is then re-emitted in all directions.

However, due to many contributing factors, the global temperature is gradually increasing. Several gases, called **greenhouse gases**, trap the heat around the Earth; the most concerning is carbon dioxide. Human activities contribute to the excess amount of carbon dioxide in the atmosphere and so are a cause of global warming.

Global warming leads to the melting of ice caps, rising sea levels, flooding, changes to climate, changes in migration patterns, changes in species distribution and reduction in biodiversity.

RPI: Field Techniques Quadrats and Transects

The distribution of an organism is affected by the environment and abiotic factors.

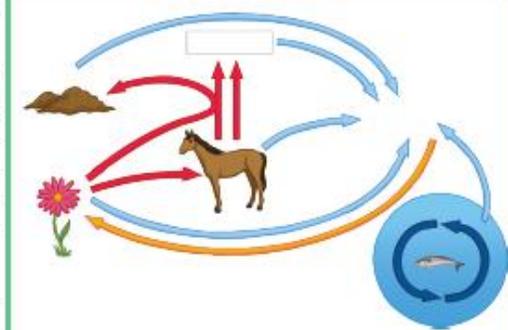
Quadrats can be used to measure the frequency of an organism in a given area e.g. the school field. You could count the individual organisms or estimate the percentage cover. You must collect data from at least two areas to make a comparison. Quadrats should always be placed randomly.

Transects are used to measure the change of distribution across an area e.g. from the edge of a river and moving further from the water's edge. You could either count the number of organisms touching the transect at regular intervals or use a quadrat placed at regular intervals along the transect.

$$\text{mean} = \frac{\text{total number of organisms}}{\text{number of quadrats}}$$



Carbon Cycle



The main focus on the carbon cycle is its transfer to and from the atmosphere. When carbon is in the atmosphere, it combines with oxygen to form carbon dioxide, a greenhouse gas.

Carbon is transferred from the atmosphere when plants absorb carbon dioxide for photosynthesis and when the gas is dissolved into oceans.

Carbon is transferred to the atmosphere through respiration by animals, plants and bacteria and by combustion of fossil fuels (coal, oil and natural gas).

Dead animals and plants are decomposed and their matter is broken down by microbes and fungi. These organisms are collectively called **decomposers**. When the organisms are broken down, the microbes and fungi release carbon dioxide into the atmosphere through respiration.



AQA Biology (Combined Science) Unit 7: Ecology Knowledge Organiser

Biodiversity and Waste Management

Biodiversity is the variety of living organisms on the earth or in an ecosystem. It is important in helping to maintain stable ecosystems. Organisms are often interdependent, relying on others as food sources, or to create suitable environmental conditions to survive. Human survival is also dependent on this biodiversity.

The global human population has exceeded 7 billion.

Human population has increased due to modern medicine and farming methods, reducing famine and death from disease.

This means a greater demand for food, resources and water.

It also means more waste and emissions are created.



Sewage, toxic chemicals, household waste and gas emissions pollute the water, land and air, killing plants and animals and reducing biodiversity.

Maintaining Ecosystems and Biodiversity

There are many ways that biodiversity and ecosystems are maintained:

- Breeding programmes can help to protect endangered species from extinction.
- Conservation programmes can help to protect and preserve specialised ecosystems and habitats such as peat bogs and coral reefs.
- Reintroduction of hedgerows and field margins on agricultural land can help improve biodiversity by breaking up the monoculture crops.
- Sustainable forestry programmes help to manage the woodlands and reduce the deforestation to a sustainable rate.
- Societies actively encourage recycling and reusing of products and packaging to reduce the household waste going to landfill sites.

Unfortunately these programmes can be difficult to manage. They are often expensive and are difficult to regulate. People who are employed in certain areas, e.g. tree felling, cannot always transfer their skills to an environmentally friendly role and so become unemployed. It is difficult to maintain biodiversity whilst preventing crops being overrun with pests and weeds, which would affect food security for the human population.

AQA GCSE Chemistry (Combined Science) Unit 7: Organic Chemistry Knowledge Organiser

Crude Oil

Hydrocarbons are compounds that are made up of the elements **hydrogen** and **carbon** only.

Crude oil is a **non-renewable resource**, a **fossil fuel**. Crude oil is made up of a mixture of compounds, most of which are **long- and short-chain hydrocarbons**.

Most of the compounds in crude oil are hydrocarbons called **alkanes**. The alkanes form a **homologous series**. This is a family of hydrocarbons that all share the **same general formula** and have **chemical properties** that are **similar**.

Alkanes are held together by **single bonds**.

The **general formula** for an alkane is C_nH_{2n+2} .

They differ from the neighbouring alkane with the addition of a CH_2 .

Alkanes are **saturated hydrocarbons**. This means that all their bonds are taken up and they cannot bond to any more atoms.

Alkanes have **similar chemical properties** but have **different physical properties** due to differences in chain length. The longer the chain, the higher the boiling point of the hydrocarbon.

The first four alkanes are: methane, ethane, propane and butane.

A mnemonic to help you remember the order of the alkanes: mice eat paper bags.



Fractional Distillation

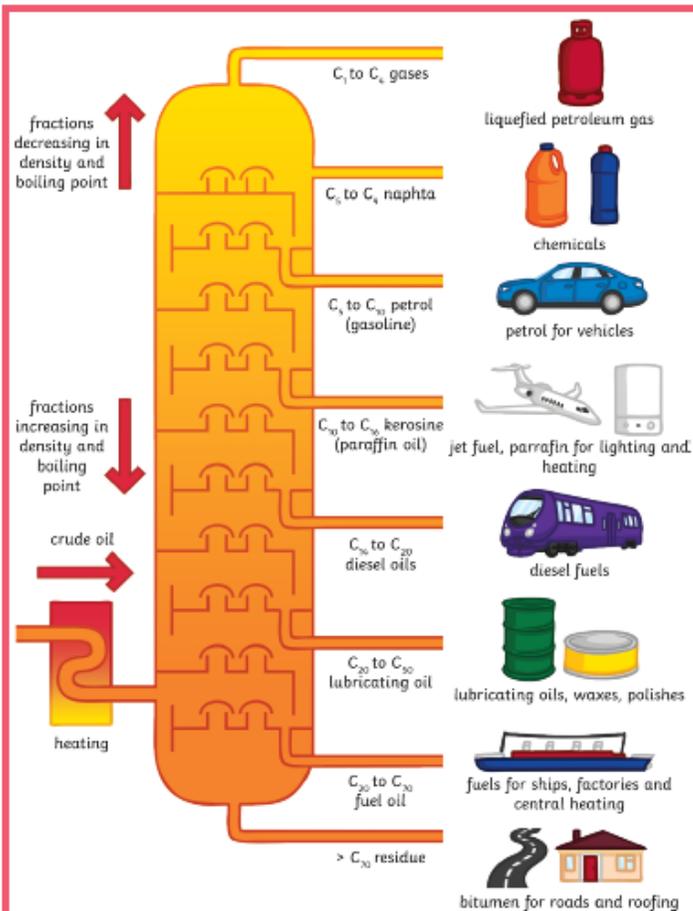
Fractional distillation is used to **separate** a mixture of long-chain hydrocarbons in crude oil into smaller, more useful fractions.

Hydrocarbons have different boiling points depending on their chain length. Each fraction contains **hydrocarbons of a similar chain length**. These fractions will boil at different temperatures due to the difference in sizes of the molecules. The different parts of crude oil are called fractions because they are a small part of the original mixture.

Crude oil is heated and enters at all column called a **fractioning column**. The column is **hot at the bottom** and decreases in temperature toward the top. As the crude oil is heated, it begins to evaporate and its vapours begin to rise up through the column. These vapours condense at the different fractions.

Short-chain hydrocarbons are found at the **top** of the column. This is because shorter chain molecules are held together by **weak intermolecular forces** resulting in low boiling points. These shorter chain hydrocarbons leave the column as **gas**.

Long-chain hydrocarbons are found at the bottom of the column and are held together by **strong intermolecular forces**, resulting in high boiling points.



Name of Alkane	Structural Formula	Molecular Formula
methane	$\begin{array}{c} H \\ \\ H-C-H \\ \\ H \end{array}$	CH_4
ethane	$\begin{array}{c} H & H \\ & \\ H-C & -C-H \\ & \\ H & H \end{array}$	C_2H_6
propane	$\begin{array}{c} H & H & H \\ & & \\ H-C & -C & -C-H \\ & & \\ H & H & H \end{array}$	C_3H_8
butane	$\begin{array}{c} H & H & H & H \\ & & & \\ H-C & -C & -C & -C-H \\ & & & \\ H & H & H & H \end{array}$	C_4H_{10}

Combustion

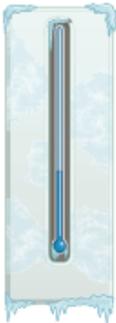
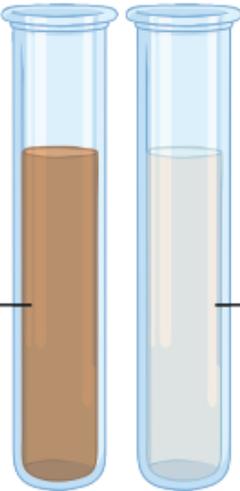
Complete combustion occurs when there is **enough oxygen** for a fuel to burn. A hydrocarbon will react with oxygen to produce carbon dioxide and water.



Incomplete combustion occurs when there isn't **enough oxygen** for a fuel to burn. The products in this reaction are water and poisonous **carbon monoxide**.



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Cracking	Test for Alkanes			
<p>Cracking is an example of a thermal decomposition reaction. Long-chain hydrocarbons can be broken down into shorter, more useful hydrocarbon chains.</p>	<p>Bromine, when added to an alkane, will remain brown/orange. Alkanes are saturated hydrocarbons, they have no double bonds which could be broken to accept the bromine molecule and so remain orange.</p>	Short-Chain Molecules	Increasing Chain Length	Long-Chain Molecules
<p>Cracking can be carried out with a catalyst in catalytic cracking or with steam in steam cracking.</p>	<p>Bromine, when added to an alkene, will change from brown/orange to colourless. This is because alkenes are unsaturated hydrocarbons. The double bond breaks and the bromine molecule is accepted.</p>		<p>As chain length increases, the boiling point of the hydrocarbon chains also increases.</p>	
<p>Catalytic cracking involves heating a hydrocarbon to a high temperature (550°C) and passing over a hot catalyst.</p>	<p>alkane alkene</p> 	<p>thin</p> 	<p>Viscosity describes how easily a substance can flow e.g. treacle is very viscous; it is thick.</p>	<p>thick</p> 
<p>Cracking of a long-chain hydrocarbon produces a short-chain alkane and an alkene.</p>	<p>Making Polymers</p>		<p>Flammability is a measure of how easily a substance burns.</p>	
<p>Alkenes are another type of hydrocarbon that is double bonded. The general formula for an alkene is C_nH_{2n}.</p>	<p>The fractional distillation of crude oil and cracking produces an array of hydrocarbons that are key to our everyday lives.</p> <p>Alkenes are used to produce plastics such as poly(ethene) which is used to make plastic bags, drinks bottles and dustbins. Poly(propene), another polymer, forms very strong, tough plastic.</p>	<p>Diagram illustrating the cracking of a long-chain hydrocarbon (alkane) into a short-chain alkane and a short-chain hydrocarbon (alkene).</p> <p>Long Hydrocarbon (Alkane): $H-C-C-C-C-C-C-H$</p> <p>Short Hydrocarbon (Alkene): $H-C=C-H$</p> <p>Short Hydrocarbon (Alkane): $H-C-C-C-C-H$</p>		
<p>Alkenes are unsaturated hydrocarbons. In a chemical reaction, the double bond of the alkenes can break. This allows other atoms to bond to it.</p>				

AQA GCSE Chemistry (Combined Science) Unit 8: Chemical Analysis

Pure Substances

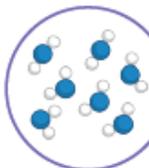
Pure substances, in chemistry, only contain **one type of element** or **one type of compound**. For example, pure water will just contain water (a compound).

In our everyday language, we use the word 'pure' differently to how it is used in chemistry. Pure can mean a **substance** that has had **nothing else added to it** and is in its natural state. An example of this is pure orange juice. This means that the bottle will just contain orange juice and no other substances.

Elements are made up of **one type of atom**.

For example, oxygen is made up of oxygen atoms.

Carbon is made up of carbon atoms.

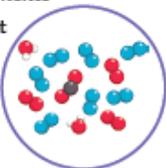


Compounds are **two or more elements** that are **chemically joined together**.

For example, NaCl which is sodium chloride.

Mixtures are **two or more elements or compounds** that are **not**

chemically joined together. An example of this is a standard cup of coffee. Coffee contains water, milk, coffee and possibly sugar. The components of the cup of coffee are not bonded together.



Pure Substances have a **sharp melting point** compared to **impure** substances which **melt over a range of temperatures**.

Formulations

Formulations are **mixtures of compounds or substances** that **do not react together**. They **do produce a useful product** with desirable characteristics or properties to suit a particular function.

There are examples of formulations all around us such as medicines, cleaning products, deodorants, hair colouring, cosmetics and sun cream.

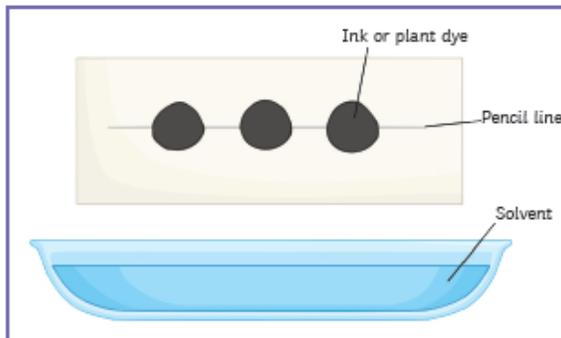
Chromatography

Paper chromatography is a separation technique that is used to **separate mixtures of soluble substances**. How soluble a substance is determines how far it will travel across the paper.

In chromatography, there are **two phases**: the **mobile phase** and **stationary phase**.

The **mobile phase moves** through the stationary phase.

The **solvent is the mobile phase**. It moves through the paper carrying the different substances with it.

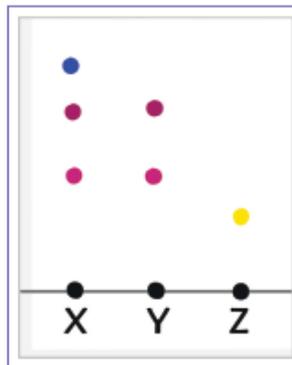


The **stationary phase** in paper chromatography is the **absorbent paper**.

Separation of the dissolved substances produces what is called a **chromatogram**. In paper chromatography, this can be used to **distinguish** between those substances that are **pure** and those that are **impure**.

Pure substances have **one spot** on a chromatogram as they are made from a single substance. **Impure substances** produce **two or more spots** as they contain multiple substances.

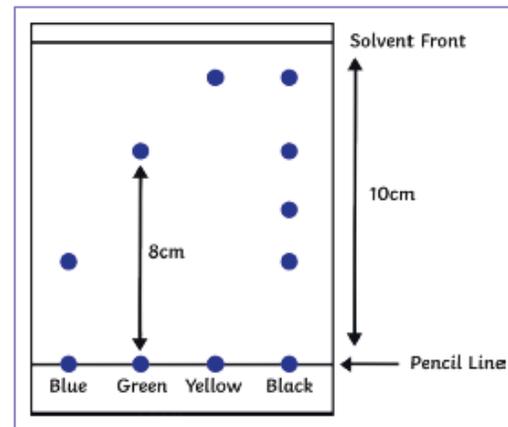
By calculating the **R_f values** for each of the spots, it is possible to identify the unknown substances. Similarly, if an unknown substance produces the **same number and colour of spots**, it is possible to match it to a known substance.



R Value

$$R_f = \frac{\text{distance travelled by substance}}{\text{distance travelled by solvent}}$$

Different compounds have different **R_f** values in different solvents. The **R_f** values of known compounds can be used to help identify unknown compounds.



AQA GCSE Chemistry (Combined Science) Unit 8: Chemical Analysis

Required Practical – Paper Chromatography

Investigate how paper chromatography can be used to separate and distinguish between coloured substances.

Step 1 – Using a ruler, measure 1cm from the bottom of the chromatography paper and mark with a small dot using a pencil. Rule a line across the bottom of the chromatography paper with a pencil, going through the dot you have just made.

Step 2 – Using a pipette, drop small spots of each of the inks onto the pencil line. Leave a sufficient gap between each ink spot so that they do not merge.

Step 3 – Pour a suitable solvent into the bottom of a container such as a beaker. The solvent should just touch the chromatography paper. The solvent line must not go over the ink spots as this will cause the inks to run into each other.

Step 4 – Place the chromatography paper into the container and allow the solvent to move up through the paper.

Step 5 – Just before the solvent line reaches the top of the paper, remove the chromatogram from the container and allow to dry.

Step 6 – Once the chromatogram has dried, measure the distance travelled by the solvent.

Step 7 – Measure the distance travelled by each ink spot.

Step 8 – Calculate the R_f value. Compare the R_f values for each of the spots of ink.

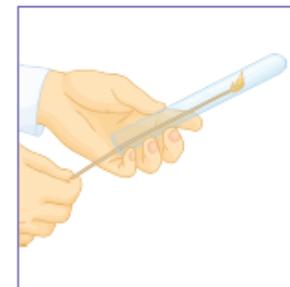
$$R_f = \frac{\text{distance travelled by substance}}{\text{distance travelled by solvent}}$$

Identification of the Common Gases



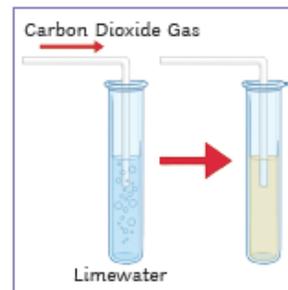
The Test for Hydrogen

Place a burning splint at the opening of a test tube. If hydrogen gas is present, it will burn rapidly with a **squeaky-pop sound**.



The Test for Oxygen

Place a glowing splint inside a test tube. The splint will **relight** in the presence of oxygen.

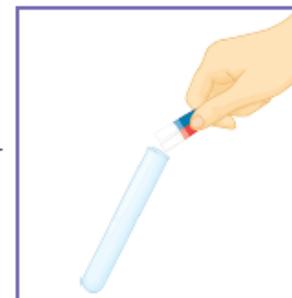


The Test for Carbon Dioxide

Calcium hydroxide (lime water) is used to test for the presence of carbon dioxide. When carbon dioxide is bubbled through or shaken with limewater, the limewater turns **cloudy**.

The Test for Chlorine

Damp litmus paper is used to test for chlorine gas. The litmus paper becomes **bleached and turns white**.



AQA Combined Science: **Physics Topic 5 Forces****Scalar and Vector Quantities**

A **scalar** quantity has **magnitude** only. Examples include temperature or mass.

A **vector** quantity has both **magnitude** and **direction**. Examples include velocity.

Speed is the scalar magnitude of **velocity**.

A vector quantity can be shown using an **arrow**. The size of the arrow is relative to the magnitude of the quantity and the direction shows the associated direction.

Contact and Non-Contact Forces

Forces either **push** or **pull** on an object. This is as a result of its interaction with another object.

Forces are categorised into two groups:

Contact forces – the objects are touching e.g. friction, air resistance, tension and contact force.

Non-contact forces – the objects are not touching e.g. gravitational, electrostatic and magnetic forces.

Forces are calculated by the equation: **force (N) = mass (kg) × acceleration (m/s²)**

Forces are another example of a **vector quantity** and so they can also be represented by an **arrow**.

**Gravity**

Gravity is the natural phenomenon by which any object with mass or energy is drawn together.

- The **mass** of an object is a scalar measure of how much matter the object is made up of. Mass is measured in **kilograms (kg)**.
- The **weight** of an object is a vector measure of how gravity is acting on the mass. Weight is measured in **newtons (N)**.

$$\text{weight (N)} = \text{mass (kg)} \times \text{gravitational field strength (N/kg)}$$

(The gravitational field strength will be given for any calculations. On earth, it is approximately 9.8N/kg).

An object's **centre of mass** is the point at which the **weight** of the object is considered to be acting. It does not necessarily occur at the centre of the object.

The **mass** of an object and its **weight** are **directly proportional**. As the mass is increased, so is the weight. Weight is measured using a **spring-balance** (or **newton metre**) and is measured in **newtons (N)**.

Resultant Forces

A **resultant force** is a single force which replaces several other forces. It has the same effect acting on the object as the combination of the other forces it has replaced.

The forces acting on this object are represented in a **free body diagram**.

The arrows are relative to the magnitude and direction of the force.

The car is being pushed to the left by a force of 30N. It is also being pushed to the right by a force of 50N.



The **resultant force** is $50\text{N} - 30\text{N} = 20\text{N}$

The 20N resultant force is pushing to the right, so the car will move right.

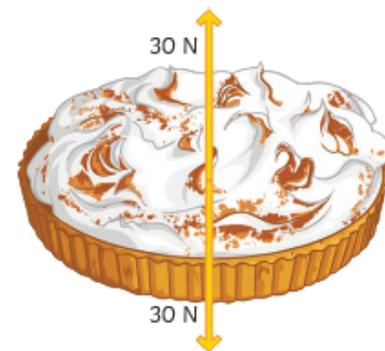
When a resultant force is not zero, an object will **change speed (accelerate or decelerate)** or **change direction (or both)**.

When an object is stationary, there are still forces acting upon it.

In this case, the **resultant force** is $30\text{N} - 30\text{N} = 0\text{N}$.

The forces are in **equilibrium** and are **balanced**.

When forces are balanced, an object will either **remain stationary** or if it is moving, it will continue to move at a **constant speed**.



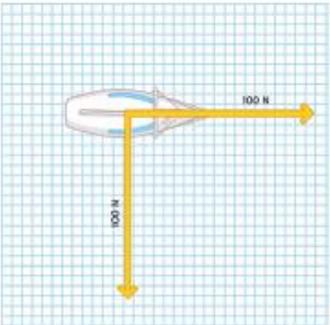
When resultant forces act along the same line, you calculate the resultant force as shown below.

Resultant Forces

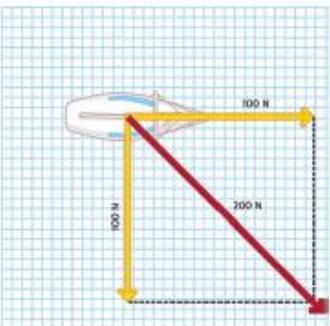
A **scale vector diagram** can be used to calculate **resultant forces** that are not acting directly opposite of one another, on a straight line.

Worked example 1:

A boat is being pulled toward the harbour by two winch motors. Each motor is pulling with a force of 100N and they are working at right angles to one another.



To find the resultant force, you would first draw construction lines from the end of each arrow parallel to the other force arrow.



Remember that the size of the arrow is representative of the size of the force being exerted.

Where the construction lines intercept indicates the direction of the resultant force: from the centre of mass through the intercept.

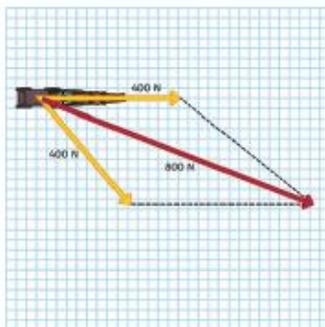
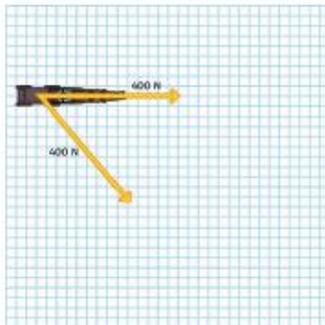
The resultant force is the sum of the forces acting so in this example, that is 200N.

Measure the size of the arrows and make sure you draw your resultant force arrow to the correct scale so it represents the resultant force size.

Worked example 2:

A horse-drawn carriage is pulled by two horses at 400N each. One of the horses is pulling in a different direction to the other horse. Show the resultant force and direction of the horse-drawn carriage.

As before, you will need to draw construction lines from the end of each force arrow and parallel to the other one. The intercept represents the direction of the resultant force. The resultant force is the sum of the individual forces so in this example, it is 800N.



Work Done and Energy Transfer

When a force acts on an object and makes it move, there is **work done** on the object. This movement requires energy. The **input energy** could be from fuel, food or electricity for example.

The energy is **transferred to a different type of energy** when the work is done. Not all the energy transfers are useful, sometimes energy is **wasted**. For example, when car brakes are applied, some energy is wastefully transferred as heat to the surroundings. **Work done against the force of friction** always causes a **temperature rise** in the object.

Work done is calculated by this equation:

work done [energy transferred] (J) = force (N) × distance moved (in the direction of the force) (m)

Worked example

A man's car has broken down and he is pushing it to the side of the road. He pushes the car with a force of 160N and the car is moved a total of 8m. Calculate the energy transferred.

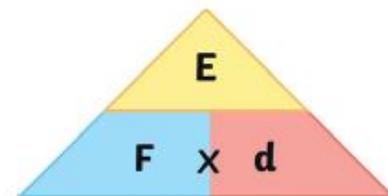
$$E = F \times d$$

$$E = 160 \times 8$$

$$E = 1280\text{J}$$

1 joule of energy is transferred for every 1 newton of force moving an object by a distance of 1 metre.

$$1\text{J} = 1\text{Nm}$$



AQA Combined Science: Physics Topic 5 Forces

Work Done: Elastic Objects

Work is done on elastic objects to stretch or compress them.

To calculate the work done (elastic potential energy transferred), use this equation:

$$E (J) = 0.5 \times k \times e^2$$

(elastic potential energy = 0.5 × spring constant × extension²)

You might need to use this equation also:
 $F = k \times e$

Worked example:

A bungee jumper jumps from a bridge with a weight of 800N. The elastic cord is stretched by 25m. Calculate the work done.

Step 1: find the spring constant using $F = k \times e$

$$\text{Rearrange to } k = F \div e$$

$$800 \div 25 = 32\text{N/m}$$

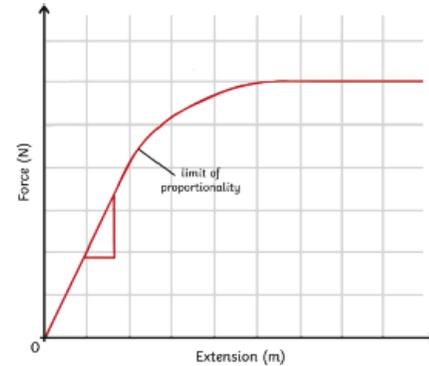
Step 2: use the value for k to find the elastic potential energy (work done) using $E (J) = 0.5 \times k \times e^2$

$$0.5 \times 32 \times 25^2$$

$$E = 10\,000\text{J}$$

Spring Constant and Hooke's Law

Hooke's Law describes that the extension of an elastic object is **proportional** to the force applied to the object. However, there is a maximum applied force for which the extension will still increase proportionally. If the **limit of proportionality** is exceeded, then the object becomes **permanently deformed** and can no longer return to its original shape. This can be identified on a graph of extension against force when the gradient stops being linear (a straight line) and begins to **plateau**. The limit is shown on the graph above and this is the specific object's **elastic limit**.



Forces and Elasticity

When work is done on an elastic object, such as a spring, the energy is stored as elastic potential energy.

When the force is applied, the object changes shape and stretches. The energy is stored as elastic potential and when the force is no longer applied, the object returns to its original shape. The stored elastic potential energy is transferred as kinetic energy and the object recoils and goes back to its original shape.



Required Practical Investigation Activity 6: Investigate the Relationship Between Force and Extension for a Spring

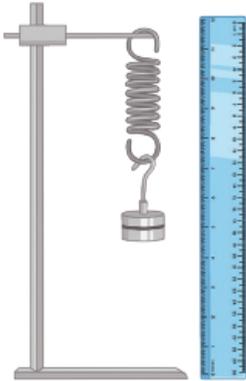
$$F = k \times e$$

force applied (N) = spring constant (N/m) × extension (m)

You should be familiar with the equation above and the required practical shown to the right.

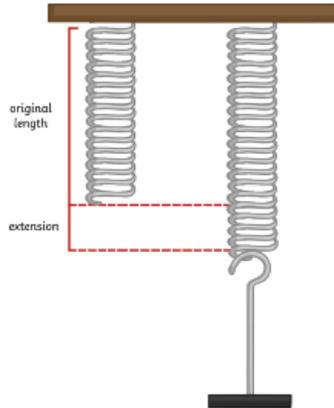
The spring constant is a value which describes the elasticity of a material. It is specific to each material. You can carry out a practical investigation and use your results to find the spring constant of a material.

1. Set up the equipment as shown.
2. Measure the original length of the elastic object, e.g. a spring, and record this.
3. Attach a mass hanger (remember the hanger itself has a weight). Record the new length of the spring.
4. Continue to add masses to the hanger in regular intervals and record the length each time.



Once you have your results, you can find the extension for each mass using this formula: **spring length – original length**

The data collected is continuous so you would plot a **line graph** using the **x-axis** for extension (m) and the **y-axis** for force (N). As a result of Hooke's Law, you should have a **linear graph**. The **gradient of the graph** is equal to the **spring constant**. You can calculate it by rearranging the formula above or by calculating the gradient from your graph.



Low Air Pressure: Rising air events, leads to cloud formation (e.g. hurricanes), generally lower than 1010 hPa on a synoptic weather chart

High Air Pressure: Sinking air events, leads to low cloud cover (e.g. anticyclones), generally greater than 1015 hPa on a synoptic weather chart

Condensation: Where moisture becomes visible in the air – causes clouds to form

Cumulus: 'Cotton wool' style cloud, blocks sunlight and can lead to rain. The tallest ones are called cumulonimbus and these lead to thunder storms

Air Mass: An area of air with a particular characteristic. In the UK, for example, tropical maritime air comes from the South West (the Azores area) and is warm and moist

Weather: The day-to-day atmospheric conditions in a given area

Climate: The average weather conditions over a period of time. Usually needs a 30 year record to be calculated accurately.

Weather Hazard: Where extreme weather (different from the climatic norm/average) has an impact on people or property

Storm Surge: The rising ocean levels associated with exceptionally low pressure events such as hurricanes

Tropical Revolving Storm: The collective term for a hurricane, cyclone, typhoon etc.

Drought: A long period of time where there is little or no rainfall. The exact time is defined differently in different countries and by different meteorologists

Heatwave: A period of time where temperatures exceed climatic averages for that location by a considerable amount

Cause: A reason why something happened

Impact: Something which happened because of the cause

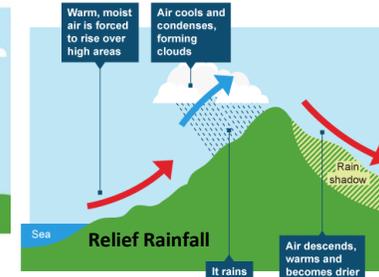
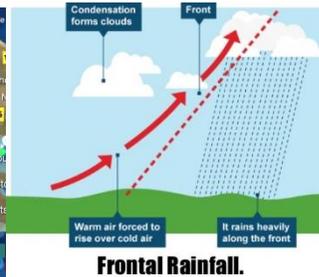
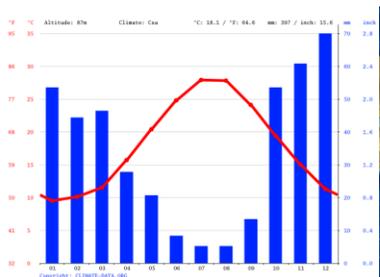
Response: Something which somebody/some organisation does as a result of something happening

Climate change: Patterns of unusually different temperatures compared with the long term averages

Global warming: The warming of the earth above long term averages. The present 'Enhanced Greenhouse Effect' is an example of this, although it has happened naturally in geological time in order to form ice ages and interglacials

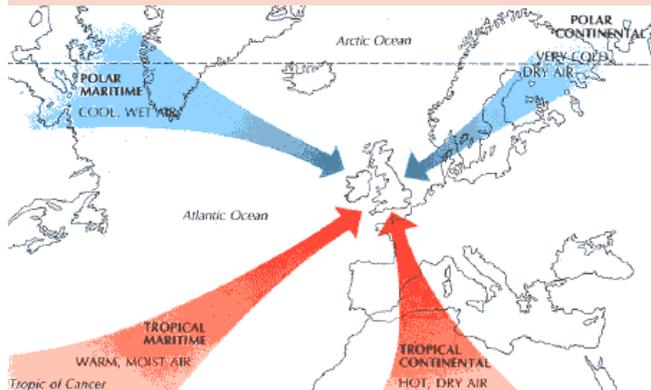
Greenhouse gas: A gas released which can become trapped in the atmosphere. This in turn absorbs sunlight (heat radiation) causing the earth's temperatures to rise. Methane is one example of a greenhouse gas. CO₂ is another – formed by burning fossil fuels such as oil, petrol, coal etc.

Fossil fuel: A fuel formed over geological time through the crushing under pressure of dead organic matter



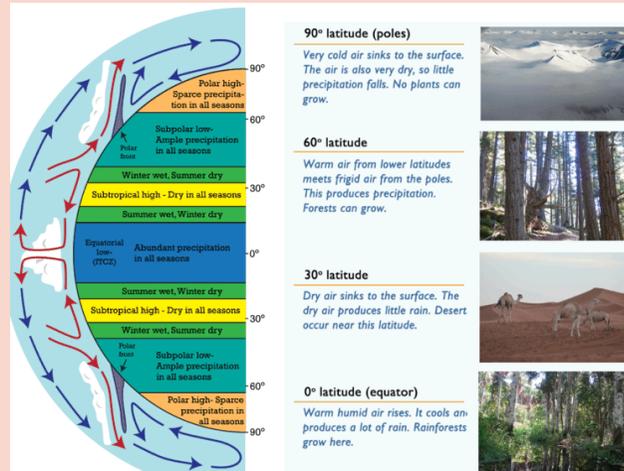
Why is the UK climate so variable?

- Air from different directions brings different weather



- Low air pressure allows cloud to form, high pressure/anticyclones stop cloud from forming.
- Weather fronts bring different weather.

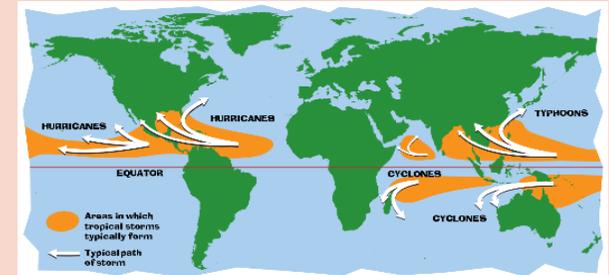
How does global atmospheric circulation create climate zones?



- Low pressure gives rain, but closest to sun at equator so tropical rainforest forms here
- High pressure stops cloud, close to sun, hot desert at 30°

How are weather hazards distributed on a global scale?

- Hurricanes form over tropical oceans and impact tropical areas. They gain strength as they move from East to West



- Droughts are felt particularly at the edges of current desert areas, such as the Sahel in Africa.
- The Monsoon is a regular weather hazard in the Indian sub-continent
- In the central states of the USA, tornadoes can be a particular problem

What were the causes and impacts of the US drought in 2004 in the Western USA?

- Causes
 - It was warmer than usual in the early part of the year.
 - There had been less snow than normal on the mountains, and this melted early in March.
 - Rivers dried up from April onwards and there was a lack of rainfall – 80% less than usual between March and September
- Impacts
 - Hose pipe bans
 - Golf courses had to be closed and allowed to 'go brown'
 - Farmers lost crops
 - Many people lost their job
 - 'Dust Bowl' conditions prevailed throughout the summer

What were the causes and impacts of Hurricane Katrina in New Orleans, USA in 2005?

- Causes
 - Massive hurricane formed over the Atlantic Ocean and then gained energy (speed) over the warm shallow Caribbean sea and the Gulf of Mexico – 3rd largest hurricane in US history
 - Category 3 storm, winds over 120mph
 - Storm surge of almost 8m was experienced in some areas
- Impacts
 - 1200 people died as a result of Hurricane Katrina
 - \$108bn of property was damaged
 - Most victims were from low income families
 - 50% of the population of New Orleans left the city
 - 800,000 houses in total were damaged or destroyed

How did authorities respond to these extreme weather events?

- Western USA drought of 2004
 - People banned from using hose pipes
 - Water only for essential purposes – e.g. watering golf courses disallowed!
 - Army corps of engineers tried to divert water from other sources/rivers – limited success
- Hurricane Katrina 2005
 - Mandatory evacuation ordered two days before the hurricane struck
 - Remaining population sent to the New Orleans Megadome sorts stadium – awful conditions
 - The city became cut-off by the storm surge – levees failed, days before help arrived
 - Further evacuations inland after the hurricane
 - Insurance companies and/or individuals bore the brunt of financial losses

How do hurricanes form

- Thunderstorms many thousands of miles away
- Gain strength as they absorb warm moist air from the ocean (which must be 26°C or above)
- Continues to gain strength, revolves, and becomes stronger, drawing more warm moist air into it
- Crosswinds in the atmosphere must be low to prevent it from being blown apart
- Gains strength in shallower warmer water (e.g. Caribbean Sea/Gulf of Mexico) but loses strength as it passes over land – e.g. Florida/Continental USA

What are the hazards associated with hurricanes?

- Strong winds – strongest in the eye wall (centre of the system)
- Storm surge (rising ocean levels due to the low pressure system)

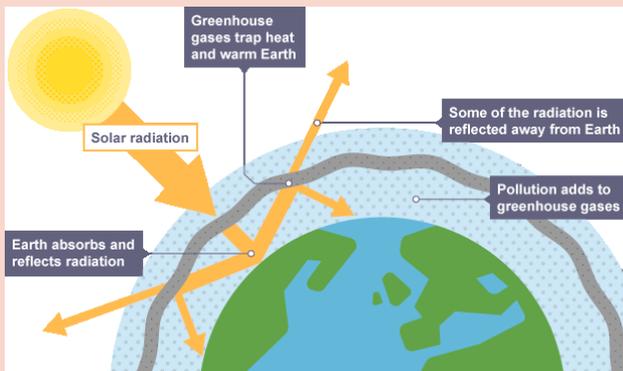
WEATHER SAFIR-SIMPSON HURRICANE WIND SCALE		
CATEGORY	WINDS (MPH)	DAMAGE
1	74-95	SOME
2	96-110	EXTENSIVE
3	111-129	DEVASTATING
4	130-156	CATASTROPHIC
5	157+	CATASTROPHIC

What are the natural causes of climate change?

- Volcanic eruptions and large-scale forest fires can alter the amounts of energy passing through the atmosphere and so cause short term climate changes
- Sunspot activity can increase temperatures during more active periods
- The earth's orbit is not perfect – the Milankovitch Cycles explain the earth sometimes is closer/further away from the sun

How do humans cause global warming?

- Emission of greenhouse gases from the burning of fossil fuels
- Methane emissions from intensive animal farming
- Deforestation (as trees would otherwise absorb the CO₂, a harmful greenhouse gas)
- Dumping waste in landfill also releases methane
- Greenhouse gases can be released from fertilisers used on arable farms



What are the consequences of climate change?

- In the UK
 - More coastal flooding – particularly in the East coast
 - Scottish ski resorts could be forced to close due to the lack of snow
 - Fewer snow days in winter – warmer but potentially more rain in the summer
 - South coast holiday destinations could become more popular due to better weather
- Worldwide
 - Sea levels likely to rise – 80 million worldwide could be affected by this
 - Warmer temperatures could increase the range at which the Malaria mosquito thrives – Estimated 280 million more cases
 - Some species will become extinct as the climate of their habitat changes – particularly Arctic
 - More extreme weather events such as hurricanes
 - More/more severe forest fires
 - Some regions which were too cold to grow crops might be able to sustain them
 - Desertification of southern Spain as it become less Mediterranean and more Saharan

What are the different attitudes towards climate change? How can governments help?

- Some people embrace the fact that humans are causing global warming and take steps such as:
 - Vegetarian/veganism/reducing the consumption of animal products is very helpful
 - Using energy more efficiently
 - Reducing energy waste (light off when leaving etc.)
 - Using lower energy transport
- What can the government do?
 - Subsidise the planting of trees – e.g. the UK's National Forest between Burton and Leicester, 1 million trees since 1990
 - Incentivise green energy – e.g. solar panels
 - Encourage public services to operate in a more environmentally friendly manner – e.g. use electric vehicles and refurbish buildings to be more sustainable
 - Encourage people to use public transport
 - Increase the costs of private transport (cars) but offer exemptions for less polluting electric vehicles
 - Subscribe to international agreements (e.g. Kyoto Protocol) and commit the country to reducing emissions by a set time



History - League in 1930s

Manchuria 1931

Japan had been badly affected by the Great Depression (sales to the USA of silk had dropped), shew anted to protect the industries & South Manchurian Railway which it already controlled in the area & the Japanese army was getting stronger and had started to take more aggressive action.



Key Terms	Definitions
Mukden Incident	18 th September 1931, explosion on the South Manchurian Railway. Japan blames the Chinese
Litton Report	Published in October 1932, it stated that Japan was in the wrong & should leave Manchuria

What did the League do?

Issued a moral condemnation & told Japan to withdraw it's troops. But there was little the League could do as:

- Japan was far away & many countries were too busy dealing with their own problems caused by the Great Depression.
- Economic sanctions were pointless, as Japan would continue trading with the USA.
- The USSR was not a member of the League & could not be asked to help even though it was the nearest country.

Results

Even though the Lytton Report said Japan was in the wrong, Japan ignored it & left the League. Japan was a permanent member of the Council. **BUT** many people still believed that if there was an issue in Europe, then the League would still deal with it successfully. **However**, Mussolini & Hitler began to wonder if they might get around the League as well.

History

Why did Mussolini think he could invade Abyssinia?

Mussolini wanted an empire, like GB & France. Italy already owned the small colonies of Eritrea & Somaliland bordering Abyssinia. It had natural resources & Mussolini believed that the League would ignore his invasion because of its action over Corfu & Manchuria. GB, Italy & France had signed the Stresa Front in 1935.

What happened?

December 1934: Italian soldiers clashed with Abyssinians at Wal Wal. 150 Abyssinians killed & 2 Italians.

Jan 1935: French foreign minister, Pierre Laval met with Mussolini & made secret agreements which would let Mussolini do what he wanted in Abyssinia.

Jun 1935: Abyssinian emperor, Haile Selassie asked the League for help

Oct 1935: Italy invaded, despite a moral condemnation issued by the League.

Dec 1935: Hoare-Laval Pact agreed.

May 1936: Abyssinian capital, Addis Ababa captured

Key Terms	Definitions
Stresa Front	Agreement between GB, France & Italy agreeing to unite against Hitler
Hoare-Laval Pact	Agreement between GB & France to split Abyssinia.



Why did the League fail? The Hoare-Laval Pact

GB & France's foreign ministers Pierre Laval & Samuel Hoare decide that Italy would be given half of Abyssinia. Italy would be given the fertile areas. This plan was not discussed with Italy or Abyssinia.

The Hoare-Laval Pact was made public in the newspapers. Both men were forced to resign.

Why did the League fail? Trade sanctions

Italy: the sanctions imposed did not cover oil, steel, iron or coal (GB didn't want its coal mining industry affected) & the League felt Italy would just trade with the USA & USSR.

Abyssinia: the League banned members from selling arms (weapons) to Abyssinian & Italy. Abyssinian had nothing to defend itself with.

Why did the League fail? Suez Canal

Mussolini would need to send troops & supplies around the coast of Africa if the Suez Canal was shut. This would make his invasion very difficult. GB & France kept the canal open.

Results

- May 1936: Italy left the League. This left only GB, France & the USSR (who joined in 1934) to run the League.
- GB & France had shown they were more concerned about their own welfare than protecting the League.
- Aggressive dictators like Hitler & Mussolini realised the League wouldn't stop them.

History

Why did the League fail?

The League had no army

Evidence: when Japan ignored the League over Manchuria, there was nothing the League could do.



Weak sanctions

Evidence: Powerful countries were not scared of moral condemnation, so the League's sanctions were useless.



Self-interest of dominant countries

Evidence: GB & France were more concerned about keeping Mussolini as an ally against Hitler to do anything about the invasion of Abyssinia.



Absence of powerful countries

Evidence: The USA refused to join & Germany & the USSR were not allowed to at the beginning. This meant that trade sanctions were ineffective, as the aggressor could trade with them. In the Manchuria Crisis, the USSR was the nearest country to China.



Slow & inefficient decision making

Evidence: The League only met once a year; the Council could veto proposals & decisions had to be unanimous. This made decision making slow. The League was slow to act in the Manchurian Crisis.

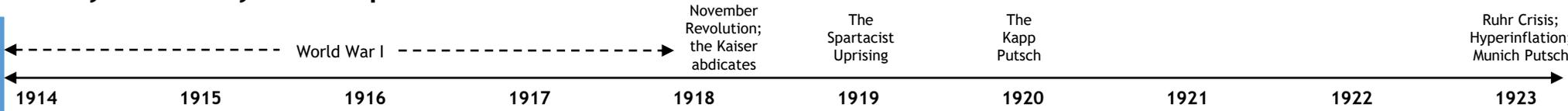


The Great Depression

Evidence: The Great Depression meant countries were more concerned with their own problems. The Depression meant that people turned to extremist dictators such as Hitler & Mussolini who were keen to invade other countries. Hitler invaded more & more countries & the League didn't do anything about it.



History - Germany: The Impact of World War I



KPI 1 November Revolution



Before World War I, Germany had been ruled by the Kaiser

- ✓ Before World War I, Germany was ruled by Kaiser Wilhelm II
- ✓ German men over 25 could vote in Reichstag elections, although the Kaiser could ignore the Reichstag if he wanted to
- ✓ The Social Democrats (SPD) were the largest party in the Reichstag after 1912
- ✓ The army held a great deal of political power

In November 1918, there was a revolution in Germany

- ✓ In November 1918, German soldiers and sailors **mutinied** and the Kaiser was forced to **abdicate**
- ✓ Friedrich Ebert, the leader of the SPD, became German **President**, surrendered to Britain, France, and America, and promised to set up a new **democratic** government in Germany
- ✓ Ebert made a **pact** with army leaders: the army would support the new government if Ebert agreed to crush any **communist** uprisings and allowed the army to maintain a powerful role

KPI 2 The Spartacist Uprising



In January 1919, a German communist group called the Spartacist League and led by Rosa Luxemburg attempted to seize power by force

- ✓ The Spartacists wanted Germany to become **communist** and lead a **revolution**, like the one in **Russia** in 1917
- ✓ They were successful in seizing key objectives in **Berlin**, such as the train stations and newspaper offices
- ✓ However, as agreed with Ebert, the army and the **Freikorps** crushed the uprising, killing Luxemburg and dumping her body in a canal

KPI 3 The Weimar Republic

After the Spartacists were crushed, a new government - known as the Weimar Republic - was created

- ✓ The **Weimar Constitution** was very **democratic**:
 - ✓ all men and women could vote
 - ✓ **Reichstag** **deputies** and the **President** were elected
 - ✓ the **President** appointed a **Chancellor** to run the government, usually from the largest party in the Reichstag
- ✓ However, the constitution had some weaknesses
 - ✗ **Article 48** allowed the **President** to rule without the **Reichstag** in an emergency
 - ✗ the system of **proportional representation** led to weak **coalition** governments which struggled to pass laws
- ✓ The **Weimar Republic** were blamed for surrendering in World War I.
- ✓ **Weimar** politicians were mocked as the **November Criminals** by **nationalists** and the 'Stab in the Back' myth became **widespread**

KPI 4 The Treaty of Versailles

In 1919, the Weimar government signed a peace treaty with Britain, France, and the USA



The Treaty of Versailles was very harsh on Germany and deeply unpopular with the German people:

- ✓ Under Article 231 Germany had to accept **full responsibility** for the war
- ✓ Germany had to pay **£6.6 billion** in reparations
- ✓ Germany lost **territory**, such as **Alsace-Lorraine** to France, and the **Rhineland** was **demilitarized**. Germany was forbidden from uniting with **Austria**.
- ✓ The German army was limited to **100,000** soldiers, **6** battleships, and no submarines or **airforce**
- ✓ Germany was not allowed to join the **League of Nations**

History - Germany: The Impact of World War I

KPI 5 The Kapp Putsch

German nationalists attempted to reverse the November Revolution in the Kapp Putsch

- ✓ German nationalists hated the Weimar Republic and the Treaty of Versailles and wanted to bring back the Kaiser
- ✓ In March 1920, the Freikorps rose up and seized power in Berlin and introduced a new government, led by the nationalist Wolfgang Kapp
- ✓ The army refused to crush the rebellion because they had similar views to Kapp and the Freikorps
- ✓ The German trade unions called a general strike which paralysed Berlin, making it impossible to govern
- ✓ Kapp was forced to resign and the Weimar Republic survived



KPI 6 The Ruhr Crisis and Hyperinflation



Germany's failure to pay reparations led to the 1923 Ruhr Crisis

- ✓ In 1922, Germany missed a reparations payment to France
- ✓ In 1923, French soldiers occupied the Ruhr, Germany's industrial region, and began to take coal, iron, and steel as reparations payments
- ✓ The Weimar Republic ordered German workers to go on strike rather than work with the French (passive resistance)
- ✓ In order to pay the striking workers in the Ruhr, the government printed money which led to hyperinflation

Hyperinflation seriously damaged the German economy

- ✓ The Weimar government's decision to print money led to hyperinflation as paper money became worthless
- ✓ Prices increased rapidly: a loaf of bread cost 201 billion marks by November 1923
- ✓ People with savings, especially the elderly, suffered as their savings became worthless

KPI 7 The Munich Putsch



Hitler attempted to take advantage of the Weimar Republic's weakness in the Munich Putsch but failed

- ✓ Hitler planned to seize power in Munich, a large city in Bavaria, before marching to Berlin and removing the Weimar government
- ✓ Hitler and other Nazis interrupted a political meeting in a beer hall and forced Gustav von Kahr, the head of the Bavarian government, to support the Nazi plan
- ✓ However, Hitler allowed von Kahr to leave the hall and he immediately told the police about Hitler's plan
- ✓ The next morning, the police and army defeated the Nazis, killing 16 and arresting Hitler
- ✓ Hitler's trial gave him great publicity and he used his nine months in prison to write *Mein Kampf*

Key Vocabulary

Abdicate	To voluntarily step down from your position as king or queen
Bavaria	A large state in the South of Germany
Chancellor	The leader of the Weimar government, appointed by the President
Coalition	A government run by lots of small parties working together
Communist	A supporter of communism
Constitution	A set of laws that set out how a government should run
Deputies	Elected members of the Reichstag, like MPs
Demilitarized	No soldiers allowed
Democracy	Government based on ordinary people voting for leaders
Freikorps	Nationalist ex-soldiers from World War I
General strike	When workers from different industries go on strike at the same time
Hyperinflation	When the value of money declines rapidly, causing prices to increase
Kaiser	The King of Germany before 1918
League of Nations	An international organisation set up in 1918 to prevent future wars
Mein Kampf	Hitler's book, which laid out the main ideas of Nazism
Mutinied	Stopped fighting / fought against their commanders
Nationalist	Supporting traditional ideas, in particular the Kaiser and the army
Pact	A deal
President	The head of state in the Weimar Republic, elected every 7 years
Proportional Representation	A type of democracy where parties receive seats according to their % of the vote
Reichstag	The German parliament
Reparations	Money Germany had to pay to Britain and France
Revolution	When the people rise up against their leaders, sometimes violently
Social Democrats/SPD	The largest party in the Reichstag, stood for democracy and a welfare state
Trade unions	Organisations set up by workers to defend their rights
Widespread	Popular with a lot of people

History - Germany: Recovery of Weimar



KPI 8 Recovery from Hyperinflation

In 1923, Gustav Stresemann became Chancellor and stabilised the German economy

- ✓ In 1923, Stresemann ended the policy of **passive resistance** in the Ruhr, meaning that German workers returned to work and the government no longer had to print money to pay them
- ✓ Also in 1923, Stresemann replaced the worthless mark with a new temporary currency - the **Rentenmark** - which ended hyperinflation and restored confidence in the economy

KPI 9 Economic policies: Dawes and Young Plans. US investment

Stresemann's economic policies helped Germany recover. He agreed two plans with US banks:

THE DAWES PLAN, 1924

- ✓ In 1924, Stresemann agreed the **Dawes Plan**, which included a **800 million mark loan** from the USA and allowed Germany to start paying **reparations** again, causing French troops to leave the Ruhr
- ✓ Stresemann attempted to **stimulate** the German economy by borrowing \$3 billion from US banks

THE YOUNG PLAN, 1924

- ✓ The **Young Plan**, agreed in 1929, reduced reparations from **£6.6 billion to £1.85 billion** and allowed Germany to pay over **59 years**
- ✓ **Nationalist** groups such as the **Nazis** criticised Stresemann because he had accepted the terms of the **Treaty of Versailles**

KPI 10 Foreign Policy: Locarno Pact, League of Nations

Stresemann's foreign policies restored Germany's great power status

- ✓ After the **Treaty of Versailles**, Germany was rejected by the international community, blamed for starting World War I, and banned from the **League of Nations**.
- ✓ To remedy this, Stresemann...

...signed the **Locarno Pact** with France and Britain in 1925

- German promised to accept its current borders
- This **reassured** the world that Germany did not want another war

...negotiated Germany's acceptance into the League of Nations

- In 1926, Germany was accepted into the **League of Nations**
- This confirmed Germany's return to great power status

KPI 11 Golden Years? Social and political developments in the 1920s

The years 1924 to 1929 have been known as the 'Golden Years' but they were built on shaky foundations

GOLDEN YEARS...

- ✓ The lives of many Germans improved: **wages** rose each year and **unemployment benefits** and **pensions** were introduced
- ✓ The **status of women** improved as more women went to work outside the home and gained the **right to vote**
- ✓ **Berlin** became a centre for **modern art** e with **dada** artists such as **Hannah Hoch** challenging traditional German culture
- ✓ Political parties opposed to the **Weimar Republic** became less popular - for example the **Nazi Party** won only 12 seats in the 1928 Reichstag elections

SHAKY FOUNDATIONS...

- ✗ Even Stresemann admitted that Germany was '**dancing on a volcano**' - loans from US banks powered the recovery and they could be called in at any time
- ✗ Following the **Wall Street Crash** in October 1929 the American banks called in their loans and the German economy entered the **Great Depression**



Key Vocabulary

Berlin	The German capital city
Dada	A modern art movement
Golden Years	The period from 1923-29 in which the Weimar Republic recovered
Great Depression	Period of global economic problems, including high unemployment
Great power status	Being seen as a powerful country
Investment	Providing money for economic development
Modern Art	Art that challenges traditional ideas of what art should be
Nazi Party	Nationalist political party led by Adolf Hitler
Pensions	Payments from the government to the elderly
Rentenmark	A temporary currency introduced to stop hyperinflation
Stimulate	Get going
Wall Street Crash	Event in October 1929 when the US economy crashed, causing the Great Depression



History - Germany: The End of the Weimar Republic

Wall Street Crash;
Great Depression
begins

Weimar
government cuts
benefits

Unemployment
reaches 6 million

Hitler appointed
Chancellor

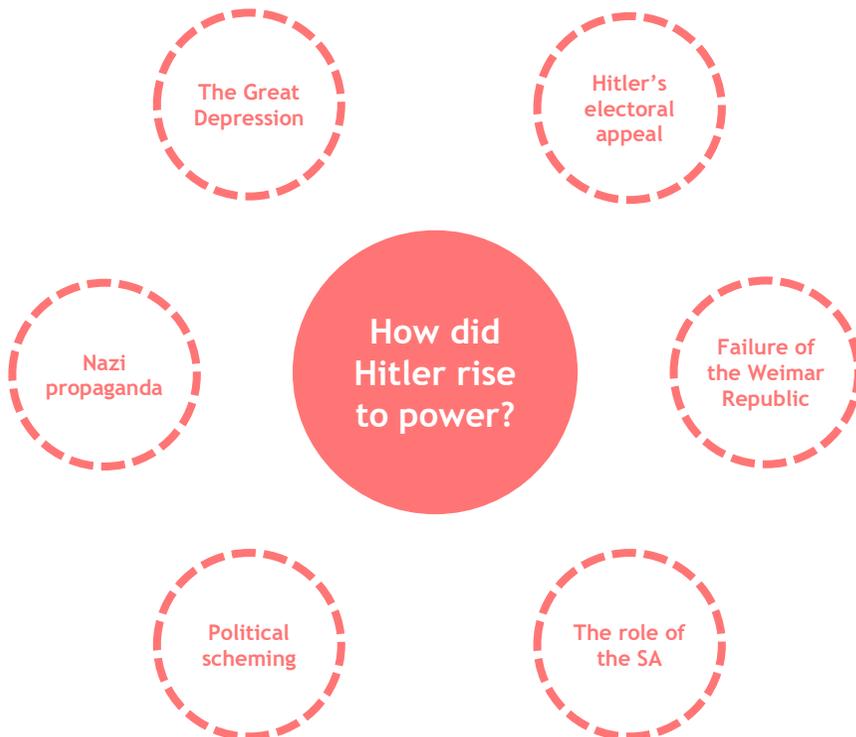
1929

1930

1931

1932

1933



KPI 12 Impact of the Great Depression



The Great Depression had a significant social and political impact on Germany

- ✓ The **Wall Street Crash** in 1929 caused US banks to recall their loans and Germany plunged into the **Great Depression**
- ✓ **Unemployment** rose to 6 million in 1932
- ✓ The **Weimar Republic** failed to deal with the economic crisis and became even more unpopular when the government cut **unemployment benefits** in 1930
- ✓ **Weak coalition** governments could not deal with the crisis and **President Hindenburg** was forced to use **Article 48** to pass laws
- ✓ Voters turned to **extremist parties**, such as the **Nazis** and the **communists**, who opposed the **Weimar Republic** and abandoned parties like the **Social Democrats** who supported it
- ✓ The Nazis had only **12 seats** in the Reichstag in 1928; by **March 1933** they had **288**

KPI 13 Hitler's electoral appeal

Hitler had a powerful electoral appeal

- ✓ Hitler was a **charismatic leader** who gave **electrifying** speeches
- ✓ Hitler's speeches offered simple solutions to Germany's complex problems, including blaming the **Treaty of Versailles**, **communists**, and **Jews**



History - Germany: The End of the Weimar Republic

KPI 14 Nazi propaganda

Joseph Goebbels used propaganda to encourage Germans to vote for the Nazis in Reichstag elections

- ✓ Goebbels was the Nazi chief of **propaganda**
- ✓ Goebbels used posters, radio broadcasts, and mass rallies to spread the Nazi message and encourage Germans to vote for the party
- ✓ Much of Nazi **propaganda** was **anti-Semitic** and made the Jews **scapegoats** for Germany's problems
- ✓ Goebbels repeated the key Nazi messages over and over again:



Hitler was Germany's saviour



The Nazis would end the **Depression** and bring "**Arbeit und Brot**" ("Work and Bread")



Jews were to blame for Germany's problems

KPI 14 The SA

The SA intimidated supporters of other parties and gave the Nazis control of the streets



- ✓ The SA were Hitler's street thugs and were led by **Ernst Rohm**
- ✓ The SA provided work for young unemployed men and had swollen to **2 million** by 1933
- ✓ The SA **intimidated** members of other parties and protected Nazi speakers
- ✓ In particular, the SA disrupted **communist** meetings and fought their supporters

KPI 15 Political scheming

Political scheming led to Hitler's appointment as Chancellor in January 1933

- ✓ In July 1932, the Nazis won the most seats in the **Reichstag** but President **Hindenburg** refused to make **Hitler** the Chancellor, choosing **Franz Von Papen** instead
- ✓ In December 1932, **Von Papen** was forced to resign and was replaced by **Von Schleicher**
- ✓ In January 1933, **Von Schleicher** was forced to resign. **Von Papen** persuaded **Hindenburg** to appoint **Hitler** as **Chancellor** and him as **Vice Chancellor**, naively believing that he could control Hitler

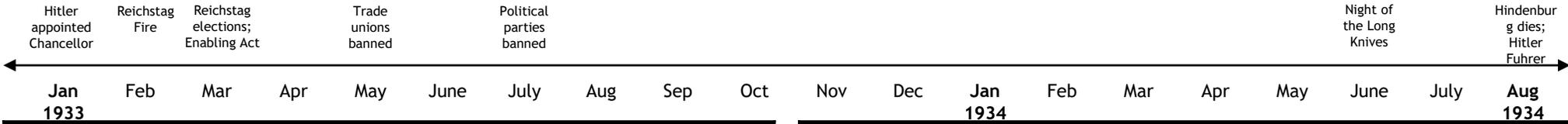


Key Vocabulary

Article 48	Law allowing the President to rule alone in a crisis
Anti-Semitic	Racist against Jews
Charismatic	Persuasive, charming
Electoral	To do with voting and elections
Electrifying	Brilliant, persuasive
Extremist	On the far left or far right of politics, such as the Nazis or Communists
Great Depression	Period of global economic problems, including high unemployment
Intimidated	Scared
Propaganda	Material designed to persuade someone to think something
Rallies	Large meetings of supporters featuring speeches, marching soldiers, etc
Scapegoat	Someone who takes the blame for something
Unemployment benefits	Money given by the government to unemployed people
Vice Chancellor	The deputy leader of the government
Wall Street Crash	Event in October 1929 when the US economy crashed, causing the Depression



History - Consolidation of Power



KPI 16 Hitler as Chancellor

Although Hitler was appointed Chancellor in 1933 he had many obstacles to overcome before he had total control of Germany:



1. Hitler was not the most powerful person in Germany, he had been appointed by **President Hindenburg**, who did not trust him



2. The Nazi party did not have a **majority** in the **Reichstag**, so Hitler needed to work with other parties



3. The **Great Depression** had led to increased support for the **Communist Party** who hated Hitler and his ideas



4. Only 30% of Germans had voted for the Nazis in the March 1933 elections, most people did not agree with their ideas



5. **Trade unions** opposed the Nazis. They could call a **general strike** and defeat Hitler as they had done during the **Kapp Putsch**



6. There were **ambitious** individuals within the Nazi Party who were potential rivals for Hitler's power

Once he became **Chancellor**, Hitler used his position to remove each of these obstacles as he **consolidated** his power over Germany.

KPI 17 The Reichstag Fire



The Nazis used the Reichstag fire to remove the threat of the **Communists**

- ✓ On 27th February 1933 a Dutch communist, **Marinus van der Lubbe** was arrested for burning down the **Reichstag**
- ✓ Although **van der Lubbe** claimed he was working alone, the Nazis convinced the German public that this was the start of a **communist revolution** in Germany and that only Hitler could stop it
- ✓ Hitler convinced **Hindenburg** to issue the **Reichstag Fire Decree** which restricted **civil liberties** such as freedom from arrest and freedom of the press
- ✓ The Nazis used these powers to arrest 4000 **communists**, including their 100 Reichstag **deputies** and made the **Communist Party** illegal

KPI 18 1933 elections and the Enabling Act

The Nazis put pressure on the Reichstag to pass the **Enabling Act**, ending democracy in Germany

- ✓ Elections were due to be held on 5th March 1933, and the Nazis used the **SA** to **intimidate** other parties including the **Social Democrats**
- ✓ Despite this the Nazis only won 288 seats (44%), and only formed a **majority** with help from another party
- ✓ Following the election Hitler introduced the **Enabling Act** which allowed the Chancellor to make laws without the **Reichstag**
- ✓ The SA surrounded the **Reichstag** to intimidate the **deputies** into passing the Act by **444 votes to 94**
- ✓ **Communist** deputies were unable to vote as they have been arrested



History - Germany: Consolidation of Power

KPI 19 Removing opposition: trade unions and political parties

Hitler also used his powers from the Enabling Act to remove other forms of opposition

- ✓ The first concentration camp - Dachau - was set up in March 1933
- ✓ In May 1933 trade unions were banned, their leaders were arrested and sent to concentration camps
- ✓ In July 1933 all political parties other than the Nazis were banned



KPI 20 The Night of the Long Knives

In the Night of the Long Knives, Hitler acted ruthlessly to establish complete control of the Nazi Party

- ✓ By 1934, the SA had 2 million members and was becoming increasingly violent, frightening businessmen whose support Hitler needed
- ✓ Ernst Rohm, the leader of the SA, wanted the SA to take control of the German army, although Hitler rejected this as he needed the army's support
- ✓ Other leading Nazis, including Goering and Himmler, reported to Hitler that Rohm was planning 'a second revolution' against him
- ✓ On 30th June 1934 Hitler ordered the SS to arrest and kill Rohm and 85 other rivals and opponents



KPI 21 Hitler becomes Fuhrer



The death of Hindenburg allowed Hitler to complete his rise to Fuhrer

- ✓ President Hindenburg died in August 1934
- ✓ Hitler combined the roles of Chancellor and President to create a new role for himself: the Fuhrer
- ✓ Hitler made all soldiers swear an oath of allegiance to him personally

Key Vocabulary

Businessmen	Factory / shop owners etc
Civil liberties	Freedoms and rights
Concentration camp	A prison for political opponents of the Nazis
Consolidated	Made secure
Decree	A law passed by the President without the Reichstag
Deputies	Elected members of the Reichstag, like MPs
Fuhrer	Hitler's role after August 1934
General Strike	When all the workers go on strike
Goering	A leading Nazi
Himmler	A leading Nazi
Majority	More than 50% support
Oath of allegiance	A formal promise of support
Reichstag	The German Parliament
'Second Revolution'	An attempt by other Nazis to remove Hitler
SA	Hitler's street thugs
SS	Hitler's elite bodyguard
Trade unions	Organisations set up by workers to defend their rights

Year 11 French Term 1

Où habites-tu ?	A	Where do you live?
J'habite dans un village près de Derby.	1	I live in a village close to Derby.
Il n'y a rien à faire ici car c'est assez petit.	2	There is nothing to do here because it is quite small.
Cependant, au centre-ville on peut faire les magasins et visiter la cathédrale et d'autres bâtiments historiques.	3	However, in centre-town one can go shopping and visit the cathedral and other historic buildings.
Il y avait un centre de loisirs mais maintenant c'est fermé.	4	There was a leisure centre but now it's closed.
Dans ma région il y a beaucoup d'espaces verts donc c'est super quand il fait beau, mais	5	In my region there are a lot of green spaces so it's super when it is nice weather, but
il n'y a pas de transport en commun, ce qui est nul.	6	there is no public transport, which is rubbish.
Si j'étais maire de mon village, il y aurait	7	If I was the mayor of my village there would be
une piscine, une patinoire et un cinéma afin que les jeunes puissent s'amuser.	8	a swimming pool, an ice-rink and a cinema so that young people could have fun.
Où voudrais-tu habiter ?	B	Where would you like to live?
A l'avenir je voudrais habiter à Londres car c'est cool bien que ce soit loin de ma famille	12	In the future I would like to live in London cause it's cool although it is far from my family
et il y a trop de circulation et de bruit.	13	and there is too much traffic and noise.
Qu'est-ce que tu as fait récemment en ville ? Qu'est-ce que tu vas faire ?	C	What have you done recently in town? What are you going to do?
Le week-end dernier, j'ai fait une promenade près du canal avec mon meilleur copain et	15	Last weekend, I went for a walk near the canal with my best friend at
on a discuté du tout. C'était assez amusant,	16	we talked about everything. It was quite fun
mais le week-end prochain on va aller au stade où on va voir un match de foot,	17	but next weekend we are going to go to the stadium where we are going to see a football match,
ce qui sera plus passionnant.	18	which will be more exciting.
Parle-moi de tes vacances.	D	Tell me about your holidays.
Normalement je passe mes vacances en Angleterre	21	Normally I spend my holidays in England
mais l'année dernière je suis allée en France.	22	but last year I went to France.
C'était fantastique car il faisait du soleil tous les jours.	23	It was fantastic because it was sunny everyday.
Pas comme ici où il pleut toujours !	24	Not like here where it always rains!
On est allées à la plage et je me suis reposée en lisant un roman policier.	25	We went to the beach and I relaxed while reading a crime novel.
Un soir j'ai mangé du loup de mer au resto mais malheureusement ce n'était pas cuit et j'ai vomit !	26	One evening I ate sea bass at a restaurant but unfortunately it was not cooked and I vomited!
Décris tes vacances de rêve.	E	Describe your dream holiday.
Si j'avais le choix je voyagerais aux États-Unis	30	If I had the choice I would travel to the US
J'ai toujours voulu aller à New York	31	I have always wanted to go to New York
J'irais à Central Park et je ferais beaucoup du tourisme	32	I would go to Central Park and I would do a lot of tourism.
Ce serait inoubliable !	33	It would be unforgettable !

Sentence builder 1: Describing your town & local area.

J'habite à I live in...	C'est It is	un village a village une petite/grande ville a small/big town	dans le nord/le sud/l'ouest/l'est in the north/south/west/east de l'Angleterre of England
Aussi also Avant before L'année prochain next year	il y a there is il y avait there was il y aura there will be	un centre commercial un centre de loisirs un lac un musée un port de pêche une bibliothèque une patinoire des plages des collines des espaces verts des fermes des forêts des magasins des stations du ski des transports en communs	a shopping centre a leisure centre a lake a museum a fishing port a library an ice rink some beaches some hills some green spaces some farms some forests some shops some ski resorts some public transport
Cependant however	il n'y a pas de there is not/there are not il n'y a plus de there is no longer a... NB : you don't need un, une or des after 'il n'y a pas/plus de' !		
Si j'étais le maire, il y aurait... If I was the mayor, there would be...			
(où) on peut (where) you can		faire les magasins/faire du sport faire des promenades/des randonnées se retrouver avec des amis	do shopping/do sport do walks/hikes meet up with friends
ce qui est which is ce qui n'est pas which isn't À mon avis c'est in my opinion it's Je pense que c'est I think that it's	très very trop too vraiment really assez quite un peu a bit		amusant fun intéressant interesting ennuyeux boring joli/moche pretty/ugly nul/utile rubbish/useful
À l'avenir je voudrais habiter In the future I would like to live	à l'étranger abroad à la campagne in the countryside à la montagne in the mountains au bord de la mer at the seaside	parce que c'est because it is parce qu'il y a beaucoup à faire. because there is a lot to do. parce qu'il y a moins de monde/de circulation/de bruit. because there is less people/traffic/noise. bien que ce soit loin de ma famille. although it's far from my family.	plus more moins less animé/tranquille lively/calm passionnant exciting

Sentence builder 2: Describing holidays in the past/future.

Normalement normally	je vais I go	en France to France	avec ma famille with my family
mais l'année dernière but last year	je suis allé(e) I went	en Espagne to Spain	avec mes amis with my friends
l'été dernier last summer		aux États-Unis to America	avec mes camarades de classe with my classmates
On a voyagé en We travelled by	avion plane bateau boat train train car coach voiture car	et on a logé dans and we stayed in	un hôtel de luxe a luxury hotel un camping a campsite une auberge de jeunesse a youth hostel une caravane a caravan une tente a tent
Le premier jour The first day	j'ai fait de la voile/de la planche à voile/du ski I did sailing/windsurfing/skiing	ce qui était which was	amusant fun ennuyeux boring fascinant fascinating relaxant relaxing fantastique fantastic incroyable incredible
Puis then	j'ai fait les magasins/du tourisme I did shopping/tourism	c'était it was	inoubliable unforgettable désastreux disastrous catastrophique catastrophic délicieux delicious
Ensuite next	j'ai fait des promenades en ville/des randonnées en plein air I went for walks in town/hikes in the fresh air		
Le soir in the evening	j'ai visité les monuments/les bâtiments historiques I visited historic monuments/buildings		
Le dernier jour The last day	je suis allé(e) à la plage/au restaurant I went to the beach/restaurant j'ai mangé du poisson/des plats traditionnels I ate fish/traditional dishes j'ai pris un coup de soleil I got sunburned on m'a volé mon portefeuille Someone stole my wallet		
Après After	je me suis reposé sur la plage I rested on the beach à l'hôtel at the hotel	en lisant un roman. while reading a book. en écoutant de la musique. while listening to music. en buvant une limonade. while drinking lemonade.	
J'avais de la chance car I was lucky because	il faisait beau it was good weather il faisait du soleil it was sunny il faisait chaud it was hot il faisait froid it was cold il pleuvait it rained	tout le temps all the time tous les jours every day tous les jours sauf un every day except one	
C'était un désastre car It was a disaster because			
L'année prochaine Next year	je voudrais aller j'aimerais aller	à la montagne to the mountains à l'Asie to Asia en Australie to Australia au Japon to Japan	car c'est / parce que c'est because it is plus more moins less touristique touristy animé lively calme/tranquille calm
L'été prochain Next summer	j'irai I will go	pour faire les sports d'hiver to do winter sports pour profiter de la nature là-bas to enjoy the nature there	

Grammar: Describing holidays in different tenses

Higher

PRESENT	PAST (PERFECT)	NEAR FUTURE	PAST (IMPERFECT)	SIMPLE FUTURE	CONDITIONAL
Normalement... Normally...	L'année dernière... Last year...	L'année prochaine Next year...	Quand j'étais plus jeune... When I was younger...	Quand je serai plus âgé(e)... When I'm older...	Pour mes vacances de rêve For my dream holidays
Chaque année... Every year...	L'été dernier Last summer...	L'été prochain... Next summer...			Si j'avais le choix If I had the choice
					Si je gagnais au loto If I won the lottery
je vais en France I go to France	je suis allé(e) en France I went to France	je vais aller en France I am going to go to France	j'allais en France I used to go to France	j'irai en France I will go to France	j'irais en France I would go to France
je fais des magasins I do shopping	j'ai fait des magasins I did shopping	je vais faire des magasins I am going to do shopping	je faisais des magasins I used to do shopping	je ferai des magasins I will do shopping	je ferais des magasins I would do shopping
je loge dans un hôtel de luxe I stay in a luxury hotel	j'ai logé dans un hôtel de luxe I stayed in a luxury hotel	je vais loger dans un hôtel de luxe I am going to stay in a luxury hotel	je logeais dans un hôtel de luxe I used to stay in a luxury hotel	je logerai dans un hôtel de luxe I will stay in a luxury hotel	je logerais dans un hôtel de luxe I would stay in a luxury hotel
je visite un musée I visit a museum	j'ai visité un musée I visited a museum	je vais visiter un musée I am going to visit a museum	je visitais un musée I used to visit a museum	je visiterai un musée I will visit a museum	je visiterais un musée I would visit a museum
je nage dans la mer I swim in the sea	j'ai nagé dans la mer I swam in the sea	je vais nager dans la mer I am going to swim in the sea	je nageais dans la mer I used to swim in the sea	je nagerai dans la mer I will swim in the sea	je nagerais dans la mer I would swim in the sea
je me repose sur la plage I relax on the beach	je me suis reposé(e) sur la plage I relaxed on the beach	je vais me reposer sur la plage I am going to relax on the beach	je me reposais sur la plage I used to relax on the beach	je me reposerai sur la plage I will relax on the beach	je me reposerais sur la plage I would relax on the beach
C'est super It is super	n/a	Ça va être super It is going to be super	C'était super It was super	Ce sera super It will be super	Ce serait super It would be super

Art - AO1

Develop ideas through investigations and showing understanding of sources



Mind map

Keywords – add branches to your mind map that include key ideas and words, using one word for each branch will allow you to develop more ideas rather than using a phrase or sentence

Central idea – this is the starting point of your mind map and shows the topic you are exploring. All keywords should link from this idea.

Include images – imagery can convey much more than a word or sentence and can help you to develop your ideas as well

Mood board

Theme – consider your theme, have you got a set idea already or are you happy to collect a wider range of ideas

Use a range of sources – don't find pictures from just one place use different sources like, photographs, wallpapers/fabric samples, lettering, magazines etc...

Pick a style – pull it all together with a colour/theme or style to make your page 'work' as a whole

Apply ideas – your mood board should be a visual representation of your mind map



Artist Research and Analysis of Work

There are several things you must include in your research to show understanding of your chosen artist

Bio – a quick gathering of facts with the artists birth/death, style, important works

Collect images – select images of their work that are relevant and images that appeal to you, comment on why you like them

Analysis – To show understanding of the artist you must discuss their work. This will allow you to explore ideas and consider different options before you begin creating your own art work.

Reproduction – either copy a small piece of their work or work in the artist's style to show your understanding of their work

Content – Looking at the subject of the work.

What is it? What exactly can you see? What is happening? What does the work represent?
What does the artist call the work?
Does the title change the way we see the work?
What is the theme of the work?
Landscape, portrait, journey, moment, memory, event, surreal, fantasy, abstract, message.

Form – Looking at the formal elements.

What colours does the artist use? Why? How is the colour organised?
What kind of shapes can you see?
What kinds of lines and marks does the artist use?
What is the surface like? What textures can you see?
What patterns can you see?
How big is the work?
Light, delicate, layered, strong, rough, dark, peaceful, dripped, textured, scale, vivid, bright.

Process – How the work has been developed and made.

What materials and tools have been used?
What is the evidence for how it has been made?
Painted, drawn, woven, printed, cast, stitched, constructed, collaged.

Mood – Looking at the communication of moods and feelings.

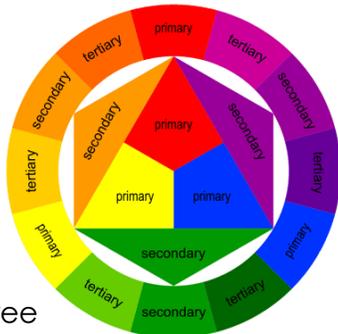
How does the work make you feel?
Why do you feel like this?
Does the colour, texture, form or theme of the work affect your mood?
Quiet, contemplative, thoughtful, hopeful, peaceful, elated, joyful, reflective.

Art - AO2

Refine ideas by experimenting with appropriate media, materials, techniques and processes

You don't have to use a specific media in your project, just show some variation.

For example if an artists uses pen, you could try using, pen, pencil, charcoal, biro, coloured pen etc.



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

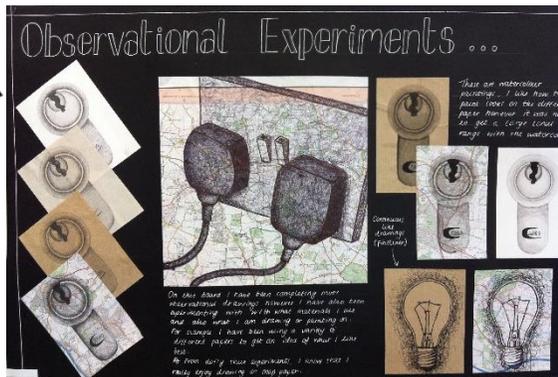


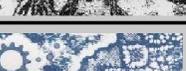
Experimentation

You MUST try things more than once to show improvement and refinement. See how the artist has tried the same sketches in lots of different media and on different surfaces.



Be brave in your use of media, aim to show off your best skills.



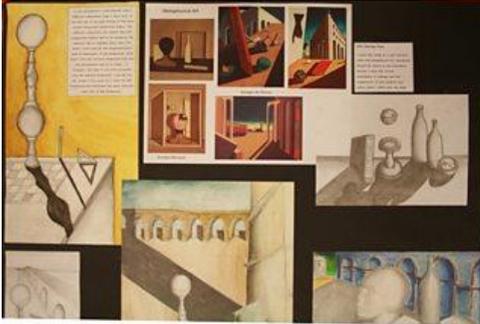
Pencil		The basic tool for drawing, can be used for linear work or for shading
Biro		Drawings can be completed in biro and shaded using hatching or cross hatching
Pastel (chalk/oil)		Oil and chalk pastels can be used to blend colours smoothly, chalk pastels give a lighter effect
Coloured pencil		Coloured pencil can be layered to blend colours, some are water soluble
Acrylic paint		A thick heavy paint that can be used smoothly or to create texture
Watercolour		A solid or liquid paint that is to be used watered down and layered
Monoprint		Where ink is transferred onto paper by drawing over a prepared surface
Collograph		A printing plate constructed of collaged materials
Card construction		Sculptures created by building up layers of card or fitting together

Media	The substance that an artist use to make art
Materials	The same as media but can also refer to the basis of the art work eg, canvas, paper, clay
Techniques	The method used to complete the art work, can be generic such as painting or more focus such as blending
Processes	The method used to create artwork that usually follows a range of steps rather than just one skill

Art - A03

Record observations, ideas and understandings as you develop your work

Take your own photographs and work from them as much as possible. Taking your own photographs will allow you to create a more personalised response.



Create both **primary and secondary studies**.

Create **maquettes** (a miniature scale model) in paper, card, etc to show your ideas.



All ideas and observations **MUST** clearly link to your project/theme. No random art work.

You may want to produce another mood board or mind map as you develop your project and narrow down ideas.



Annotation

Describes writing notes, using images and explain your thoughts to show the development of your work.

You must annotate and reflect on your work as it progresses to show your intentions and ideas.

Step 1 – Describe

What is the image of?

What have you done?

Step 2 – Explain

How was this work made?

How did you produce these effects?

How did you decide on the composition?

Step 3 - Reflect

Why did you use these methods?

Why do some parts of the work 'work' better than others?

Why might you do things differently next time?

How to 'record'

Observational drawing	Drawing from looking at images of objects
Primary observation	Drawing directly from looking at objects in front of you
Secondary observation	Drawing from looking back at images of objects
Photographs	Using a camera or smartphone to take pictures to draw from (this is also classes as a primary observation)
Sketches	Basic sketches and doddles to show undeveloped and initial ideas.
Annotations	Writing about your art work



Art - AO4

Present a personal and meaningful response that realises intentions and shows an understanding of visual language

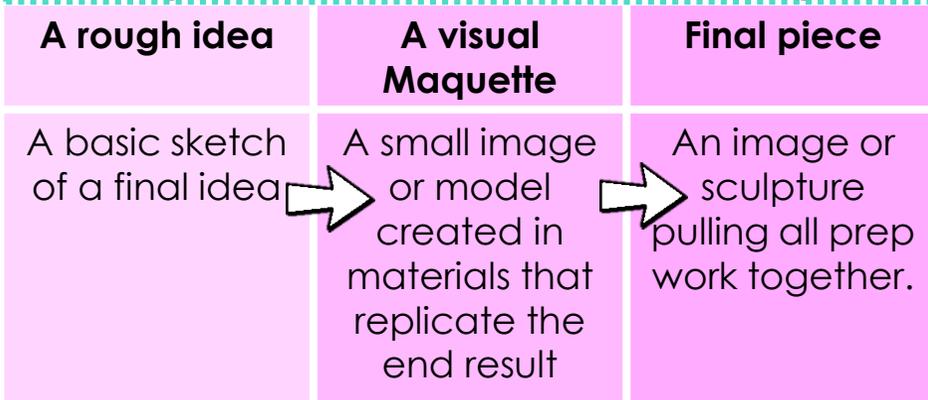
Telling a story with your art and sketchbook, using your work to convey a message instead of relying on words.

Avoid sticking with your first idea. Sometimes your initial idea is worth pursuing but before a final piece is decided upon you should have considered at least three different design ideas.

Thinking about your Final Piece

- Use materials and media that you can control well and have practised with.
- Your final piece should show influences from the artists you have studied
- Remember to think about composition rules when designing your final piece

Present your work well, this doesn't mean fancy background. Just take care on every page.



Sketchbook checklist

- Have you demonstrated what the starting point, theme or brief means to you personally?
- Have you established a link between the starting point and your chosen sources?
- Have you reflected your understanding of the social and cultural context?
- Is there a clear link between your sources and your own work?
- Is it clear what ideas or techniques from your sources you have developed?
- Have you selected and presented your studies carefully?
- Made use of your discoveries?
- Made clear links between your work and that of other artists, designers and craftspeople?
- Collected images to show your inspiration and stimuli?
- Made use of drawings, sketches, jottings, photographs and experiments with different media?
- Annotated images to explain how they fit into your development process?
- Demonstrated your understanding through correct use of art and design vocabulary?
- Shown experimentation and selection of the most successful results for your project?
- Organised your recordings and presented them to show and explain your decisions?
- Clearly linked all of your work to your starting point?

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 

Another method to consider when drawing is using the grid method.

The **Grid method** is a tool used to help you draw whilst keeping everything in proportion. It allows you to break down drawings into lots of small squares. Therefore you can concentrate on smaller sections at a time. The more squares the use the more accurate you can be.

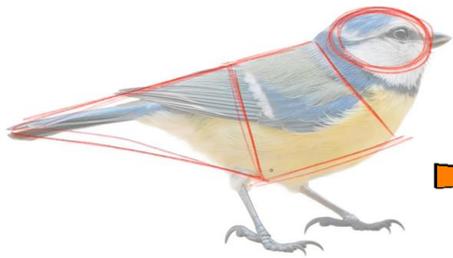


Art - Drawing

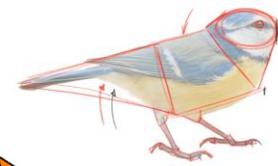
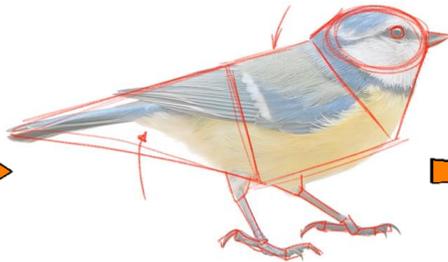
Constructing a drawing is important to ensure you keep correct proportion. Use simplified shapes to develop the structure of your drawing. Start with the largest structures first.

1. **Large rough shapes** – block out the most basic version of your drawing
2. **Accurate shapes** - Refine shapes so that they resemble the object more closely
3. **Detail** – add the detailed sections of the drawing like fine lines etc (then apply tone once drawing is completed)

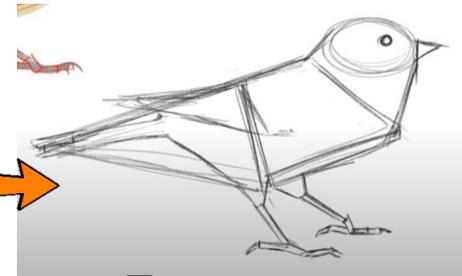
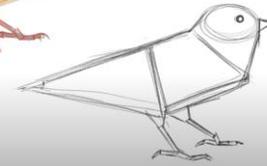
Take a look at the images below to see how it is done



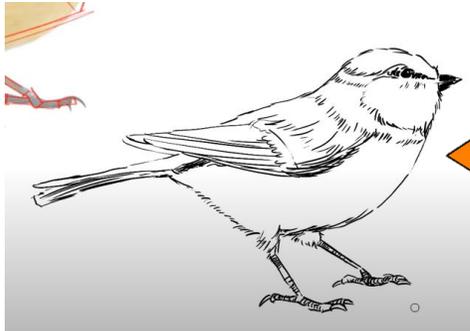
Block out the large rough shapes that make up your image.



Draw out those shapes on their own



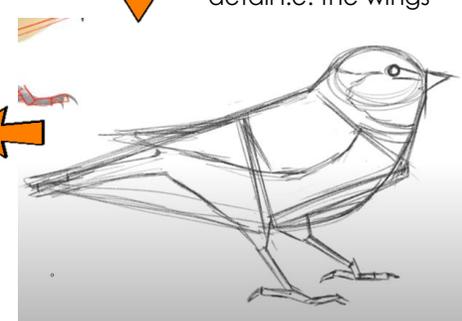
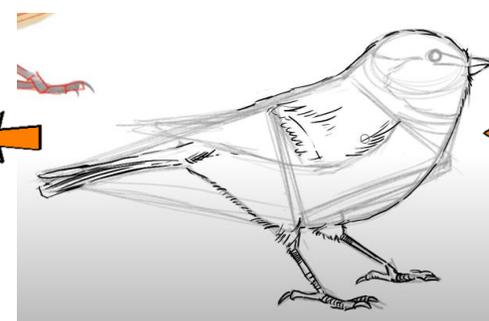
Add other structural detail i.e. the wings



Completely remove any construction lines.



Rub out the large rough shapes so you can barely see them and draw using lines that show the texture of the finished object, in this case a bird.



Develop lines so they more closely resemble they way the final image will look. See how the breast of the bird is now curved, not straight and angular.

Art - Adding Tone

Grades of pencil

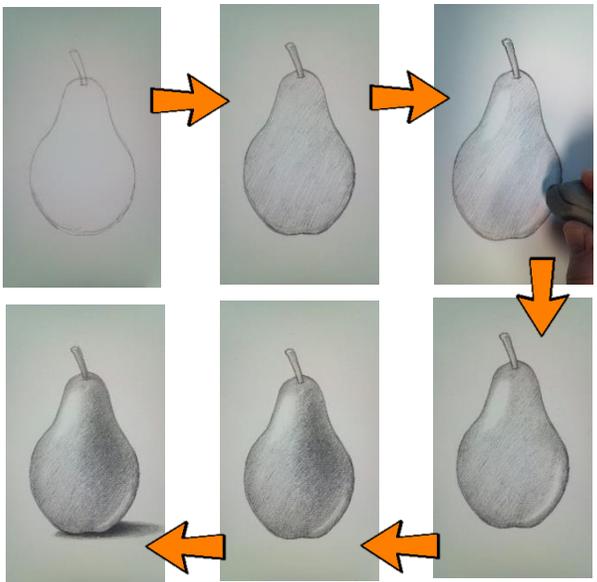
Pencils come in different grades, the softer the pencil, the darker the tone.

H=Hard B=Black

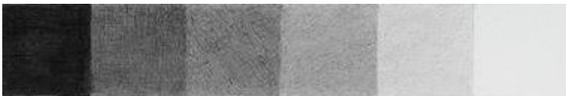
In art the most useful pencils for shading are 2B and 4B. If your pencil has no grade, it is most likely HB(hard black) in the middle of the scale.



When **applying tone** to a drawing you must remember to apply base shades first to add depth and suggest form. Secondly, add mark making to develop the texture and fine details line work to finish.



Directional shading is shading that follows the contours of an object. Using this method makes your work appear more realistic. Look at the portrait, see how the shading changes direction and curves with the shape of the figure. This technique should be used on all drawings. See how it has been used on the spheres below.



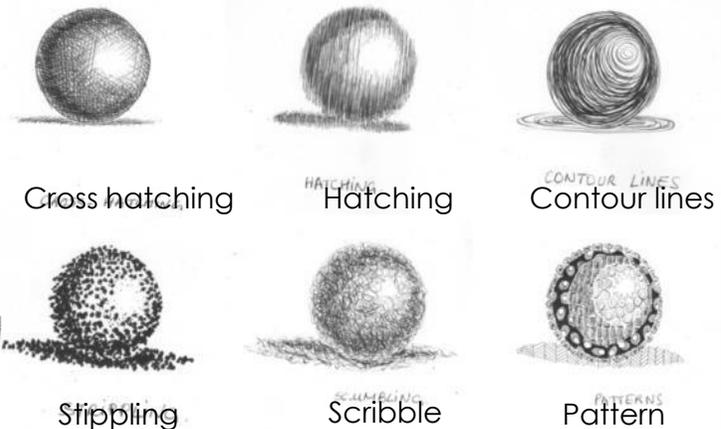
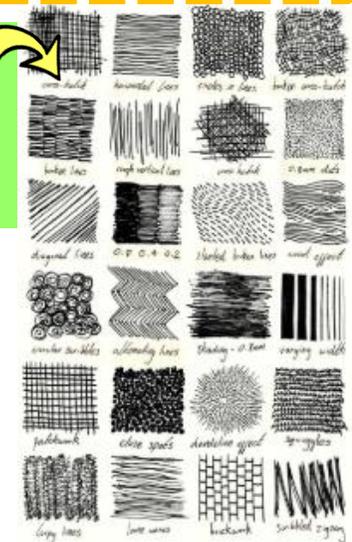
Tonal shade

Produce a range of tones by varying the pressure and layering - consider using softer pencils for darker shades

Mark Making - techniques

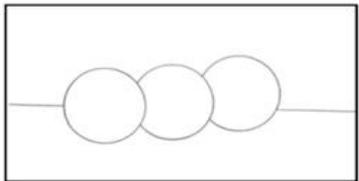
Making things look 3D: To stop drawings looking flat use a range of tone and marks. Pressing harder and light and layering with your pencil creates different tones and adds depth.

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.

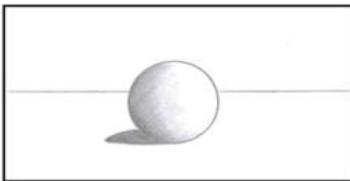


Art - Composition

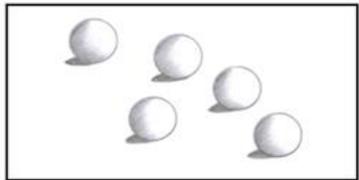
Creating a sense of **space and depth** is important in art work to make it feel sophisticated and well thought out. Knowing how to raise objects over the top of each other is important in communicating space and depth to your viewer.



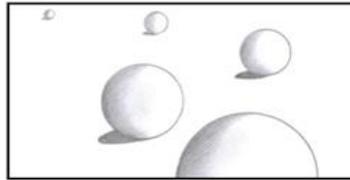
Overlap
One object appears to be behind the other



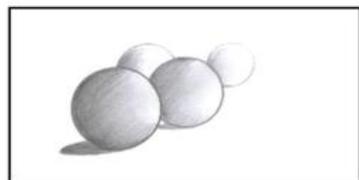
Shading
Light and shadow create the illusion of form and space



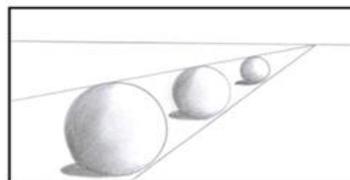
Placement
Objects higher in the picture appear to be in the distance



Size
Small objects look distant, while closer objects should be larger

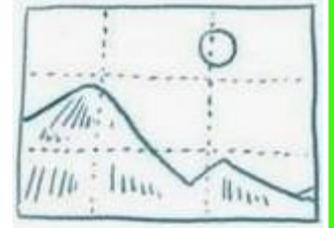


Value and Focus
Lighter values and less details suggest distant objects



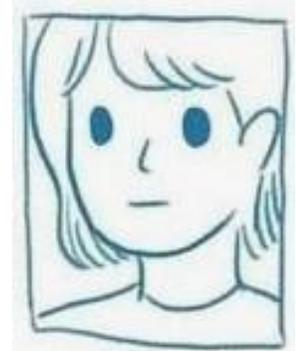
Linear Perspective
Parallel lines and edges seem to go toward one or more vanishing points

Rule of thirds – Place focal elements (objects) at 1/3 or 2/3 of the image horizontally or vertically, not in the middle

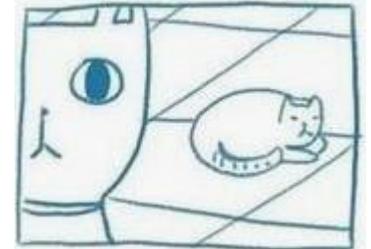


Repetition and grouping
Try grouping objects in odd numbers, this often looks better than an even number of objects.

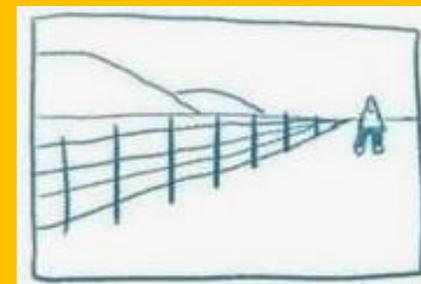
Simplify and fill – Enlarge or crop the image to fill the space and draw your viewers attention to that particular object



Balance elements – If there is an emphasis on one side of the piece balance it out with smaller objects on the other side.



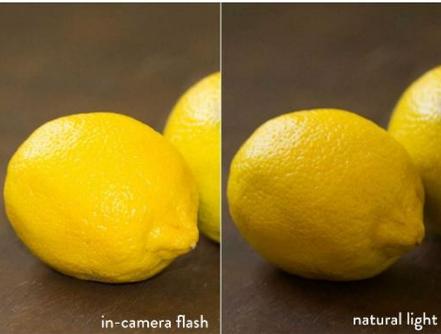
Line – Use lines to draw the viewers eye across the work. The lines don't have to be straight, think about using S or C shaped lines.



Art - Taking a Good Photograph

Light

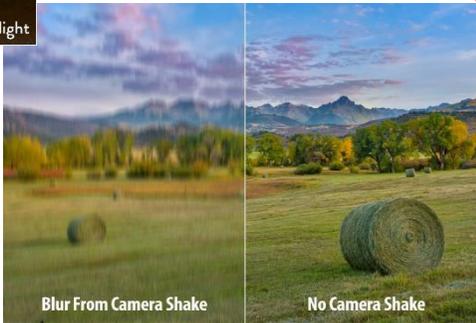
Use natural light as much as possible. The best times for shooting are sunrise and sunset. As far as possible avoid taking shots in artificial light i.e. bedroom lights or with flash.



Notice that most of the tone is removed with flash on

Taking a good photograph will be key to your project. You will be using these images to draw from. Photography is another great way to record (AO3) the work you are carrying out.

If your picture is blurry, it means you are probably too close to your subject. Move back a little bit until your image becomes sharper.

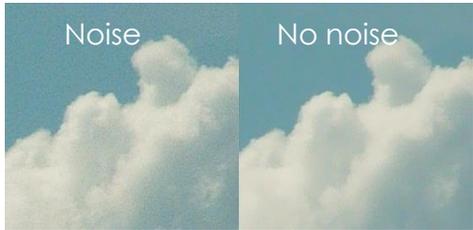


Think – don't just point your camera and click. Think about what you want to take a picture of, is it...

- Texture? Get in really close, just make sure your picture is focused and not blurry.
- A portrait? Make sure nothing distracts from your main subject, try to use a plain background,
- Landscape? Then hold your camera steady, stand far back and line up your scene with the rule of thirds.

Noise

No noise



Noise

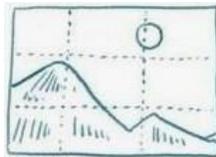
Avoid digital zoom, it can make images grainy, this is called noise in photography. Try to get physically closer to your subject instead (if you can).



When there is less light your camera finds it harder to focus and often it will create an image with 'camera shake'. If you need to take an image in low light try to rest your camera on a flat surface to help steady it.

Grid lines – on most phones/cameras you can go into the settings and add grid lines.

Using these grid lines will help you to create a successful composition and therefore photograph. Check out the 'Composition' page and look at the 'rule of thirds'.



To switch the grid on ...

iPhone: Go to "Settings," choose "Photos & Camera," and switch "Grid" on.

Samsung Galaxy: Launch the camera app, go to "Settings," scroll down and switch the "grid lines" option to "on."

Pro tip: Take lots of pictures from similar angles and only make slight changes with each photograph. Once you have finished capturing you can choose which images are the best.

Art - Painting

Tape Masking

- Tape off sections of your paper with masking tape.
- Paint over the tape and let dry.
- Peel tape off and reveal white paper underneath.



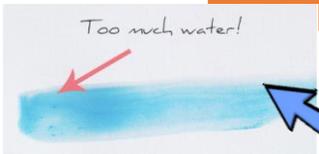
Blot

- Use a paper towel to blot up wet paint to reveal white paper underneath.



Painting with watercolour – Tips

- If water is pooling at all on the paper, you generally have too much water, it will be harder to control the flow of the paint.
- Use two jars of water, once for cleaning your brushes and one with clean water to mix paints.
- Use thicker 'watercolour paper' normal paper will become wavy as it cannot handle so much water.
- Tape down your paper before, during and after painting until your image is completely dry, this way you will have nice flat paintings.
- Let your watercolour dry between layers,
- Use a layering technique, just remember that you cannot put lighter colours over darker colours when using watercolour, work from light to dark.



Salt

- Sprinkle salt into a wet (still shiny) wash of watercolor paint.
- The results will appear when dry.



Consider using some of the watercolour techniques mentioned here to give your work texture and visual interest.

Crayon Resist

- Draw with any color of crayon on dry paper.
- Paint wet watercolor over crayon to reveal drawing underneath.



Wet-in-Wet

- Apply clean water to your paper.
- Before the water dries, load up your brush with paint and touch it to the water. The color will spread quickly.



Dry Brush

- Start with a dry brush and almost dry paint.
- Run your brush over your paper to create grass or scratchy lines.



Wash

- Load your brush with plenty of wet paint. Smooth your brush over the paper with swooping strokes.



Painting in layers

Painting, just like drawing (or making a sandwich) needs to be done in layers.

You must start from the base of your image and work forwards. Think about background, midground and foreground

- We can add different materials or techniques individually one over the other,
- waiting until one layer is dry before applying the next.
- Each layer could be the same technique as before, or a different one.
- A layer doesn't have to cover the surface in its entirety.

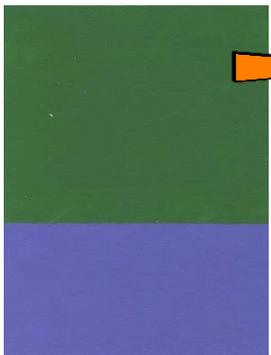
A **layer** can consist merely of one small dab of paint, or can involve thick overlays covering the whole surface. A technique does not have to be applied over the whole surface to qualify as a layer.

Painting with acrylic - In stages

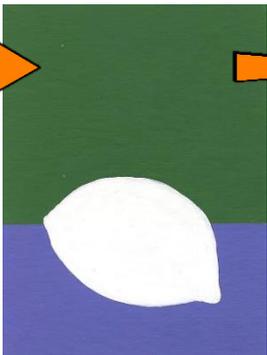
Once you have finished drawing out what you want to paint you should follow these rules when painting with acrylic

Brights: a colour that is lighter than your background

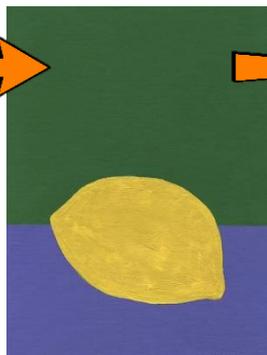
Paint a background



White under brights



Brights over white (block colour)



Apply tonal range, shadows/highlights



Soften edges and blend colours



Art - Colour Theory

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

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



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



Colour and emotion

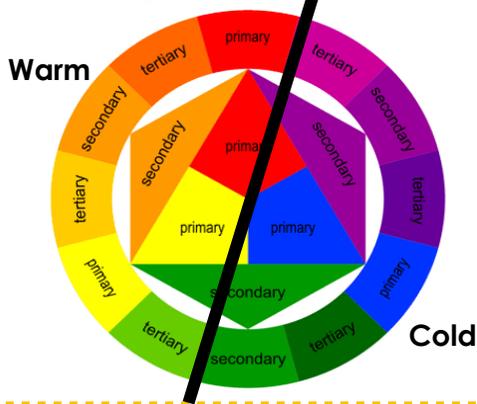
Colour has a powerful influence over human behaviour, to the extent it can manipulate your perception of what is actually there.

- Red: Passion, love, anger and danger
- Orange: Vitality, creativity and activity
- Yellow: Energy, light and hope
- Green: Health, nature and wealth
- Blue: Trust, security and spirituality
- Purple: Creativity, royalty and wealth

We can use these psychological triggers to influence how we want the viewer to perceive the painting. If you want the viewer to have a passionate and aggressive response, then you should be utilizing reds and other warm colours. If you want a calming scene, then greens and blues should be utilized.

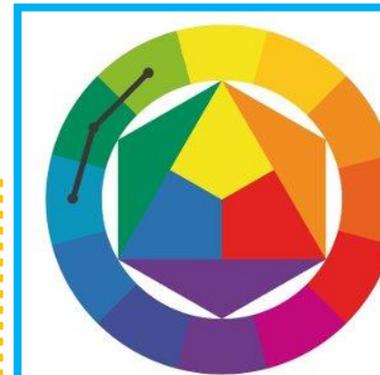
Hue – any colour that appears on the colour wheel, note that neither black nor white appear on there

Tone – used to describe a colour that has had grey added to it.



Complementary colours are opposite each other on the colour wheel. When placed next to each other, there is an extremely strong contrasting and vibrant effect. If overused, your painting may become jarring and uncomfortable to look at.

You should select a dominant colour and use the other colour as an accent.



Harmonious colours are relaxing colour combinations using colours positioned next to each other on the wheel. Harmonious colour combinations were famously used by impressionist artists such as Claude Monet to create beautiful harmonious paintings. It is often most effective to select one dominant colour, a secondary colour and a third accent colour.

What can I actually see?

We all have preconceived ideas of what colour an object should be, i.e. a tree is green. But that is not always the case. If you are not careful and do not observe the tree for what it actually is, then you may be drawn towards adding more green than is necessary. This is because we forget to observe and we try to paint from a memory or idea. - **Paint what you see, not what you think.**

Constructing the Built
Environment Level 1 / 2 Award
– Unit 3



Construction Design Management (CDM)

- sensibly plan the work so the risks involved are managed from start to finish
- have the right people for the right job at the right time
- cooperate and coordinate your work with others
- have the right information about the risks and how they are being managed
- communicate this information effectively to those who need to know
- consult and engage with workers about the risks and how they are being managed

Gantt chart Important points:

- Gives team a reference point
- Regularly updated by planner
- All factors that influence the procurement, design and construction processes are factored into the plan
- Can be produced using powerful software or excel spreadsheets or by hand.

Planning Permission:

Planning permission is managed by the local Council, whereas Building Regulations are managed by private companies such as Inspectors
Building regulations: Building Regulations are minimum standards for design, construction and alterations to virtually every building. The Building Regulations 2010 cover the construction and extension of buildings and these regulations are supported by Approved documents..

What is the difference between them?

Planning permission relates to the principal of development, covering issues such as siting, scale and appearance, whereas the Building Regulations deal with the technical issues such as structural stability, fire drainage and energy conservation.

Building Regulations: how do they apply to renovation and conversion projects?

Some homeowners are unaware that they will require Building Regulation approval for work that they are planning to carry out, believing that once they received Planning permission (if it is required), that is all that is required do and they can carry on with the building work.

Summary: The planning of projects remains the same whether a refurbishment, extension, new build or infrastructure project.

Gantt chart Important points:

- Gives team a reference point, regularly updated by planner
- All factors that effect the procurement, design and construction processes are factored into the plan
- Can be produced using powerful software or excel spreadsheets or by hand.

Constructing the Built
Environment Level 1 / 2 Award
– Unit 3



Project planning: The pre-construction period, construction phase and maintenance period will be planned in detailed schedules and programmes of work at an early stage, to help inform, guide and check the procedures, activities and processes of construction and quality checking during the project.

Building trades: trades (as carpentry, bricklaying, plumbing) that are essential to and chiefly practiced in connection with building construction.

Professional Tradesman: Generally a tradesman that has been educated to degree level such as an architect, site manager or Civil Engineer.

Three Stages of Drawing-

Preliminary Conception-Drawn by hand then reworked digitally

Tender Drawings- These show more detail and have been approved by the client

Construction Drawings- Accurate drawing ready to be used by contractors

Common Factors That Effect

Location - Working in remote locations or far away from an organisation, head office can be costly

Value of project- A large multi million pound office development may be impossible for a small contractor to attempt due to restricted cash flow

Size of the project- A large building maybe too complex for a small company to manage resources without needing more staff

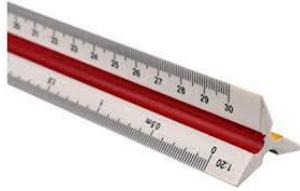
Availability of resources- Shortages of labour, plant or materials are common when constructing buildings, when there is a demand for buildings prices increase

Site clearance: This can happen once **permission** to proceed and **risk assessment** taken place. The site clearance is a vital activity that allows **controlled waste removal**. Waste that needs to be removed in a controlled manner: Vegetation, asbestos, contamination, redundant buildings and infrastructure, and waste to be removed from site in a controlled manner and taken for disposal or recycling locally. **Legislation** linked to the removal of asbestos:

Control of Asbestos Regulations 2012

Tests completed: •Contamination e.g. asbestos or oil in the subsoil, •Presence of tree roots, water sources and antiquities.
*if it is a historically significant site an archaeologist will attend

Constructing the Built
Environment Level 1 / 2 Award
– Unit 3



Scaling: an important tool that is used in the construction industry to help you comprehend the ratios of measurements to a consistent scale. The scale is often agreed at a scale that is comfortable to the persons eye.

Scale	Equal to	Use
1:50	For every 50mm this is equal to 1mm on the scale rule	Plans, evaluations and sections
1:100	For every 100mm this is equal to 1mm on the scale rule	Plans, evaluations and sections
1:200	For every 200mm this is equal to 1mm on the scale rule	Site plans

Key terms

Substructures: all structures below the superstructure, which in general terms is considered to include all structures below ground level but including the ground floor bed.

Superstructures: all structures above superstructure both internally and Externally

'Soft Landings': The building logbook and manuals help the owners optimise its energy consumption, owners and new owners know and understand how the building works and needs to be maintained.

Percentages: Percentages are a common means of understanding the specific part of a material that has been formed into products or requires some form of division.

Scaling: an important tool that is used in the construction industry to help you comprehend the ratios of measurements to a consistent scale. The scale is often agreed at a scale that is comfortable to the persons eye.

Best value: is the procurement process by which the buyer investigates the value of these goods and services not just by its commercial cost/value £ alone

Tolerances: are the primary quality control measure used to set the standards for the design and construction process, and give a definitive value that the tradesperson must work to.

Constructing the Built
Environment Level 1 / 2 Award
– Unit 3

Calculations needed:

Content:

- Area, volume
- Percentages, scaling
- Best value, tolerances
- VAT, tender price

Resources:

- Plant
- Labour
- Materials

Client responsibilities

- Satisfy themselves that the project is **feasible** in
- Choose experienced construction professionals
- Trust the selected team to **procure**, design, construct
- **Pre-determine** what the possible risks are that may threaten the development and act when appropriate.

Primary sources of information: Status of drawing

The Architect, checks that the client or user of the building is satisfied and that it is compliant with the specialist members of the team

This allows the team to understand that the drawing has been developed, checked and double-checked by everyone responsible for designing and coordinating the drawings.

Status A - highest level of drawing approval

Status B - moderate level of approval and indicates there are minor changes such as spelling still to be made, but the drawing can be used for manufacturing or construction purposes, providing any recommendations are followed.

Status C - means the drawing is not in a condition to be used for construction or manufacturing purposes

Why are there so many levels of approval?

To make sure the complex design process is compliant. Any mistakes at this stage will be very costly in terms of money and time. As drawings can take several days or weeks to revise, the status helps the builder know if they can order materials and therefore save time on the programme.

Secondary Sources of Information

Spreadsheets- Useful in formatting large amounts of data E.g.: dimensions, area, time and cost. Data can be changed and updated easily.

Catalogues- Produced by suppliers or manufacturers to offer products. Can be produced digitally and issued through social media to compare and contrast different materials.

Suppliers materials lists- These are used to compare the most current and compliant ready equipment and products

Constructing the Built
Environment Level 1 / 2 Award
– Unit 3

The **RIBA** plan of works is a timetable of how a construction project can be managed and delivered. It shows how there is a cycle of **analysis and improvement**

Key terms

Infrastructure: important building and transportation network

Validate: Prove the accuracy

Transparency: Financial decisions must be clearly recorded and follow UK and European procurement law. This is so investment decisions can be made

Feasibility: Deciding whether the building is either practicable or will proceed

Lead time:

The time taken between ordering an item and it being delivered. Resources such as windows are usually made to order, which would require planning to make sure they arrive when they are needed to ensure work isn't delayed.

Secure Site.

Risks: stealing plant and machinery, tools, belongings
sensitive information: electronic data, ID, bank details, personal information

What other **primary measures** can be added to the perimeter fence to increase security? •Controlled access gates •Guardrooms

Secondary measures can also be added: •CCTV •Reactive guarding arrangements e.g. alarm, security guards, guard dogs

By applying the principle of **SLAM** we can proactively or reactively understand the measures that need to be used to minimise the risk to security



STOP: Engage your mind before your hands. Look and think how security could be compromised. Always stay alert!



LOOK: At your workplace and find the security hazards that may impact you and your colleagues. Report your findings to your supervisor. Look for gaps!



ASSESS: The effects of hazards may have on you, work procedures, pressures, colleagues and the environment. Do you have the knowledge, training and tools to do the task? Can theft, vandalism or privacy occur? Secure valuables when they are left unattended.



MANAGE: If you or your environment doesn't feel secure or if you suspect there could be an issue then stop working. Tell your supervisor what you think the issues are.

Potential effect of factors on project success

- Internal** e.g. lack of qualified and certified key personnel, sourcing of finance, security
- External** e.g. penalty clauses, weather conditions

Section 106

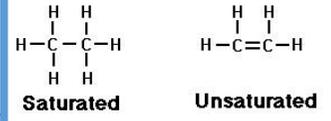
A Section 106 is a legal agreement between an applicant seeking planning permission and the local planning authority, which is used to mitigate the impact of your new home on the local community and infrastructure. In other words, a new house will mean another car(s) on the roads and perhaps your children will attend nearby schools, putting a little more strain on local services

Food and Nutrition – Nutrition

MACRO NUTRIENTS

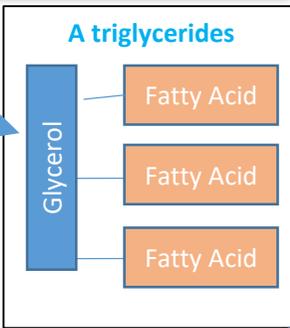


Carbohydrates	
Keyword	Meaning
Monosaccharides	A simple sugar: the most basic sugar molecule.
Disaccharides	Made up of two monosaccharides.
Polysaccharides	Complex carbohydrates: made up of lots of monosaccharides joined together.



Fats (9kcal per gram)

Fats are made up of **Fatty acids** and **glycerol** in the form of **triglycerides**. **Fatty acid chains** are made of **carbon** and **hydrogen**. They can be **saturated** or **unsaturated**- the difference is in how **carbon atoms** bond with **hydrogen atoms**.



PROTEIN

Proteins are made up of amino acids of which there are:

9 essential	12 non-essential
Body cannot manufacture (make) these.	Can be made by the body.
Must be provided by our diet.	Low Biological Value
High Biological Value	Plants, legumes, grains, nuts, seeds and vegetables.
Animal sources of protein, such as meat, poultry, fish, eggs, milk, cheese and yogurt.	Complementary Proteins

Combining two or more LBV protein foods can provide the essential amino acids found in a meat dish:
 baked beans on wholemeal toast
 dhal with rice
 hummus and pitta bread

CARBOHYDRATES

Simple Carbohydrates = Sugars
 Fast release Carbohydrates such as Fruit, Energy drinks, Sweets, honey.

Simple Sugars (Monosaccharides)

Glucose Fructose Galactose

Disaccharides – 2 sugar molecules

Maltose Lactose Sucrose

All carbohydrates, no matter what type, provide **4kcal** of energy per gram. The difference is complex carbs take longer to break down and therefore satisfy hunger for longer, whereas simple sugars leave you feeling empty and wanting more. **Complex carbs provide dietary bulk and fibre** which makes us **feel full!**

Complex Carbohydrates= Starch
 Slow release carbohydrates such as Potatoes, Pasta, Rice.



Complex Carbohydrates
 Polysaccharides – long chain sugar molecules

Food and Nutrition – Nutrition

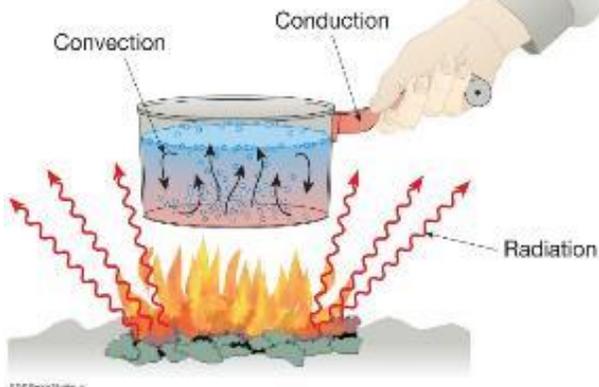


Fat Soluble	Needed For	Found In	Deficiency
A Antioxidant	Vision	Dairy Products Dark Green Veg Orange coloured fruit and veg Fish Oils and Liver	Poor vision
D	Bone growth	Fish Oils Dairy Products Sun Light Absorption	Rickets Osteomalacia
E Antioxidant	Protect tissue	Dairy Products Dark Green veg Nuts	Age quickly Wrinkles Skin loses elasticity
K	Blood clotting	Dark Green Veg Fish, liver, fruit	Haemorrhages

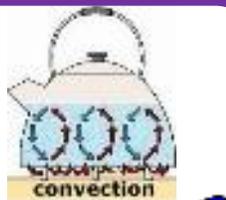
Water Soluble	Needed For	Found In	Deficiency
C Antioxidant	Normal structure and function of connective tissue Antioxidant (protects from free radicals) Helps absorb iron	Main sources from plants – fruits and vegetables. Milk and liver contain small amounts.	Scurvy
B1 Thiamin	Normal function of the nervous system and heart	Whole grains, meat, flour and breakfast cereals.	Beri-beri (disorder of the nervous system).
B2 Riboflavin	Release of energy from food	Milk, eggs, green vegetables.	Dry cracked skin around the mouth and nose.
B12	Cell division and blood formation Normal structure of nerves	Animal sources – milk, meat and eggs. Some algae and bacteria can produce B12.	Anaemia (rare), may be found in vegetarians.

Fats	
Keyword	Meaning
Saturated	considered the unhealthiest if eaten in large amounts- often from animal sources
Unsaturated	healthier fats, usually liquid at room temperature, help promote healthy cholesterol
Visible fats	Those you can see, such as butter and lard.
Invisible fats	Fats hidden within products, such as milk, cheese and other dairy items.
Monounsaturated	Monounsaturated fats contain one C=C double bond in their carbon chains
Polyunsaturated	Polyunsaturated fats contain more than one C=C double bond in their carbon chains
Omega 3 + Omega 6	are polyunsaturated fats and are classed as 'good' and 'essential' as they cannot be produced by our bodies.
Cholesterol	is a waxy substance which circulates in the blood. It is used by the blood to carry lipoproteins, which take the cholesterol between cells. The body needs a balance of good and bad cholesterol.
Low Density Lipoproteins (LDL)	are often called 'bad cholesterol'. High levels build up in the arteries, meaning a higher risk of heart disease.
High Density Lipoproteins (HDL)	are often called 'good cholesterol'. They carry cholesterol from around the body to the liver, which processes cholesterol out of the body.

Heat Transfer Methods



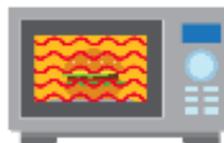
Convection - when heat travels through air or water. E.g. in an oven or a pan of boiling water.



Conduction - when heat travels by direct contact through solid materials such as food or metal.



Radiation - when heat rays travel towards food, e.g. grilling, toasting, microwaving

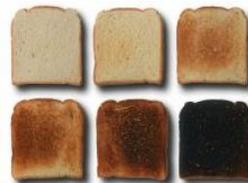


Properties of Carbohydrates



Dextrinisation

Dextrinisation is when dry heat turns starch brown



Starch broken down into **dextrin**.

Caramelisation



Caramelisation is when sugar molecules break down at high temperatures turning brown and changing flavour

Gelatinisation



Starch granules do not dissolve in liquid. Instead they form a **suspension**

Suspension – a solid held in a liquid

When heated at **60°C**, the starch granules begin to absorb the liquid and swell.

At 80°C the particles will have absorbed about 5 times their volume of water until they burst open and release starch, thickening the liquid.

Gelatinisation is complete when the liquid reaches boiling point, **100°C**



Keyword	Meaning
Coagulation	When a liquid protein is heated and becomes solid. E.g. boiling an egg.
Denaturation	When protein foods are heated causing them to change size, colour and texture. E.g. steak, meatballs, chicken.
Dextrinisation	When dry heat causes starch to turn brown. E.g. toasting bread, baking bread.
Gelatinisation	When liquid is added to starch grains, making them swell. Used to thicken sauces. E.g. custard, cheese sauce.
Plasticity	is the ability of a solid fat to soften over a range of temperatures. The more plasticity a fat has, the easier it is to spread.
Emulsion	keeps oil and water in a stable emulsion (mixture of two liquids).
Shortening	gives food a crumbly texture.
Aeration	When air is trapped in a mixture.
Caramelisation	is when sugar molecules break down at high temperatures turning brown and changing flavour
Gluten Formation	Gluten is a protein found in wheat flours. It forms when water is mixed with flour to make a dough. Gluten molecules coil making the dough elasticated.
Foam Formation	When liquids containing protein are agitated the proteins inside denature, this causes them to stretch and air gets trapped. When the proteins coagulate the air becomes trapped forming a foam.
Enzymic browning	is a chemical process which occurs in some fruits and vegetables. It causes the them to discolour, usually turning a brown colour.



Properties of Fats

Shortening gives food a **crumbly texture**



Emulsification keeps **oil** and **water** in a **stable emulsion** (mixture of two liquids).



Aeration
When **air** is **trapped** in a mixture



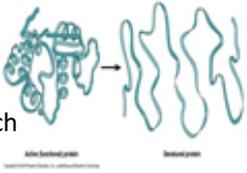
Plasticity is the ability of a **solid fat** to **soften** over a **range of temperatures**. The more plasticity a fat has, the easier it is to spread.



Properties of Protein

Denaturation

When liquids containing protein are agitated the protein inside denature, this causes them to stretch and air gets trapped.



When the proteins coagulate the air becomes trapped creating a foam.

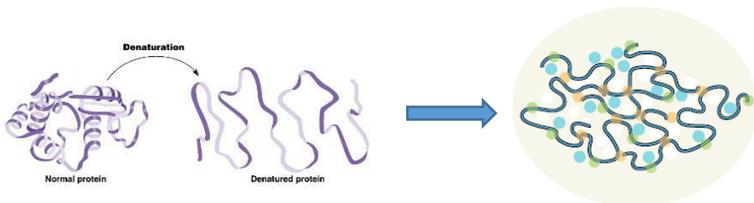
Denaturation of protein molecules can be caused by....

- Heat – frying or boiling an egg
- Acids – adding lemon juice to cream
- Air bubbles – whisked sponge
- Mechanical agitation – whisking egg whites for meringue



Coagulation

Denatured protein molecules are larger and take up more space....



They knock into other denatured protein molecules and start to join together in large groups – called coagulation



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.



BTEC Sport, Unit 2; Practical Sports Performance.

Key Words

Rules
Regulations
Scoring Systems
National governing body
Officials
Tactics
Techniques
Roles
Responsibilities
Components of fitness

Definitions

Rules (or laws) as regulated by the national or international governing body for the sport. For example, the Fédération Internationale de Football Association (FIFA) laws of football.

Regulations - for example, relating to players and participants, equipment, playing surface, facilities, health and safety, time, officials (referee, umpire, judge, starter, timekeeper). Topic

Scoring systems - for example, the method of scoring goals or points, method and/or requirements of victory.

Roles of officials, for example, the roles of umpires, referees, referees' assistants, judges, timekeeper, starters, table officials, third umpire, fourth official.

Responsibilities of officials, for example, appearance, equipment, fitness, qualifications, interpretation and application of rules, control of players, accountability to spectators, health and safety (equipment, facilities, players), fair play, use of technology, effective communication (voice, whistle, signals). continued

ROLE	DESCRIPTION OF ROLE
Referee	The role of a referee is to ensure that the performers follow all the rules of the game. This is important because it helps prevent injuries from occurring and keeps the game safe and fair. The referee also shows other players that certain actions like arguing with the referee will not be tolerated.

APPLICATION OF RULES

RESPONSIBILITY	DESCRIPTION OF RESPONSIBILITY
Equipment	Specific equipment is required to support the application of the rules and regulations of football. Officials are required to bring the correct equipment to every game. A football referee will require a whistle, yellow and red cards, a pen and book. This equipment is needed because A football assistant referee will require flags because Fourth official will require a number board and a pen and book (encase of any dissent from the bench) because

Situation 1

In a football match the referee blows his whistle as he has witnessed a player kicking an opponent.

What decision would the referee give in this situation?

Situation 1

As players prepare for a centre pass in netball they stand in their respective goal thirds. Before the whistle sounds they are free to move but must not enter the centre third. One player steps into the centre third before the whistle is blown.

What decision would the umpire give in this situation?

Structure:

GCSE Music

Instrumentation - string quartet:

Minuet		Trio		Minuet	
Section A (repeated)	Section B (repeated)	Section A (repeated)	Section B (repeated)	Section A (repeated)	Section B (repeated)
G major	G major	D major	D major	G major	G major
Tonic Key		Dominant Key		Tonic Key	



Dynamic

range:

- pp* very soft
- p* soft
- mp* moderately soft
- mf* slightly loud
- f* loud
- ff* very loud

MINUET AND TRIO
from *Eine Kleine Nachtmusik*
By Wolfgang Amadeus **Mozart**
Composition date: 1787



Tempo - *Allegretto*:

Quite fast, but not as fast as *Allegro*.

Time signature:

3
4

Texture:

Homophonic : Melody plus accompaniment



Clefs and note positions:

Treble Clef

Alto Clef

Bass Clef

Violin 1 & 2

Viola

Cello

Melody:

Mainly **Conjunct** and within quite a narrow range.

Harmony:

Diatonic, with modulation to the **Dominant** key.

Structure: Verse/Chorus form

GCSE Music

Intro	Verse 1	Pre chorus	Chorus	Verse 2	Pre chorus	Chorus	Bridge	Chorus 2
Intro: G D Em C		Verse 1 & 2: G D/F Em D C G/B A D			Pre chorus: Eb F Eb F/A Cm7 D			
Chorus: G D Em C		Bridge: Half tempo feel			Chorus 2 (modulated): A/E E F#m D F			

Instrumentation – Rock band:

Vocals – Male, main melody.

Electric Guitar – Accompaniment and lead in bridge.

Bass guitar – Bass line, supporting the harmony.

Keyboard – Accompaniment, with improvisation in bridge.

Drum kit – Standard kit consisting of snare drum, bass drum, hi hat, tom toms and cymbals.

Dynamic range:

Mainly *forte*, although the bridge section is slightly quieter.

Rainbow: *Since You Been Gone*

Recorded: 1979 and featured on the album *Down to Earth*

Written in 1976 by Russ Ballard



Tempo: Moderate

A moderate bright rock beat
BPM: 120

Time signature:



Texture:

Homophonic : Melody plus accompaniment



Moderately bright Rock beat

Words and Music by RUSSELL BALLARD

The song starts with the main **riff** played on **electric guitar**. This riff can also be heard during the chorus.

There is a distinctive rhythmic pattern heard in the **riff**.

Syncopated rhythms are heard throughout the piece.

Melody:

Mainly **conjunct** and **syllabic**, with occasional **melismatic** movement.

Vocal range: G to top D



Harmony:

Diatonic. The piece is in **G major** and modulates to **A major** after the bridge for the final chorus/fade out.

BTEC Music Unit 1: The Music Industry

UNIONS

VENUES TYPES –

LARGE/MULTI-PURPOSE: Arena, Stadium, Large outdoor festivals, Large Theatres
SMALL: Pub, Club, Small Theatre, School Hall

HEALTH & SAFETY AT VENUES :

- Heating, lighting, ventilation
- Safe electrical equipment
- Hygiene (toilets, clean drinking water)
 - First Aid Qualified Staff
 - Emergency Exits
- No tripping hazards
 - Adequate
 - Disables Access
- Security Guards (SIA license)
 - No Smoking

ROYALTY COLLECTION AGENCIES

PRS

Performing Rights Society represents their members' performing rights, whenever a piece of music is performed or played in any public space or place outside of the home. They then collect royalties for this in the form of licenses.

Phonographic Performance Limited licenses the right to play recorded music and music videos in public. They then collect royalties for this.

PPL

MCPS

The Mechanical Copyright Protection Society represents their members' mechanical rights, whenever a piece of music is reproduced as a physical product. They then collect royalties for this.

MU

The Musicians' Union is an organisation which represents over 30,000 musicians working in all sectors of the British music business.

Musician

Composer/
Songwriter

Record Producer

Session Musician

Equity

Equity is the UK trade union for professional performers and creative practitioners. It represents artists from across the entire spectrum of arts and entertainment.

Musician

Session Musician

Broadcaster

BECTU

The Broadcasting Entertainment Cinematograph and Theatre union is the UK's media and entertainment trade union. It represents 26,000 members who work in broadcasting, film, theatre, entertainment, leisure and interactive media.

TRADE BODIES

MPG

The Music Producers Guild represents the interests of all involved in the production of recorded music in the UK.

APRS

Association of Professional Recording Services represents those who work in the audio industry in the UK.

PLASA

Professional Lighting and Sound Association represents those who supply technologies and services to events in entertainment in the UK.

BTEC Music Unit 1: The Music Industry

HIRE & TRANSPORT COMPANIES

RECORD COMPANIES



The Big Three Major Record Labels

Advantages of a major record label are:

- They have a great deal of money at their disposal.
- They have many connections with other labels and artists
- They have great links when it comes to promotion of an artist
- Because of their large size, they can get the best deals on manufacturing, advertising and links to media outlets.

Disadvantages of a major record label are:

- Difficult to stand out in such a big pool of artists
- Deals that are balanced in the favour of the record label making money as opposed to the artist.

Advantages of an independent record label are:

How does this compare to major record labels

- There are usually less artists so there is more time that can be spent with the artist
- The contracts are more fair to the artist, giving them a more even split of the money made

- Due to more time spent with the artist, a closer personal relationship can exist
- The artist can have more creative freedom with the songs chosen and the sound of the music.

Disadvantages of an independent record label are:

- Less funds available to make records
- Less funds to publicise and promote a record
- Organisation of record label can be difficult due to less employees and more informal nature
- Can have less contacts with the media for advertising and promotion.

Which label would you choose?

Promotion Companies

Promotion companies support the marketing and promotion of an artist and encourages publicity of an artists product for public awareness. This can include live shows, record signings, public appearances etc. Many of the big record labels will have a promotions company within their label rather than outsourcing to other companies.

Lighting and Sound Equipment

- Company will have technical expertise with the equipment and can also give advice about best set up or needed specifications.
- The equipment will be higher quality and looked after properly.
- Engineer to take care of sound/lights so that the artist can focus on the music

Transport

- They will transport equipment when on tour so equipment is always at the venue when needed.
- Transport company may provide Roadies to carry and install equipment.
- Hire a bigger live in coaches for tours around the country or abroad.

PUBLISHING

Advantages of a major publishing house are:

- Major publishing houses are better equipped to distribute music, through funds they have available and already establish connections.
- The music published is associated with a certain quality and can be packaged and printed to reflect this.
- There are lot more opportunities for marketing and promotion as the publishing house will do this for you and have greater funds to do this more extensively.
- More opportunity to make significant amounts of money



Published Sheet Music

Disadvantages of a major publishing house are:

- Usually need to go through an agent who will take a percentage of the money you earn.
- It is harder to have music published when the company is large
- They may insist on further editing to your music and certain changes made.

Which way of publishing would you pick and why?

Self Publishing (Online)

Advantages of self publishing are:

- Don't need to go through an agent as you can send your work directly to them
- You are more in control with the editing process
- It can be a stepping stone to a larger company
- May cater to a specific genre that is different from the style required of the major publishing houses.

Disadvantages of self publishing are:

- Less marketing and promotion through online publishing. This will need to be carried out by the composer
- You are likely to make less money from online publishing, especially in the short term.
- Not the same possibilities of distribution of your work.

Musician

A musician is someone who performs music through the playing of an instrument or singing. Musicians play many different styles of genre's, from Jazz to Pop, from Classical to Folk.

Musicians main responsibilities are:

- Train and practise regularly to keep skills to a high standard
- Turn up to rehearsals on time and ready to play
- Look after their instrument or their voice
- Learn new music for a show.

Why is it difficult to be a professional musician?



Ed Sheeran (Guitarist and Vocalist)

Studio Manager

A Studio Manager makes sure that the studio is organised, in terms of bookings, equipment and administration. They are involved in the business side of the operations and making sure that they keep existing clients satisfied and attract new business to the recording studio.

Studio Managers main responsibilities are:

- Ensure that the studio is run effectively and that it is financially profitable
- Schedule times and liaise with clients
- Employ session musicians and engineers
- Promotion and marketing of studio
- Check Health and Safety is in place to safeguard clients and employees

What health and safety concerns are there at a studio?



Abbey Road Studios (London)

Composer/Song Writer

A Composer is someone who writes music. This can be in the form of music written for an orchestra or brass band, music written for film or television, electronic music written on computers or through song writing.

Composers main responsibilities are:

- Compose music for a TV programme (quiz show, soap, commercial)
- Compose songs for singers
- Compose music for a special event (coronation, Olympics)
- Keep to a deadline
- Work with the performer so that the song/composition is at their ability level of singing/performance (correct range)

What ways can a composer/song writer earn money?



John Williams (Film Composer: Star Wars)

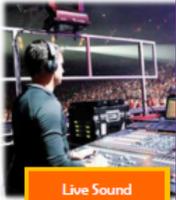
Live Sound Technician

A Live Sound Technician controls the sound at live events such as theatre performances and music concerts. They operate microphones, amplifiers and control desks to balance the sound levels, as well as providing background music and sound effects.

Live Sound Technicians main responsibilities are:

- Choose suitable microphones and equipment and make sure these are looked after.
- Position and rig-up microphones
- Do sound-checks
- Operate the sound desk during shows/recording

Why are sound checks important?



Live Sound Technician at a Concert

Promoter

A Promoter is typically hired as an independent contractor by music venues, earning an agreed-to fee or royalties. They work with agents, or in some cases, directly with the bands, and with clubs and concert venues to arrange for a show to take place. Promoters then are in charge of making sure the word gets out about that show.

Promoters main responsibilities are:

- Work with venues to arrange for a show
- In charge of 'putting on' the show
- Work with artists' management

How would a promoter go about arranging a show?



Local Flyer to Promote a Concert

Sound Engineer

A Sound Engineer is required to assemble, operate and maintain the technical equipment used to record, amplify, enhance, mix or reproduce sound.

Sound Engineers main responsibilities are:

- Planning recording sessions with producers and artists
- Setting up microphones and equipment in the studio
- Making sure the volume and recording levels are set correctly
- Operating recording equipment and adding effects
- Recording each instrument or item onto a separate track
- Mixing tracks to produce a final 'master' track

How does this compare to a Live Sound Technician?



A Sound Engineer Recording a Drum Track

Venue Manager

The venue manager must ensure the smooth running of their venue and make sure that the venue is profitable business. This involves working closely with artists, ensuring the quality of the music performed and negotiating fees for the use of the venue.

Venue Managers main responsibilities are:

- Ensure that all services are opened and fully functional during scheduled times
- Check Health and Safety is in place to safeguard clients and employees
- Give consistent and excellent level of service to clients
- Book artists for the venue.
- Assist with preparations of shows and supervise the whole process

What financial aspects does the Venue Manager need to consider?



O2 Academy Shepherds Bush (London)

Marketer

A Music marketer is someone who is in charge of raising awareness of an artist and creating a brand that can be easily recognisable to the public. In order for the artist to be popular, a marketer must help create a fan base through various types of media and publicity campaigns.

Marketers main responsibilities are:

- Design and implement marketing (i.e selling) plans: album sales, streams
- Gather prices for advertisements and promotions
- Devise promotional events, giveaways, sponsorships
- Have a radio/ online campaign for an artist
- Create the artist's image/brand



Social Media used to Market an Artist

Why is a brand/image important?

Mastering Engineer

A mastering engineer is a person skilled in the practice of taking audio (typically musical content) that has been previously mixed and preparing it for use in distribution, whether by physical media such as a CD, vinyl record, or as some method of streaming audio.

Mastering Engineers responsibilities are:

- Complete the audio mastering process for an album
- Prepare and transfer audio from one format to a desired master format
- Refine the sound quality and make subtle changes to create an appealing sound

Why is a Mastering Engineer important?



A Mastering Engineer Making Subtle Changes to the Audio

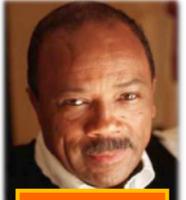
Record Producer

A Record Producer (or Music Producer) has a very broad role in overseeing and managing the recording (i.e. "production") of a band or performer's music. They have a lot of responsibility over the final recording made and are often likened to the director of a film in terms of their importance and overall creative input.

Record Producers main responsibilities are:

- Oversee and manage the recording of an artist's music
- Gather ideas for the project and select songs
- Hire session musicians for the project
- Coach the artist in the studio
- Control the recording session
- Supervise the entire process through mixing to mastering

What coaching would they give the artist? And why?



Quincy Jones (Record Producer: Thriller)

Music Journalist/Blogger

Music journalism is reviewing and reporting about popular music topics, including pop music, rock music, and related styles. Music journalism is an aspect of entertainment journalism, covering popular music and including profiles of singers and bands, live concert, and album reviews.

Music Journalists main responsibilities are:

- Write reviews about an artist's concert and album
- Attend shows, concerts, events and interview people
- Listen to CDs, online music, new talent to stay up to date with the latest music scene

Why should artists do interviews?



Taylor Swift on the Cover of Rolling Stone

Session Musician

A session musician is a musician that is called in to play on recordings or in bands at short notice. They must learn and play parts almost immediately and should therefore be musicians of a high ability and have very good performance skills.

Venue Managers main responsibilities are:

- Turn up on time to recording sessions or performances
- Rehearse music and keep instrumental level high
- Follow instructions given by producer/conductor
- Bring instrument and keep it in good condition for regular playing
- Contribute partly, at times, to the writing of an arrangement

Why would anyone want to be a session musician?



Session Musicians Recording Their Part

Venue Manager

The venue manager must ensure the smooth running of their venue and make sure that the venue is a profitable business. This involves working closely with artists, ensuring the quality of the music performed and negotiating fees for the use of the venue.

Venue Managers main responsibilities are:

- Ensure that all services are opened and fully functional during scheduled times
- Check Health and Safety is in place to safeguard clients and employees



O2 Academy Shepherds Bush (London)

What financial aspects does the Venue Manager need to consider?

- Give consistent and excellent level of service to clients
- Book artists for the venue.
- Assist with preparations of shows and supervise the whole process

CD/Vinyl Manufacturer

A Manufacturer is someone who takes the final master copy of a record and presses it onto CD or Vinyl to be distributed to retail stores for consumers to purchase.

Manufacturers main responsibilities are:

- Master CD's/Vinyl's of high quality
- Transport to distribution outlets (stores or online)
- Duplicate CD's/Vinyl's



CD Manufacturing

What dangers does a Manufacturer face?

Retailer

A Retailer is someone who works in a business that sells music to consumers. This could be in the form of physical copies sold through high street shops or through online stores where music can be downloaded or streamed.

Examples of Retailers:

- Online: iTunes, Amazon, Spotify.
- Shops: HMV, Fopp, specialist record shops.



Music Retailer (HMV)

Why are high street retailers under threat?

Music Journalist/Blogger



Taylor Swift on the Cover of Rolling Stone

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Why should artists do interviews?

Software Programmer/App Developer



Computer Sequencing Software

A programmer, computer programmer, developer, coder, or software engineer is a person who writes computer software. Software is extremely beneficial to the music industry and it has made it easier than ever to set up home studios and produce music in a more accessible way.

Programmers main responsibilities are:

- Create apps, musical programmes: sequencing (Logic), notation software (Sibelius), music games
- Up date the programme regularly
- Create computer programmes that assist musicians with their training (aural tests, music theory)

How has software benefitted the industry?

Roadie

The road crew (or roadies) are the technicians or support personnel who travel with a band on tour and handle every part of the concert productions except actually performing the music with the musicians

Roadies main responsibilities are:

- Carry equipment
- Set up equipment before event
- Look after the equipment
- Pack away the equipment at the end of the event



DJ

DJs play music for audiences at live venues. DJ's use various formats including vinyl, CD or MP3s, and a range of equipment such as turntables, mixers, microphones and amplifiers. DJ's develop the skill to seamlessly transition from one recording of a song to another by using turntable skills that involve the simultaneous use of two record turntables and a DJ mixer

DJ's responsibilities are:

- Play and mix records in clubs or bars, to create atmosphere or keep people dancing
- Choose music to suit the audience's taste and the venue's music policy
- Create their own sounds by manipulating beats, using samples, adding extra music and sound effects
- Work with an artist who raps or sings over the music.



David Guetta (DJ)

What other job roles could a DJ become involved in?

Distributor

A music distributor links a record label or independent musical group to consumers. Their job is to sell recordings and to increase the group's visibility and popularity by convincing stores to stock and promote its recordings. Much of that comes through the distributor's sales reps, who build relationships with the chains and independent stores.

Distributors main responsibilities are:

- Convince stores to sell their clients album.
- Work with stores to promote their clients album
- Build good relationships with stores for future sells.

What skills do you need to have to build relationships with people?



Distributing to Online Retailers



Instrument Technician

Instrument Technicians are those that have specialist knowledge of specific instruments and can therefore support with the use of them. They also have knowledge of how they should be used or the best configuration to get the best sound.

Instrument Technicians main responsibilities are:

- Look after the instrument
- Fix the instrument when broken (e.g. broken strings)
- Give advice regarding best use of equipment

What expertise would you need to have and know?



Instrument Technician Repairing a Guitar

Artists and Repertoire (A&R)

Artists and repertoire (A&R) is the division of a record label or music publishing company that is responsible for talent scouting and overseeing the artistic development of recording artists and songwriters.

A&R main responsibilities are:

- Scouting for new talent and sign to a record label
- Oversee all the aspect of the process from delivery to finished recordings
- Development of artist as they grow and mature
- Manage the recording process
- Help find songs appropriate for the artist

What would they look for in new talent?



Simon Cowell (A&R Exec. One Direction)

Artistic Manager/Talent Manager

A artistic manager, also known as a talent manager, band manager or music manager, is an individual who guides the professional career of artists in the music industry.

Artistic Managers main responsibilities are:

- Organise and confirm show dates and tours
- Liaise with record companies
- Assist with studio planning
- Support artist on a personal level, with advice on lifestyle choices
- To maintain the high standard needed of the artist
- Exploit marketing opportunities.

Why can't artists manage themselves?



Scooter Braun (Talent Manager: Justin Bieber)



Child Development - Unit 3: The Principles of Early Years Practice

Learning Aim A: Understand the Importance of Inclusive Practise in Early Years Settings

Inclusive practice ensures that all children are supported and given equal opportunities to succeed regardless of age, disability, race, background, gender or lifestyle

Benefits of Inclusive Practice

1. Positive self image – affects confidence, motivation and positive attitudes towards others
2. Developmental benefits - needs identified early & support put in place
3. Opportunities to play & socialise – with others developing social & emotional skills
4. Development of self efficacy – confidence to try new activities & cope in new situations
5. Emotional wellbeing – as a result of being accepted and cared for
6. Positive health outcomes – health & physical needs met
7. Positive attitudes towards others – by observing how people are treated

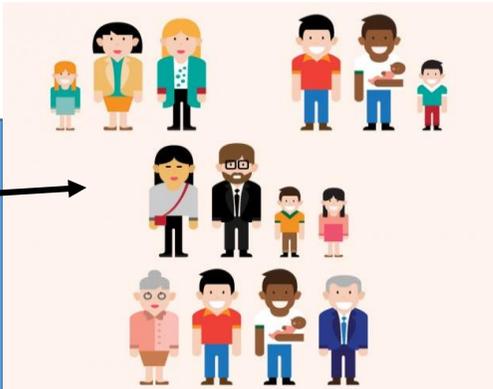
Non-Inclusive Practice

1. Poor self image – result of feeling unwanted and inferior
2. Low self efficacy – learnt helplessness
3. Delayed development – late identification of needs or needs not met
4. Poor health outcomes – health & physical needs not met
5. Lower educational outcomes – needs not met so skills & knowledge not developed as well

Child Development - Unit 3: The Principles of Early Years Practice

Learning Aim B: Explore Ways in Which Early Years Settings Implement Inclusive Practice

1. Adopting a non-judgemental attitude
2. Implementing a welcome environment
3. Using/displaying resources that reflect a children's lives and diversity
4. Strong relationships with children & their families
5. Adapting provisions to meet children's individual needs
6. Keeping children safe
7. Establishing routines
8. Adults are consistently positive role models



Daily Schedule	
7:30 - 8:00	Free Play Table
8:00 - 8:30	Breakfast
8:30 - 9:00	Colouring/Play Dough
9:00 - 9:30	Circle Time
9:30 - 9:45	Art
9:45 - 10:00	Learning Plans/Phonics
10:00 - 10:30	Outside Play
10:30 - 10:45	Lunch

Travel and Tourism - Unit 5

Key Facts

What factors affect the appeal of a destination

- Climate
 - Too cold?
 - Too hot?
 - Is the weather right for the activity to be done (e.g. will there be snow if skiing)
 - Likelihood of weather hazard (e.g. hurricane)
 - Predictability of weather
- Jet Lag
 - Different time zone?
 - How many hours different?
 - Easy to acclimatise or will it ruin the holiday?
- Travel Health
 - Is the water safe to drink?
 - Are illnesses more present there than at home?
 - What can be done to reduce the risk of becoming unwell?
- Emergency Situations

What is the difference between weather and climate?

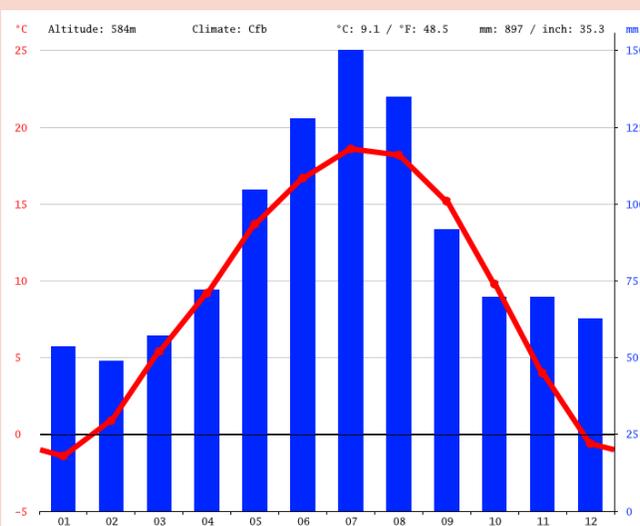
- Weather is the day-to-day climate conditions being experienced at a specific location
- Climate is the average weather measurements over a period of time – usually at least 30 years
- Many travellers will study the climate (on a climate graph) before committing to a holiday in order to assess how likely the weather is to be suitable for their visit

What weather do people like?

- As a general rule, at least 20°C to wear shorts and t-shirt outside
- Anything above 30°C may be classed as uncomfortably hot
- Wet weather is uncomfortable to most people, regardless of how warm it is
- Warm and wet weather is often called 'humid'. Humid weather can be dangerous for elderly people
- Snow is formed when rain falls in sub-zero temperatures – needed for skiing/snowboarding holidays although artificial snow is sometimes added, although the air temperature still needs to be low
- Extreme heat and sunshine is not ideal for children and those with sensitive skin – risk of sunburn

How to read a climate graph

- The temperature is read using the line graph and the red data to the left
- In this location, the average temperatures fall below freezing in January and December
- The summer temperatures are warmer but do not exceed 20°C
- The cold winter temperatures may make this location suitable for snow sports. In the summer, people may undertake sporting activities such as mountain walking, climbing, cycling etc. as the temperatures are warmer but not so warm as to be uncomfortable when exercising.
- It is not an ideal location for 'lounging' around an outdoor swimming pool in the summer months as the temperatures are not consistently high enough.



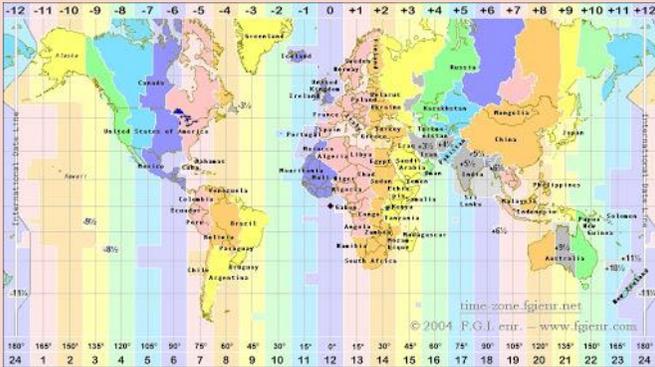
- Precipitation is read using the blue bars and the data to the right.
- In this location, precipitation can be expected in pretty much every month of the year
- July is the rainiest month, with around 150mm of rainfall expected
- As precipitation is expected in the winter months, and temperatures can fall below freezing, it would be reasonable to expect snow to be a feature of this climate.
- Along with the cooler temperatures, the rainfall in the summer months may prevent this from being a location where 'lounging' around an outdoor pool may be a key activity.

Travel and Tourism - Unit 5

Key Facts

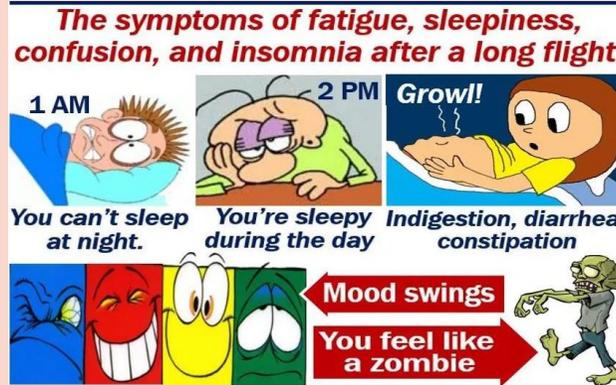
What is Jet Lag?

- A feeling of tired ness and confusion caused by rapidly travelling through different time zones. Your body clock thinks it is a certain time of the day (where you came from) but it may still be light or getting dark at your destination



- For example
 - A flight leaves London at 1200 lunchtime
 - Arrives in Los Angeles 11 hours later
 - The passenger thinks it is bedtime as it feels like 11pm
 - Because of the -9 hour time difference, it is actually 2pm
 - The passenger has to stay awake for a number of hours until it is actually bedtime in Los Angeles – or go to bed early (UK time) and risk waking up in the middle of the night

What does Jet Lag feel like?



- There are many symptoms of Jet Lag. They include:
 - Sleeping at the wrong time
 - Not sleeping when you should
 - Irritable bowel
 - Diarrhoea
 - Fatigue

How can Jet Lag be reduced?

- Drink plenty of fluids
- Avoid alcohol and caffeine on the flight
- Avoid napping
- Don't nap in daylight hours
- Move to destination time as soon as possible
- Take overnight flights where possible
- Choose destinations which cross as few time zones as possible – e.g. Disneyland Paris is +1 hour, Walt Disney World Orlando is -5 hours, Disneyland California is -9 Hours: All have a mouse and a castle!
- Try to move towards the destination time before travelling, e.g. late nights before travel if going West, early to bed if going East



What types of emergency situations impact travel? PHYSICAL

- Earthquakes and volcanic eruptions (volcanic eruptions can ground aircraft over vast areas) – e.g. New Zealand's White Island Volcano 2019
- Weather hazards such as hurricanes, typhoons, drought etc.
- Landslides and avalanches
- Outbreaks of illnesses caused by environmental factors, e.g. Malaria

What types of emergency situations impact travel? ECONOMIC

- Financial crises in the destination country (e.g. devaluation of the currency, rise in the price of fuel)

What types of emergency situations impact travel? SOCIAL

- Fighting and civil unrest – e.g. Hong Kong 2019, Paris 2019
- War
- Manmade hazards and illnesses
- Terrorist activities – e.g. the evacuation of Sharm el Sheikh after the Metrojet bombing in 2015

How does Dengue Fever impact travel/Travellers?

Dengue Fever.



Dengue fever is caused by the dengue virus, it is spread by the bite of an infected mosquito which mainly bite during the day.

Dengue is the second most commonly identified cause of fever in ill international travellers.

Dengue fever occurs in more than 100 countries throughout the tropics and subtropics. Nearly 100 million cases of dengue fever are thought to occur every year. Severe infection mainly affects infants and children living in the tropics and subtropics. Outbreaks are common and often occur in a seasonal pattern. Outbreaks due to imported infection have been reported in Southern Europe.

The Illness.



Most infections are mild and not very bad.

Between 4-10 days after the mosquito bite a sudden onset of fever, headache, muscle and joint pains may occur. A rash may develop.

Within a few days the illness usually gets better, and serious illnesses are uncommon. In 1 – 2 % of cases dengue can progress to a more serious form, severe dengue, which can be fatal (death).

The treatment.



There is no specific treatment but people who have symptoms should consult a doctor. Headache and fever can be treated symptomatically. Hospital care is indicated if severe illness or complications develop.

Within a few days the illness usually gets better, and serious illnesses are uncommon. In 1 – 2 % of cases dengue can progress to a more serious form, severe dengue, which can be fatal (death).

Avoiding Dengue Fever

The best way to avoid infection is to prevent mosquito bites. As the transmitting mosquitoes bite from dawn until dusk, long clothing should be worn and repellents should be used all day.

Medical attention must be sought for any feverish illness experienced whilst travelling or on your return home.

There is no vaccine against dengue fever for travellers.

A vaccine for people living in dengue affected countries aged between 9–45 years (who have had dengue before) is available in some affected countries.

How does Typhoid Fever impact travel/travellers?

Typhoid Fever



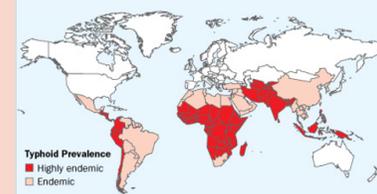
Typhoid fever is a bacterial infection that can spread throughout the body, affecting many organs. Without prompt treatment, it can cause serious complications and can be fatal.

It's caused by a *Salmonella typhi*, which is related to the bacteria that cause salmonella [food poisoning](#).

Typhoid fever is highly contagious. An infected person can pass the bacteria out of their body in their poo (stools) or, less commonly, in their pee (urine).

If someone else eats food or drinks water that's been contaminated with a small amount of infected poo or urine, they can become infected with the bacteria and develop typhoid fever.

Typhoid Fever



Typhoid fever is most common in parts of the world that have poor sanitation and limited access to clean water. Worldwide, children are thought to be most at risk. This may be because their immune system (the body's natural defence against infection and illness) is still developing. But children with typhoid fever tend to have milder symptoms than adults.

Typhoid Symptoms

The main symptoms of typhoid fever are: a high temperature that can reach 39 to 40C

[headache](#)
general aches and pains
[cough](#)
[constipation](#)

As the infection progresses, you may lose your appetite, feel sick, and have a [tummy ache](#) and [diarrhoea](#). Some people may develop a rash.

Typhoid fever is uncommon in the UK, with an estimated 500 cases occurring each year. In most of these cases, the person developed the infection while visiting relatives in Bangladesh, India or Pakistan. But you're also at risk of developing the infection if you visit Asia, Africa or South America.

Typhoid treatment



Typhoid fever requires quick treatment

with [antibiotics](#).

If typhoid fever is treated early, the infection is likely to be mild and can usually be treated at home with a 7- to 14-day course of antibiotic tablets.

More serious cases of typhoid fever usually require admission to hospital so antibiotic injections can be given.

With prompt antibiotic treatment, most people will start to feel better within a few days and serious complications are very rare.

Deaths from typhoid fever are now virtually unheard of in the UK.

If typhoid fever isn't treated, it's estimated that up to 1 in 5 people with the condition will die. Some of those who survive will have complications caused by the infection.

Typhoid Vaccination

In the UK, 2 vaccines are available that can provide some protection against typhoid fever. These involve either having a single injection or taking 3 capsules over alternate days.

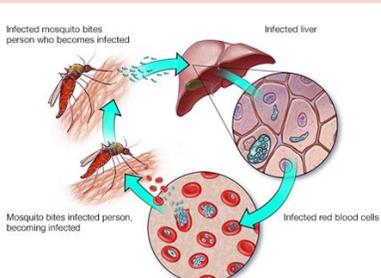
Vaccination is recommended for anyone planning to travel to parts of the world where typhoid fever is widespread.

How does Malaria impact travel/Travellers?

Malaria

is a serious tropical disease spread by mosquitoes. If it isn't diagnosed and treated promptly, it can be fatal.

A single mosquito bite is all it takes for someone to become infected



Symptoms of malaria

It's important to be aware of the symptoms of malaria if you're travelling to areas where there's a high risk of the disease. Symptoms include:

a high temperature of 38C or above
feeling hot and shivery
[headaches](#)
vomiting
muscle pains
[diarrhoea](#)

Symptoms usually appear between 7 and 18 days after becoming infected, but in some cases the symptoms may not appear for up to a year, or occasionally even longer.

Malaria is a serious illness that can get worse very quickly. It can be fatal if not treated promptly.

It can also cause serious complications, including:

severe anaemia – where red blood cells are unable to carry enough oxygen around the body, leading to drowsiness and weakness

cerebral malaria – in rare cases, the small blood vessels leading to the brain can become blocked, causing seizures, brain damage and

Malaria risk areas

Malaria is found in more than 100 countries, mainly in tropical regions of the world, including:

large areas of Africa and Asia
Central and South America
Haiti and the Dominican Republic
parts of the Middle East
some Pacific islands

Malaria is not found in the UK – it may be diagnosed in travellers who return to the UK from risk areas.

The [TravelHealthPro](#) website has more information about the [risk of malaria in specific countries](#).

Preventing malaria

Many cases of malaria can be avoided. An easy way to remember is the ABCD approach to prevention:

Awareness of risk – find out whether you're at risk of getting malaria before travelling.

Bite prevention – avoid mosquito bites by using insect repellent, covering your arms and legs, and using an insecticide-treated mosquito net.

Check whether you need to take malaria prevention tablets – if you do, make sure you take the right antimalarial tablets at the right dose, and finish the course

Diagnosis – seek immediate medical advice if you develop [malaria symptoms](#), as long as up to a year after you return from travelling.

Speak to your GP if you're planning to visit an area where there's a malaria risk. It may be recommended that you take antimalarial tablets to prevent infection.

How does Rabies impact travel/travellers?

Rabies is a rare but very serious infection of the brain and nerves. It's usually caught from the bite or scratch of an infected animal, most often a dog.

Rabies is found throughout the world, particularly Central and South America.

It's not found in the UK, except in a small number of wild bats.

It's almost always fatal once symptoms appear, but treatment before this is very effective.

There's also a vaccine for people at risk of being infected.



Rabies vaccination

You should consider getting vaccinated against rabies if you're travelling to an [area of the world where rabies is common](#) and:

you plan to stay for a month or more, or there's unlikely to be quick access to appropriate medical care

you plan to do activities that could put you at increased risk of exposure to animals with rabies, such as running or cycling

Visit a GP or travel clinic if you think you may need the vaccine.

How to avoid being bitten or scratched

All mammals (including monkeys) can carry rabies, but it's most common in:

Dogs, bats, raccoons, Foxes, jackals, cats, mongooses

They can spread the infection if they bite or scratch you or, in rare cases, if they lick an open wound or their saliva gets into your mouth or eyes.

Rabies is not spread through unbroken skin or between people.

While travelling in an area where rabies is a risk:

- avoid contact with animals – some infected animals may behave strangely, but sometimes there may be no obvious signs they're infected
- avoid touching any dead animals

Symptoms of rabies

Without treatment, the symptoms of rabies will usually develop after 3 to 12 weeks, although they can start sooner or much later than this.

The first symptoms can include:

- a high temperature (fever) of 38C or above
- a headache
- feeling anxious or generally unwell
- in some cases, discomfort at the site of the bite

Other symptoms appear a few days later, such as:

- [confusion](#) or aggressive behaviour
- seeing or hearing things ([hallucinations](#))
- producing lots of saliva or frothing at the mouth
- muscle spasms
- [difficulty swallowing](#) and breathing
- inability to move ([paralysis](#))

Once symptoms appear, rabies is almost always fatal (you DIE!!)

GCSE Statistics – Key Definitions

1 Collection of data

Types of data

- **Quantitative** data is numerical observations or measurements.
- **Qualitative** data is non-numerical observations.
- Quantitative data can be either continuous or discrete.
- **Continuous data** can take any value on a continuous numerical scale.
- **Discrete data** can only take particular values on a continuous numerical scale.
- **Categorical data** can be sorted into non-overlapping categories.
- **Ordinal data** can be written in order or can be given a numerical rating scale.
- **Bivariate data** involves pairs of related data.

- H • **Multivariate data** involves sets of three or more related data values.
- **Primary data** is collected by, or for, the person who is going to use it.
- **Secondary data** has been collected by someone else.

Sampling

- A **population** is everything or everybody that could possibly be involved in an investigation.
- A **census** is a survey or investigation of a whole population.
- If a sample is not representative of a whole population, it is **biased**. A sample that is selected unfairly or that is too small can bias the results. In general, the larger the sample, the more reliable the results.
- The **sampling units** are the people or items that are to be sampled.
- The **sampling frame** is a list of the people or items that are to be sampled.

- H • The **Petersen capture-recapture** formula is $N = \frac{Mn}{m}$ or $\frac{m}{n} = \frac{M}{N}$
- In a **random sample**, every member of the population has an equal chance of
- A **stratified sample** selects a random sample from each stratum of the population in proportion to the size of that stratum.

Collecting data

- A **questionnaire** is a set of questions designed to obtain data.
- An **open question** has no suggested answers.
- A **closed question** has a set of given answers to choose from.
- A **pilot survey** is conducted on a small sample to test the design and methods of that survey.

- H • A **random response method** uses a random event to decide how to answer the question.
- An **outlier** or **anomalous value** is a value that does not fit the pattern of the data.
- Data may be **cleaned** by identifying and assessing extreme values, missing data and errors before it is used.
- In an investigation or experiment, you need to try to control **extraneous variables**. These are any variables that you are not interested in but that could affect the result of your experiment.
- H • A **control group** is selected randomly from the population and is not subject to any factors under investigation.
- A **hypothesis** is a statement made as a starting point for an investigation.

GCSE Statistics – Key Definitions

2 Processing and representing data

Recording data

- A **database** is a collection of information.
- A **two-way table** shows information in two categories.
- **Tables** give exact data values for different categories, but do not show trends and patterns as clearly.
- **Bivariate data** has two variables.

Pictograms, bar charts and vertical line graphs

- A **pictogram** uses symbols or pictures to represent a number of items.
- In a **bar chart**, bars are **equal width** with equal spaces between them. The height (or length) of the bar represents the **frequency**.
- A **vertical line graph** is similar to a bar chart, but uses lines instead of bars.
- **Multiple bar charts** have more than one bar for each class. A **key** shows what each bar represents. The frequencies of each category can easily be compared.
- A **composite bar chart** compares data for each category in a single bar, divided into components that show the frequency for each part. A key identifies each component.
 - The **total frequencies** and the frequencies of each component group can be compared.
- **Bar charts** and **vertical line graphs** show trends and patterns in data.

Stem and leaf diagrams

- A **stem and leaf diagram** shows numerical data split into a 'stem' and 'leaves'. The numbers are written in order. A key shows how to combine the stem and leaves to read the numbers.
- A stem and leaf diagram shows the shape of the data distribution in the same way as a bar chart, but retains the original data values.
- A **back-to-back stem and leaf diagram** shows two sets of data with the same stem. The smallest values on each row are always nearest the stem.

Pie charts

- A **pie chart** is a way of displaying data when you want to show how something is shared or divided. Pie charts show proportions but not accurate data values.
- The **area of each sector** of a pie chart is proportional to the frequency it represents. The **area of the whole pie chart** is proportional to the total frequency.
- **Comparative pie charts** are used to compare two sets of data with different total frequencies.
 - The areas of the two circles should be **in the same ratio** as the two total frequencies.
 - To compare the **total frequencies**, compare the **areas**. To compare **proportions**, compare the individual **angles**.

Population pyramids

- **Population pyramids** are similar to stem and leaf diagrams. They show the age groups in a population, usually divided by gender.

Choropleth map

- A **choropleth map** is used to classify regions of a geographical area. Regions are shaded with an increasing depth of colour. A key shows what each shade represents.
- A choropleth map can be a diagram rather than an accurate map.

Histogram

- A **histogram** is similar to a bar chart but, because the data is continuous, there are no gaps between the bars.
- To draw a **histogram for unequal class intervals**, adjust the height of the bars so the **area** of the bar represents the frequency. The height of each bar represents the **frequency density**.
- $$\text{Frequency density} = \frac{\text{frequency}}{\text{class width}}$$
- You can compare data from histograms if they have the same class intervals and the same frequency density scales.

Frequency polygons

- A **frequency polygon** joins the midpoints of the tops of the bars of a histogram with straight lines. A frequency polygon may be drawn with or without a histogram.

Cumulative frequency

- **Cumulative frequency** is the running total of the frequencies from each class interval.
- For discrete data, you can draw a **cumulative frequency step polygon**. Plot the cumulative frequencies against the upper class boundaries. Join the steps with straight lines.
- For grouped continuous data, you can draw a **cumulative frequency diagram**. Plot the cumulative frequencies against the upper class boundaries. Join the points with a smooth curve or straight lines.
- Cumulative frequency diagrams can be used to estimate or predict other values.

Distributions

- The **shape of a distribution** is the shape formed by the bars in a histogram, or by a frequency polygon, or by the rows of a stem and leaf diagram.
- A **distribution** can be **symmetrical**, or have **positive skew** or **negative skew**.

Misleading diagrams

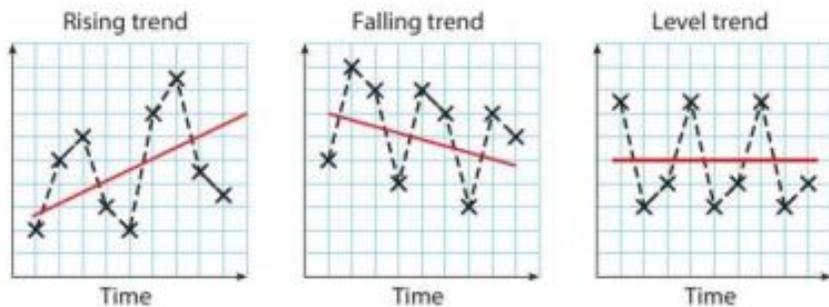
- **Three-dimensional diagrams** make comparisons difficult as data proportions appear distorted.
- Diagrams without clear scales, labels or keys may be misleading.

Line graphs and time series

- A **time series** is a set of observations taken over a period of time.
Use a line graph to show a time series. When plotting a time series, plot time on the horizontal axis.

Trend lines

- A **general trend** is the way that data changes over time.
- A **trend line** shows the general trend of the data.
- A trend line may show a tendency to rise, to fall or to stay level.



Variations in a time series

- Variations in a time series may be:
 - a general trend (as shown by the trend line)
 - seasonal variations (a pattern that repeats).

Moving averages

- A **moving average** is an average worked out for a given number of successive observations.
- The number of points in each moving average should cover one complete cycle of seasons.
- Plot moving averages on a time series graph to help show the trend. They are plotted at the midpoint of the time intervals they cover. Do not join up the points for moving averages.

H

Estimating seasonal variations and making predictions

- seasonal variation at a point = actual value – trend value
- estimated mean seasonal variation for any season = mean of all the seasonal variations for that season
- predicted value = trend line value (as read from trend line on graph) + estimated mean seasonal variation

7 Index numbers

GCSE Statistics – Key Definitions

Index numbers

- **Index numbers** compare the price of an item with a **base year price** – its price in another year. The base year price has index number 100.

$$\text{Index number} = \frac{\text{price}}{\text{base year price}} \times 100$$

RPI, CPI and GDP

- The **Retail Price Index (RPI)** shows the rate of change of prices in everyday life, such as mortgage payments, food, heating and petrol. The government uses the RPI to set the interest rate for student loans.
- The **Consumer Price Index (CPI)** also measures the rate of price changes in everyday life, but does not include mortgage payments. State benefits and pensions are updated each year in line with the CPI.
- The **Gross Domestic Product (GDP)** is the value of goods and services a country produces within a time period.

H

- **Weighted index number** = $\frac{\text{current weighted mean price}}{\text{base year weighted mean price}} \times 100$

Chain base index numbers

- **Chain base index numbers** compare prices from each year with the previous year.

$$\text{Chain base index number} = \frac{\text{price}}{\text{last year's price}} \times 100$$

- The RPI and CPI use chain base calculations to show annual or monthly percentage changes in price.

Rates of change

- The crude birth or death rate is the number of births or deaths per thousand of the population.

$$\text{Crude birth rate} = \frac{\text{number of births}}{\text{total population}} \times 1000$$

$$\text{Crude death rate} = \frac{\text{number of deaths}}{\text{total population}} \times 1000$$

- H**
- The **standard population** is a hypothetical population of 1000 people and is representative of the whole population.

$$\text{Standard population} = \frac{\text{number in age group}}{\text{total population}} \times 1000$$

- Summary statistics summarise the data. The mean, median, mode, standard deviation, range and interquartile range are all summary statistics.
- A **box plot** represents the maximum and minimum values, the median and the upper and lower quartiles for a set of data.
- **Range** = largest value – smallest value.
- Interquartile range (IQR) = upper quartile – lower quartile.

- H**
- An **outlier** is any value that is more than 1.5 times the interquartile range below the lower quartile or more than 1.5 times the interquartile range above the upper quartile.
 - Small outlier is less than $LQ - 1.5 \times IQR$
 - Large outlier is greater than $UQ + 1.5 \times IQR$
 - Another definition of an outlier is a value more than 3 standard deviations from the mean.

Distributions

- A **distribution** can be **symmetrical**, or have **positive skew** or **negative skew**.
- For a set of data:
 - mean > median > mode could indicate positive skew
 - mode > median > mean could indicate negative skew.

- H**
- Skew = $\frac{3(\text{mean} - \text{median})}{\text{standard deviation}}$
 - If a sample is representative of a population, you can use the mean, median, range and IQR of the sample to estimate these statistics for the population.
 - In a distribution:

- 50% of the data in a distribution is less than the median, and 50% is greater than the median.
- 25% of the data is less than the lower quartile
- 25% of the data is greater than the upper quartile
- 50% of the data is between the lower and upper quartiles.

