

The Trafalgar School at Downton

# Knowledge Organiser

Year 10: Terms 1 and 2 2025/2026

Name......Tutor .....



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Use fronted adverbials:  Rather slowly, (manner)	Use a range of sentence structures:  The spotted green frog jumped	Use a tricolon (tripartite list):  'I stand here today humbled by the	Use different sentence types:
During the night, (time/temporal) Every minute or two, (frequency) At the end of the corridor, (spatial)	into the pond. (simple)  The spotted green frog jumped into the	task before us, <b>grateful</b> for the trust you have bestowed, <b>mindful</b> of the sacrifices borne by our ancestors.'	The wind is blowing. (declarative)  Put your pen down. (imperative)
Just beyond the stairwell on his left, he opened the door.	pond <b>and</b> he splashed water on me. (compound – coordinating	Snap! Crackle! Pop! (Rice Krispies slogan)	Who do you trust most in the world? (interrogative)
Use a two and then three word sentence:	conjunction: for, and, nor, but, or, yet, so)  The spotted green frog jumped into the	Use a conditional sentence:  When people smoke cigarettes, their	Pollution is killing us! (exclamation)
It hurt. I was dying!	pond when the hawk flew overhead.  (complex – subordinating conjunction:	health suffers.  If I had cleaned the house, I could	Use discourse markers to begin paragraphs and start/link some
Snow fell. Flakes floated precariously.	if, although, as, before, because, when, after, since, until, so that, while etc.)	have gone to the cinema.	First of all, To begin with, Firstly,
Use anaphora:	When the hawk flew overhead, the spotted green frog jumped	Use paired adjectives to describe a noun:	Therefore, Consequently, Hence, As a result,
Now is the time for action. Now is the time to take up arms. Now is the time to fight for your country.	into the pond. (subordinate/dependent clause start)	Take a look at this <u>bright red</u> spider.	Furthermore, In addition, Additionally, Moreover,
	The frog, which had been lurking underwater, jumped on the lily pad. (embedded clause)	Luckily, it isn't a <u>wild, dangerous</u> one.	Meanwhile, Later that day, Seconds later, Subsequently, That afternoon,
Use epiphora (epistrophe)	Use a past participle - 'ed' start: Glazed_with barbecue sauce, the rack	Use anadiplosis (yoked sentence):	On the whole, Interestingly, Basically, In short, Broadly speaking,
I can't believe I was robbed. Everything is <b>gone</b> . My television and electronics are <b>gone</b> . The money I left	of ribs lay nestled next to a pile of sweet coleslaw.	Building the new motorway would be disastrous, disastrous because many houses would need to be destroyed.	Alternatively, Conversely, Similarly, On the other hand, Despite this, Likewise, However,
on my nightstand is <b>gone</b> .	Use a present participle - 'ing' start: Whistling to himself, he walked down the road.	'Fear leads to <b>anger</b> . <b>Anger</b> leads to <b>hate</b> . <b>Hate</b> leads to suffering.' Yoda, <i>Star Wars</i> .	To conclude, Finally, In conclusion, Eventually, In the end,

# Full Stop

Full stops are used to:

- 1) mark the end of a sentence.

  Carefully, he kicked the ball into the goal.
- 2) show when a word has been abbreviated.

Saint Peter's Road is on the High Street.

→ St. Peter's Road is on the High Street.

# COMMAS

Commas are used to separate:

1) items in a list.

Bert, Ernie and Elmo are my three pet rats.

2) <u>dependent clauses and phrases</u>.

While I was in the bath, the cat scratched at the door. That meant, because I was on my own in the house, I had to get out to let him in. Thankfully, I had a towel handy!

# Quotation Marks

Quotation marks show exact words that are spoken or written by someone.

'Don't be late!' shouted Mrs Smith.

'I will be,' Molly said, and added, 'so **d**on't expect me before 11.'

# Overtion Monk

Question marks are used at the end of direct questions instead of a full stop.

What is your favourite food?

How do you feel today?

An indirect question ends with a full store rather than a question mark:

I'd like to know what you've been doing all this time. I wonder what happened.

# Exclamation Mark

Exclamation marks express strong emotions: forcefulness, commands, anger, excitement, surprise etc.

Don't buy that car! Stop telling me what to do! I'm free! You're late! She actually won! They're also used for most <u>interjections</u>:

'Hi! What's new?' 'Ouch! That hurt.'
'Oh! When are you going?'

he'd ever been.

## Semi-colon

Semi-colons are used to separate two sentences that are closely related:

It was winter; the snow was falling heavily. They can also be used to separate items in a list made of longer phrases. I have been to Newcastle, Carlisle, and York in the North; Bristol, Exeter, and Portsmouth in the South; and Cromer, Norwich, and Lincoln in the East.

# Colon

Colons are used to:

1) begin a list.

I have three pet rats: Bert, Ernie and Elmo.

2) indicate that what follows it is an explanation or elaboration of what precedes it.

Unfortunately, the weather forecast was wrong: it rained all day!

# Apostrophe

An apostrophe is used to show:

1) omission - where a letter or letters has been missed out.

does not → doesn't | am → l'm

2) possession – when some thing/one
owns something. Thankfully, they played

Susan's game. Interestingly, David's house has no garden, but Susan's house does.

# Dash

Dashes are used for parenthesis: a word or phrase inserted as an explanation or afterthought into a passage which is grammatically complete without it. E.g. Last year, they roasted the winning brisket — the size of a pillow — in a mighty clay oven. Paul felt hungry — more hungry than

# Brackets

Brackets are used in pairs for parenthesis:
a word or phrase inserted as an
explanation or afterthought into a passage
which is grammatically complete without
it. E.g.

Andrew Jacklin (last year's losing finalist) is expected to win this heat.

Tigers are carnivores (meat eaters)!

# Ellipsis

Ellipsis is used to:

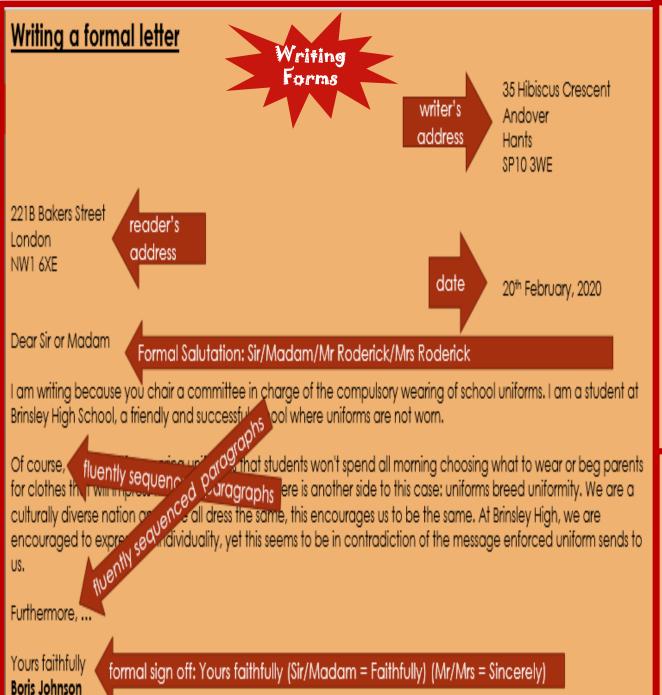
1) show a pause or hesitation in someone's speech or thought.

I don't know ... I'm not sure.

2) build tension or show that something is unfinished.

Looking up, Paul couldn't believe what he saw ...





#### Dystopian Narrative: The Machine Stops by E.M. Forster

Above her, beneath her, and around her, the Machine hummed eternally; she did not notice the noise, for she had been born with it in her ears. The earth, carrying her, hummed as it sped through silence, turning her now to the invisible sun, now to the invisible stars. She awoke and made the room light.

"Kuno!"

"I will not talk to you," he answered, "until you visit me."

"Have you been on the surface of the earth since we spoke last?"

His image faded.

Again she consulted the book. She became very nervous and lay back in her chair palpitating. She directed the chair to the wall, and pressed an unfamiliar button. The wall swung apart slowly. Through the opening she saw a tunnel that curved slightly, so that its goal was not visible. Should she go to see her son, this would be the beginning of the journey.

Of course she knew all about the communication-system. There was nothing mysterious in it. She would summon a car and it would fly with her down the tunnel until it reached the lift that communicated with the air-ship station: the system had been in use for many, many years, long before the universal establishment of the Machine. Those funny old days, when men went for change of air instead of changing the air in their rooms! And yet — she was frightened of the tunnel: she had not seen it since her last child was born.

#### Writing a Narrative: extract is from The Silent Land, by Graham Joyce.

It was snowing again. Gentle six-pointed flakes from a picture book were settling on her jacket sleeve. The mountain air prickled with ice and the smell of pine resin. Several hundred metres below lay the dark outline of Saint-Bernard-en-Haut, their Pyrenean resort village; across to the west, the irregular peaks of the mountain range.

...

If there are few moments in life that come as clear and as pure as ice, when the mountain breathed back at her, Zoe knew that she had trapped one such moment and that it could never be taken away. Everywhere was snow and silence. Snow and silence; the complete arrest of life; a rehearsal and a preecho of death. She pointed her skis down the hill. They looked like weird talons of brilliant red and gold in the powder snow as she waited, ready to swoop. I am alive. I am an eagle.

...

The noise itself filled her ears and muffled everything, and then there was silence, and the total whiteness faded to grey, and then to black!

#### Climax (turning point, height of action/problem at its worst):

- · use exciting adverbs and verbs;
- accelerate pace and heighten tension using lots of shorter sentences.

# Rising Action (build towards conflict):

- build on character, setting, plot;
- introduce a complication/problem;
- build tension/ excitement;
- use interesting adjectives, sensory description, figurative language etc.

Freytag's Pyramid/ the Story Mountain is the best for planning

narratives (stories).

Falling action (turning point, height of action/problem at its worst):

 what events happen to solve the problem?

## **Exposition (Introduction):**

- use an opening hook to grab attention e.g. mysterious atmosphere, in medias res, etc.
- use descriptive vocabulary to set the scene and describe the main character/setting;
- foreshadow what is to come.

# Dénouement/Resolution (ending):

- link back to the start (circular);
- what has the character learned?
- how are things different now?
- is there an exciting twist or cliffhanger ending?

Conclusion: To conclude, repeat RQ, Quite simply, yes!

Yours Sincerely

Counter reason:
old-fashioned
tradition, so easier to
continue
Argument reason:

other traditions burnt witches, slept
on straw, walked
barefoot – now
discontinued so ...
Supporting
example: anecdote,
use experts

P3

Intro: My address right hand side, +
date, school address left,
Dear Mr Cole
Should we consider discontinuing
wearing a school uniform, you've
asked? Quite simply, yes! Within this
letter, you will find several arguments
setting out precisely why we should
make this change.

Form: Letter
Audience: Headmaster
Purpose: Argue change
uniform
P2

Counter reason: all look same so no prejudice/bullying over clothes,

**Argument reason**: no individualism, learning who we are

Supporting example:

RQ +triple
Isn't part of our
learning at school
about learning how to
dress appropriately,
learning who we are,
learning how to judge
people on what is
inside, not what wear?

Counter reason: cost cheaper as not designer or from shops making huge profit

**Argument reason**: cost of blazers, trousers and skirts from school uni shop expensive as no competition, own clothes mix 'n' match so fewer outfits needed, wear weekends so more use,

**Supporting example**: emotive language: force poorer families to go without, statistics

Mind maps/spider diagrams, allow you to jot down content ideas in no particular order and then decide on the best order to write them up in – so they're ideal for non-fiction writing. Each leg = a paragraph

# Capitalism and Socialism: two main economic and political systems used in developed countries. Capitalism dates back to 1400 AD Europe. Socialism evolved in France during French Revolution (1789) and in Britain as a reaction against Industrialization (1700s-1800s): factory owners became wealthy, while many workers were often mistreated by them, lived in increasing poverty, working for long hours under difficult and sometimes dangerous conditions.

Historical and Social Context of 'An Inspector Calls' by J.B. Priestley: set one evening in 1912, written/published in 1945, first performed in the UK in 1946.

# Capitalism: Socialism: Missed any lessons? Scan this code to fill the gaps!

Traditionally a view of the conservative party (Churchill), Capitalism is a rightwring political belief in individual gain through hard work and a focus on profit. Capitalists accept that, for this to happen, there will always be people in society who

are much better off than others.

Traditionally a view of the labour party (Clement Atlee, Priestley), Socialism is a left-wring political belief in greater equality and fairness for all, especially the poorest and most needy in society. Socialism creates equality by state/public ownership of money/capital and control of business, distributing wealth more evenly among the classes.

# In 1912 (year play set):

- Society divided into three rigidly fixed classes dependent on family background, wealth and education: Upper class aristocracy (wealthiest, greatest political power: led opulent and leisurely lives); Middle-class: business owners, educated professionals (lawyer, doctor); Lower class: worked for middle and upper classes (servant, factory, shop).
- General belief of middle and upper class you look after yourself and your family only, and lower class poverty was caused by their laziness, drunkenness, and lack of morals.
- Few rights for workers, little support for unemployed, injury, illness, cost of medical treatment; millions of poor lived in city slums across UK; 2% London's poor were dying from cold; poor relied on help from charities, Government offering only the workhouse.
- ❖Year for employee disputes after workers had appealed for social and economic reform unsuccessfully, for years: protests, riots, coal strikes, docks lying idle, garment workers walking out in their thousands.
- RMS Titanic was a British passenger liner that sank five days into maiden voyage (Southampton to NYC), after hitting an iceberg in North Atlantic Ocean, in April; approx. 1,500 people died (incl.130 first class, 166 second class and 536 third class passengers).
- ❖Women treated as subservient to men; no social welfare system so many unemployed lower class women had no alternative but prostitution; upper class women also had few choices: most they could hope was to impress a rich man and marry him.



Historical and Social Context of 'An Inspector Calls' by J.B. Priestley: set one evening in 1912, written/published in 1945, first performed in the UK in 1946.

# After WW1 (1914-19) and WW2 (1939-1945):

- Society recovering from two wars: they'd had to unite, rich with poor, old with young, man with woman; rationing further enforced equality, so people particularly open/desire to continue with social equality (treated equally) and social responsibility (looking out for each other).
- July 1945, Clement Atlee's Labour party won landslide victory in elections over Winston Churchill's Conservatives reflecting scale of enthusiasm for the social and moral reform and equality they offered.
- Women earned more valued place as had filled work roles of men: helped change perceptions about gender as men had to acknowledge women just as capable.
- Priestley deliberately set 'An Inspector Calls' in 1912 as the year represented an era very different from the time he was writing it: rigid class and gender boundaries were now almost disbanded.

Priestley wanted to make the most of these changes, so through his play, he encourages people to seize the opportunity to build a better, more caring society, rather than return to past inequalities.

# John Boynton Priestley (1894 – 1984):

- Grew up in northern industrial town of Bradford, Yorkshire; socialist views formed here as noticed while many lived in poverty, city's respectable men folk could be smug, even hypocritical: pompously religious on Sundays, but on Saturday nights ill-using young women.
- Fought WW1; nearly died when buried alive by a trench mortar explosion, and later gassed.
- By 1930s, strong social conscience, troubled by effects of social inequality in Britain, and became actively involved in politics.
- Much of his writing was revolutionary and controversial; it included new ideas about possible parallel universes, and contained strong political messages.
- ❖In 1942 he was a co-founder of new political party, the Common Wealth Party, which argued for public ownership of land, greater democracy, and a new 'morality' in politics. The party merged with the Labour Party in 1945, their mandate to create a 'welfare state' and a national health service, eliminating poverty.



# Act 1 Summary and Key Quotations

- 1.Set in1912, the play begins during a celebratory engagement dinner at the Birling residence: 'a fairly large suburban house'.
- 2.Arthur Birling toasts the future marriage of his daughter, Sheila, to Gerald Croft (son of aristocrats Lord and Lady Croft), mentioning his hopes the marriage will enable his and the Croft's (rival) businesses to work together to 'lower costs and higher prices'.
- 3. Sheila teases Gerald about his detachment towards her last summer. Arthur pontificates about the marriage being at a good time: 'passed the worst' of the strikes, 'there isn't a chance of war', time of great progression such as newly built Titanic, sailing next week, which is 'unsinkable, absolutely unsinkable'.
- 4. After dinner, Arthur privately tells Gerald he's up for a knighthood, so Gerald can allay Lady Croft's fears he's marrying beneath him. He lectures Eric and Gerald on his belief one should 'look after himself and his own' only clearly rejecting ideas of socialism. The 'sharp ring of a doorbell' interrupts his views.
- 5. It is Inspector Goole, who 'creates at once an impression of massiveness, solidity and purposefulness' and 'speaks carefully, weightily'.
- 6.The Inspector states a girl named Eva Smith has committed suicide by drinking disinfectant which 'Burnt her inside out'. He shows Arthur alone a photograph of her. Arthur admits employing Eva two years ago, she was a 'good worker', but he dismissed her for being a ring-leader in a strike so he 'can't accept any responsibility' for her suicide.
- 7.The Inspector explains Eva 'like a lot of young women' in the country, had no relatives to help, 'few friends, lonely, half-starved'. Due to a winter influenza outbreak, she secured a job at Milwards. After a very happy couple of months there, a customer complained, so she was fired. Goole then shows Sheila the photograph. She is shocked, 'gives a half-stifled sob, and then runs out'.
- 8. Sheila returns 'distressed', confessing she had Eva sacked out of jealousy: a dress looked better up against Eva than on Sheila. She caught Eva smiling, thought she was mocking her, so told the manager she'd have her mother close their account if he didn't fire Eva. Sheila vows 'if I could help her now, I would' and 'I'll never, never do it again to anybody'.
- 9.The Inspector reveals Eva took a new name Daisy Renton; Gerald is visibly 'startled'. Sheila, alone with Gerald, questions him. At first he denies knowledge of the girl, but then admits it was where his attention was last summer! He thinks he can 'keep it from' the Inspector. The 'door slowly opens and Inspector appears ... Slow Curtain'.

# **Characterisation: Character Profiles**

Mr Arthur Birling is described as a 'heavy-looking, rather portentous man' suggesting his affluent

lifestyle. From the start of play, he comes across as arrogant, foolish and selfish:

- he makes political, social and economic predictions for the future that the audience know to be completely mistaken;

  he asserts a man should look out for himself, not wasting time with 'community and all the
- he asserts a man should look out for himself, not wasting time with 'community and all that nonsense';
- ▶he brags he's a 'hard-headed business man ... who knows what he's about', who was 'Lord Mayor two years ago ... still on the bench', and up for a knighthood; he tries to use his status to influence others and evade the law, warning the Inspector Chief Constable Roberts is an old friend.

He doesn't learn any lessons: when it seems the Inspector might have been an imposter, he's overjoyed he'll retain his reputation, mocking others for being 'tricked' by the investigation. Priestley believed in socialism so he uses Arthur Birling to represent greedy businessmen, an example of the ills of capitalism, who only care for themselves, implying Eva Smiths of the world will continue to suffer if people like Birling remain in positions of power.

**Sheila** is the Birlings' daughter, in her early twenties. At the start of the play, celebrating her engagement, she's described as 'very pleased with life and rather excited'. At first we get the impression she's a giddy, naïve and childish, but when the Inspector arrives she changes:

- >she's shocked by the news of Eva Smith's death;
- >she's deeply affected by and repentant of her own involvement in Eva's death, accepting responsibility at once, promising to never behave in such a way again;
- she matures quickly, standing up to her parents, and showing she's insightful and intelligent: she grasps where the investigation is going, so tries to warn others.

By the end of the play she has grown up and realises your actions can have grave consequences. Sheila, like Eric, allows Priestley to show his opinions on youth: he felt there was hope for the future in the young people of post-war Britain, viewing them as the ones who would help solve the problems the country had with class, gender and social responsibility.

# Act 2 Summary and Key Quotations

- 1.In Act 2, the same setting, the Inspector tells Gerald and Sheila a girl had died that night 'in misery and agony hating life'.
- 2. Sybil enters and fails to see why they should be trying to understand actions of 'Girls of that class'. Sheila warns her not to act complacently or 'build up a kind of wall between us and that girl'.
- 3. Sybil admits Eric, who's 'only a boy', drank too much at dinner. Sheila and Gerald shock her revealing 'he's been steadily drinking too much for the last two years'.
- 4.The Inspector questions Gerald, who reluctantly concedes he knew Daisy; 'distressed', suddenly realizing 'she's dead', he recounts how he rescued her in the theatre bar from the lecherous Meggarty 'one of the worst sots and rogues in Brumley'. Mrs Birling is 'staggered' by this description of an Alderman they know.
- 5.Gerald put Eva up in a friend's set of rooms; she became his mistress. He's embarrassed by his indiscretion, maintains his concern for Daisy was genuine, but eventually ended it, insisting on giving her money 'to see her through to the end of the year'.
- 6. The Inspector tells him according to her diary, in September, she went to a 'seaside place' for two months 'to make' the memory of their affair 'last longer'.
- 7. Sheila gives Gerald back the engagement ring, telling him they're 'not the same people who sat down to dinner', they'd 'have to start all over again, getting to know each other'. Gerald tells the Inspector he's going for a walk but will return.

  8. Sheila queries why the Inspector didn't show Gerald the photograph. He insists
- Sybil see it. She immediately lies, saying she doesn't know the girl. Sheila begs her mother to tell the truth.
- 9.It's revealed that in her role as a member of the Brumley Women's Charity Organization, two weeks ago, Sybil refused to give Eva money because she pretended to be called 'Mrs Birling' and she 'didn't like her manner'; Sybil states she used her 'influence to have it refused'. The Inspector reveals Eva needed money as she was pregnant. Sybil told Eva to make the father 'responsible' but Eva claimed she couldn't take the father's money as it was stolen. Sybil asserts Eva was 'claiming elaborate fine feelings and scruples that were simply absurd in a girl in her position'.
- 10.Pressured by the Inspector, Sybil, who'll 'accept no blame for it at all', insists the father should shoulder all responsibility for Eva's death and be 'compelled to confess in public'. Suddenly, the Birlings realize who's the father of Eva's baby! 'Eric enters ... the curtain falls slowly'!

# **Characterisation: Character Profiles**

Gerald Croft, about thirty, is the 'easy well-bred young man-about-town'. He's an aristocratic heir to a rival business, Crofts Ltd. At the beginning of the play he appears confident and charming; this changes after his secret affair is revealed:

- his outlook on life and business mirror Birling's: he agrees with Eva's dismissal and says the Crofts 'would have done the same thing';
- ➤ he's acted immorally, given in to lust, having an affair (although at the beg. of the 20<sup>th</sup> Century it wasn't uncommon for upper class men to have a mistress), and when caught out initially tries to deny it to Sheila, and then a Police Inspector;
- ➤ he seems to have rescued Eva from the Palace Bar out of genuine concern, and provided her temporary accommodation, stating he didn't do this in order to have an affair, but she did become his mistress; he says he 'didn't feel about her as she felt about me', so after some months, when it suited him, he ended it.

At one point it appears he's developing some remorse: 'I - well, I've suddenly realised - taken it in properly - that she's dead'; the Inspector later says he: 'at least had some affection for her and made her happy for a time', but in the final act he's trying to get them all out of trouble, and says 'Everything's all right now, Sheila. (holds up the ring) What about this ring?' suggesting he's learned nothing, inconsiderate of Sheila's feelings. It implies how ingrained attitudes to women and lower classes were in the upper class, and how difficult it was to change them. Priestley uses Gerald to attack the upper-classes, showing despite outward appearances and a privileged upbringing, they were capable of very questionable behaviour.

Mrs Sybil Birling, Arthur's wife, in initial stage directions is described as 'rather cold' and 'her husband's social superior'. From the outset we get the impression she's an unfeeling, haughty snob despite (we later find out) being a prominent member of the local women's charity:

- ➤ throughout dinner she tells Sheila and Eric off for slips in social etiquette, whilst blind to her son's drinking, ignorant of his long-standing drink problem and of the world around her: Alderman Meggarty; 'scruples...simply...absurd' for 'Girls of that class';
- she's unsympathetic of Eva's situation and refuses to take any responsibility for her suicide: 'I accept no blame for it at all'.
- her cold, uncaring nature leads to her downfall as the Inspector forces her to unknowingly condemn her own son; her own children are disgusted by her lack of compassion for a pregnant, destitute lower-class girl.

By the play's end, Priestley shows she clearly learned nothing, and so is typical of an older generation who he believed couldn't accept responsibility, cared only for themselves, and were unwilling to change. He uses Sybil as a contrast to the future welfare state: in 1912 rich people like her decided, with their own prejudices, who deserved welfare and who didn't.

# Act 3 Summary and Key Quotations

1.Eric confesses: very drunk one night in November, he met Eva, followed her home, and forced himself on her as he 'was in that state when a chap easily turns assertive'. In other words, he lacks confidence, although at points he tries to stand up to his father

alone. We are members of one body. We are responsible for each other' but 'if men will not learn that lesson, then they well be taught it in fire and blood and anguish'. He says 'Goodnight' and leaves.
4.Arthur worries about public scandal, blaming everything on Eric. Eric and Sheila criticize their father for worrying about his knighthood and reputation when someone has died.

2.A fortnight later they began a relationship; she fell pregnant. He offered to marry

3. The Inspector reiterates the parts each of them played in the girl's death. Hearing

Inspector reminds Eric he used Eva as 'an animal, a thing, not a person', and all of

her but she refused as he 'didn't love her'. He stole money from his father's

his mother's role for the first time, Eric tells her 'you killed them both'. The

them that even though 'One Eva Smith has gone ... there are millions and millions of Eva Smiths and John Smiths still left with us', and 'We don't live

nasty'.

company to support her.

everybody else, as if we were all mixed up together', they suspect Goole's a fraud. Sheila and Eric point out their actions are still terrible, but their parents disagree!

6.Gerald, having bumped into a police officer on the street, returns and confirms their suspicions: there's no such person as Inspector Goole. Arthur verifies it by

5. Replaying the Inspector's arrival, just after Arthur had declared they shouldn't

take any notice of those 'cranks' who tell us 'everybody has to look after

- ringing the Chief Constable!

  7. For Eric and Sheila 'the girl's dead and we all helped to kill her and that's what matters'. However, the Birling parents and Gerald try to acquit themselves from responsibility again, for Eva Smith's death, by arguing their actions may have been performed on four or five different girls, and Eva might not even be dead.

  8. Gerald phones the hospital and confirms there's been no suicide. Arthur and Sybil are overjoyed. Eric and Sheila are appalled at them: 'You began to learn
- something. And now you've stopped. You're ready to go on in the same old way.'

  9.Just as Arthur jovially mocks his children for their over-seriousness, the phone rings ....

➤he forced himself on Eva one drunken night;
➤he had an affair with her, she became pregnant, so he stole money from his father's business to

help her;

he offered to marry her, but she refused him;

▶he attacks his parents' behaviour and values in the final act, showing he can be assertive.

Like Sheila, he's grown up considerably by the end of the play, and the evening's events can be seen

as his path to adulthood and responsibility. Through Eric, Priestley shows that immoral behaviour, excessive drinking and casual relationships can have consequences.

Priestley uses Inspector Goole:

says as his mouthpiece, representing Priestley's socialist views so Goole speaks up for working class.

much for quite some time:

(Eva), he makes selfish middle/upper class characters reflect and take responsibility for unfair treatment of them. In Goole's dialogue, Priestley uses the plural pronoun 'we', for Birlings, the singular 'l', creating clear contrast between Birlings' self-interest and Goole's/Priestley's humanitarianism: 'We are members of one body', threatening if we don't take responsibility for each other, world doomed by 'fire and blood and anguish'.

**Characterisation: Character Profiles** 

but is talked down. He is drunk at the dinner table and later it's revealed that he's been drinking too

- each other, world doomed by 'fire and blood and anguish'.

  to heighten drama: all his entrances, exits and dialogue used to create maximum tension: pausing, interrupting, repeating, shocking language: 'a burnt out inside on a slab'.

  to impose control: on entering, physically controlling aura as 'need not be a big man' but must create an 'impression of massiveness, solidity and purposefulness', even silences unstoppable Birling at one point; controls flow of information to audience: supplying dates, filling in
- background; controls structure of play: deals with 'one line of enquiry at a time', each revelation driving play a further step forward, revealing the 'chain of events' in order, but deliberately swapping Eric for Sybil from the chronological order to expose her double-standards.

  \* to reveal all crimes: he's omniscient, shedding light ('pink and intimate' to 'brighter and harder' as soon as he arrives) on family's moral offences; plays role of God, urging characters to repent, knows extraordinary amount: history of Eva and Birlings' involvement in it (Sheila tells Gerald, 'Of course he knows') even though Eva died only hours ago.

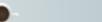
  \* to add a haunting layer of mystery: by end of play, revealed he's not an Inspector, but not clear
- who he is as know little about him; name 'Goole' pun on 'ghoul' suggests supernatural/other worldly; fishing village near home town of **Bradford** suggests he's fishing out the truth. For Priestley, Goole's dramatic power lies in the audience's speculations over his possible identity.

	Genre and Structure	Themes		
Greek tragedy:   (originated    Ancient   Greece - one   of oldest   literary   genres)	drama with a moral lesson telling story of high ranking character destroyed due to hubris (selfish or arrogant actions).  Priestley constructs play using the three unities of Greek tragedy (set of structural rules that classical Greek dramas adhered to): Unity of time: play should take place in period of less than 24 hours; Unity of place: play should take place in single physical location; Unity of action: play should focus on one storyline with few/no subplots.  Perhaps he thought this structural simplicity would help audience to focus	Age: Priestley uses age to illustrate the differing attitudes in society at time. Older characters, Arthur and Sybil, who believe in only looking after themselves and their family, represent outdated way of thinking; younger characters, Sheila and Eric, represent modern attitudes towards caring about others in society.	Responsibility and Remorse: Priestley shows a family forced to reflect upon their actions and responsibility for a young girl's demise. Sheila and Eric at once admit responsibility and feel guilty; Arthur and Sybil refuse to accept responsibility or feel guilt; Gerald's acceptance/guilt doesn't last out to the end of the play!	
Morality play: (genre based on religious mystery plays of Middle Age)	entirely on his moral lesson.  sought to teach audience lessons focused on seven deadly sins: lust, gluttony, greed, sloth, wrath, envy and pride.  Characters who sinned were punished but if repented could redeem themselves.  Priestley perhaps uses this structure to teach 20th century audience lessons about social responsibility; audience invited to enjoy judging characters but also question own behaviour. He would have hoped audience left theatre as better people.	Secrecy and Lies: Priestley exposes hypocrisy and dishonesty of upper and middle classes: Arthur ironically (magistrate) wants the scandal covered up, Sheila vengefully uses her family's status to get Eva sacked, Gerald cheated (like many men of his class), Sybil lied to the inspector about recognising the girl in the photograph, Eric hides his alcoholism, child, and embezzlement.	Class and Gender: Priestley reveals unfairness of class system using Birlings and Croft as caricatures of all the bad qualities he felt ruling classes had, and how the working class (Eva) were victims of it, not the drunk, lazy, immoral ones! He exposes gender stereotypes: women - protected, clothes obsession, vain; men serious business, can sleep around. He challenges this with his rebellious young female characters: Eva and Sheila.	
Well-made play: (popular dramatic genre from	plot based on events that happened before opening of play; each individual act repeats same pattern; contrived (engineered for max impact) entrances, exits and props (such as letters) to increase suspense; plot based on withheld secret revealed only, at <a href="climax">climax</a> , which reverses <a href="misfortunes">misfortunes</a> of protagonist.  Priestley perhaps uses this structure to manipulate audience: they don't know	enlightened in a life, which allows us to escape cycle, and enter new life in which we don't make same mistakes) and J.W. Dunne's theory: past, present and future all happen at same time. Human consciousness experiences this simultaneously in linear form!		
what happened to Eva Smith so each revelation about her treatment by characters adds drama, each one more shocking than last, building to climax.		We never meet <b>Eva Smith</b> during the course of the play, her voice is never heard, but it's her death that dominates the plot. We learn about her through the Inspector, who's read a letter, and diary she kept, and infer through the incidences with the other character:  > Birling's factory: good worker, brave, strong willed, intelligent;		
Crime thriller /The 'Whodunnit' (genre based around a crime)	a murder/mystery that needs solving; audience receives clues about who's committed crime and enjoy trying to guess outcome before end; a highly competent detective investigates and interrogates suspects.  Priestley subverts the genre as centres around suicide not murder investigation; initially seems no clear suspect but soon revealed all characters are guilty for different reasons, so audience would be considering who is 'more' to blame for the suicide. Priestley makes audience question if they too committed similar 'crimes' to the characters.	Fric relationship: honest, principled/moral, mature;  Sybil: desperate and resourceful.  She's always referred to in a positive light by characters, suggesting she's better personant than any of them, but Goole/Priestley never lets audience or characters forget her gruesome death. His final speech reveals Priestley's lesson: millions of Eva Smiths are		









# ☐ Vocabulary

Narrative

Hyperbole

Metaphor

Simile

#### Context

Priestley served in the army during WW1 1914-1918 and wrote 'An Inspector Calls' Dramatic Irony was suffering" at the end of WW2. Characterisation

The play is set in 1912 and exposes Stage Directions

Symbolism

message.

Foreshadowing Interrogative Tone

Exclamatory Tone Satire

Allegory Listing

Naturalistic Dialogue

Genre

Structure and Form

Written in three Acts. Each act. ends with on cliff hanger.

The play is cyclical in nature, with the last Act directly linking to the events of the first.

By the end of the play Sheila and Eric have learned important lessons and are ashamed of their previous behaviour. Mr and Mrs Birling believe their actions were right and justified. in the winter of 1944-1945 as the "world

the "rottenness behind the facade" of the families like the Birlings. The play is a social criticism of "middle-class" prosperity and apparent respectability". Priestley exposes the irony of 1912

attitudes. The dramatic irony of Mr. Birling's claims: "there isn't a chance of war" and that the Titanic is "absolutely unsinkable" reflect his ignorance and pre-war complacency. Birling's speech at the beginning of the play also dismisses the idea of community "as if we were all mixed up together like bees in a hive". The idea that "a man has to make his own way" is interrupted by the Inspector's arrival to counter this

resonate with the audience who had lived through two world wars. Priestley highlights the way Europe moved towards the 'fire and blood and anguish' of the 1914-1918 War because society did not appreciate that "We are members of one body" responsible for each other.

The Inspector's final warning would

The concept of "Time" inspired this and other works by Priestley, 'An Inspector Calls' allows the characters to examine the consequences of their actions. They are given an opportunity to change and act differently to break this cycle. The final climax of the play shows that lessons have not been learned just as they were not from WW1 and repeated in WW2.

 Support points with reference to characters and events and refer back to the question set.

The provided extract can be useful for language analysis (AO2).

ZaiT

Exemplar response

Responsibility is central to 'An Inspector Calls' because the play revolves around the death of a young woman, Eva Smith, and to what extent the Birling family and Gerald Croft are responsible for this. Priestley also emphasizes the tragic consequences of the Birling's actions because "we are responsible for each other" and yet Eva Smith became so desperate she took her own life. The play is set in 1912 and exposes the "rottenness behind the façade" of the families like the Birlings. The play is a criticism of "middle-class prosperity and apparent respectability".

We first encounter the theme of responsibility directly when Mr. Birling gives a speech to his family as they celebrate his daughter's engagement. Mr. Birling states that a man "has to look after himself" and dismisses ideas of community as "nonsense" encouraged by "cranks". It is at this point that Inspector Goole arrives to challenge Mr. Birling's ideas and investigate Eva Smith's death.

As the first Act continues Priestley presents the lack of responsibility evident in capitalist values as Mr. Birling claims it is his responsibility to keep profits high and labour costs down. He is also keen to ensure his daughter's marriage to Gerald Croft in order to secure a merger for his business and avoid any potential scandal. He is, however, reminded by the Inspector that public men "have responsibilities as well as privileges". Sheila's sense of responsibility is clear in her guilt for turning Eva "out of a job" is in direct contrast to her father's lack of responsibility and capitalist solution stuttering an offer of "thousands" to end the matter.

Priestley highlights the lack of responsibility for others as the Inspector reveals how Gerald tries to avoid responsibility for his affair with Eva at first denying he knew her. The theme is highlighted most cruelly in Act 2 by Mrs. Birling who admits her prejudice against "girls of that class. Mrs. Birling is reminded "masterfully" by the Inspector that she used her position and influence to deny an unemployed, pregnant Eva "even the pitiable little bit of organized charity". Mrs. Birling's refusal to accept any responsibility also leads to the dramatic irony of her demand to hold the "father" responsible and make an "example" of him.

In Act 3 the theme builds to it's peak. The Inspector's exclamative "Stop!" brings a distinct focus to the key message on this theme as the focus of responsibility shifts from the Birling family to a general message to society. Priestley uses the Inspector as a mouthpiece for a more Socialist reminder that all our lives are "intertwined". Priestley emphasizes the number of working class, ordinary people in need of support from the more advantaged in society by repeating the enormous number "millions and millions and millions of Eva Smiths and John Smiths". The Inspector's speech warns of "fire and blood and anguish" if society does not take responsibility for "each other".

Overall, the younger generation take responsibility for their actions, learn the Inspector's lesson and provide hope for the future. The older generation' however refuse to acknowledge their responsibilities or adapt which results in the final plot twist where events repeat themselves.

#### Commentary

The opening sentence shows a clear focus on the question and addresses the theme of responsibility. The candidate brings in relevant points and discusses Priestley's purpose in writing the play. The second paragraph keeps the focus firmly on the theme in the play. The response makes some clear AO2 points about technique - e.g. dramatic irony. The candidate also uses the extract. There are appropriate direct references from the extract and other parts of the text, used to support the candidate's astute points. Overall this response shows assured understanding of the demands of the task and covers all the Assessment Objectives in a sustained, integrated way.

# An Inspector Calls

BIRLING

INSPECTOR

INSPECTOR

You are advised to spend about 45 minutes on this question.

You should use the extract below and you knowledge of the whole play to answer the question.

Write about the theme of responsibility in An Inspector Calls and how it is presented at different points in the play.

In your response you should:

- refer to the extract and the play as a whole show your understanding of characters and events in the play.
- 5 of the question's marks are allocated for accuracy in spelling, punctuation and the use of

vocabulary and sentance structure.

(taking charge, masterfully) Stop! They are suddenly quiet, staring at him.

> And be quiet for a moment and listen to me. I don't think to know any more. Neither do you. The girl killed herself - and died a horrible death. But each of you helped to kill her. Remember that. Never forget it. (He looks from one to the other of them carefully.) But I don't think you ever will. Remember what you did --

(unhappily) My God — I'm not likely to forget. ERIC

Just used her for the end of a stupid drunken evening, as if she was an INSPECTOR animal, a thing, not a person. No you won't forget. (He looks at SHEILA.) (bitterly) I know. I had her turned out of a job. I started it.

SHEILA You helped — but didn't start it (Rather savagely, to BIRLING.) You started INSPECTOR it. She wanted twenty-five shillings a week instead of twenty-two and

sixpence. You made her pay a heavy price for that. And now she'll make you pay a heavier price still. (unhappily) Look, Inspector — I'd give thousands - yes, thousands —

You're offering the money at the wrong time, Mr Birling. (He makes a move as if concluding the session, possibly shutting you notebook, etc. Then surveys them sardonically.) No, I don't think any of you will forget. Nor that young man, Croft, though he at least had some affection for her and made her happy for a time. Well, Eva Smith's gone. You can't do her any more harm. And you can't do any good now, either. You can't even say 'I'm sorry, Eva Smith.'

(who is crying quietly) That's the worst of it. SHEILA

But just remember this. One Eva Smith has gone — but there are millions and millions and millions of Eva Smiths and John Smiths still left with us, with their lives, their hopes and fears, their suffering and chance of happiness, all interwined with our lives, and what we think and say and do. We don't live alone. We are members of one body. We are responsible for each other. And I tell you that if the time will soon come when, men will not learn that lesson, then they will be taught it in fire and blood and anguish.

Good night.

He walks straight out, leaving them staring, subdued and wondering.

# Year 10 Term 1 Working in 2D

#### What do I need to be able to do?

- Use standard units of measure (mm, cm, m, km)
- Measure line segments and angles accurately
- Use scale drawings and bearings
- Know and apply formulae to calculate the area of triangles, parallelograms, trapezia and composite shapes
- Identify, describe and construct reflections, rotations, translations and enlargements
- Identify and apply circle definitions, properties and formulae

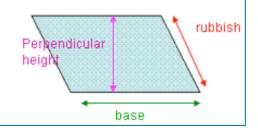
NEVER FORGET every time you work out an area, give your answer as SQUARED UNITS e.q. m², cm², km², mm² etc

# The Importance of Perpendicular Height

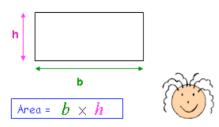
As you will see, most of the formulas for area involve. multiplying the base of the shape by it's height... but it's not just any old height!

Sparx U950

The height must be perpendicular to the base!

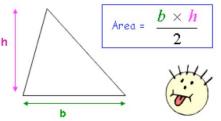


#### Sparx U993 1. Rectangle



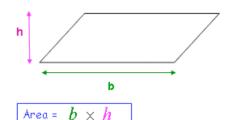
What to do: Multiply the base by the height!

#### Sparx U945 2. Triangle



What to do: Multiply the base by the (perpendicular) height and remember to divide your answer by 2!

#### Sparx U424 3. Parallelogram

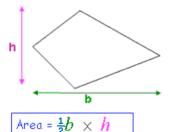


What to do: Multiply the base by the perpendicular height... definitely not the slanted height!

# 4. Trapezium Sparx U265 Area = $(\frac{p+q}{2}) \times h$

What to do: Add together the lengths of your two parallel sides and divide the answer by 2. This gives you the average length of your base. Then multiply this by the vertical height!

#### 5. Kite



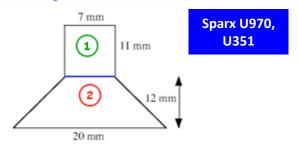
What to do: The base and height in a kite are just the two diagonals from point to point ... so multiply them together!

## 6. Circle

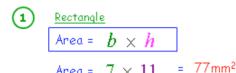


What to do: Find the radius of your circle (if you are given the diameter, just halve it!). Square the radius, and multiply your answer by

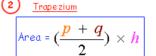
# Compound Area



I have chosen to split this shape up into a rectangle and a trapezium. It is also possible to split it up into rectangles and triangles. It is completely up to you!



Area =  $7 \times 11$  =  $\frac{77 \text{mm}^2}{}$ 



Area = 
$$(\frac{20 + 7}{2}) \times 12$$
 =  $\frac{162 \text{mm}}{2}$ 

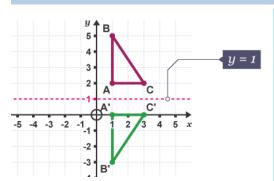
Total Area 77 + 162  $= 239 \text{ mm}^2$ 

#### **Year 10 Term 1 Transformations**

#### Sparx U799

# Reflection

A reflection is when you create a mirror image across a line. The image should be the same distance away from the mirror line.



Shape A'B'C' is a reflection of the shape ABC in the line y =1

#### **Describing Reflections**

It a shape has been reflected, you must state it has been reflected and give the equation of the line it has been reflected in (mirror line)

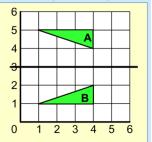
Example: Describe the transformation of the shape A to shape B

Step 1: Find the equation of the mirror line

Equation is: y = 3

Answer is:

A reflection in the line y = 3



#### Sparx U696

Rotating a shape means you are turning it around a point. You need 3 things:

- 1) Angle of rotation
- 2) Centre of Rotation (usually a co-ordinate
- B) Direction Clockwise or Anti-clockwise

Example: Rotate the shape 90 degrees about point marked x

Step 1: Place tracing paper over grid

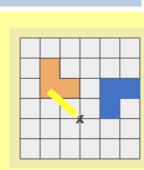
Step 2: Copy the shape on the tracing paper

Step 3: Place your pencil on the marked point

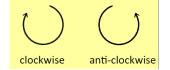
Step 4: Rotate the shape

Sparx

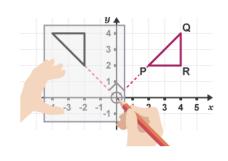
Step 5: Copy the shape onto the grid



Rotation



90° means a quarter turn 180° means a half turn 270° means a 3 quarters turn



## Sparx U196

# **Translation**

A translation is when you move or slide a shape without changing it in any other way.

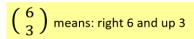
Translations with Vectors

Vectors are used to describe translations

The top number tells you how far to move left or right

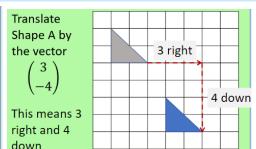
The bottom number tells you how far to up or down

A positive number corresponds to right/up and negative left/down



 $\begin{pmatrix} -2 \\ 8 \end{pmatrix}$  means: left 2 and up 8

 $\begin{pmatrix} 0 \\ -3 \end{pmatrix}$  means: left 0 and down 3



To describe a translation, you must state it has been translated and give the vector translation.

# **Enlargement**

using a scale factor. The scale factor tells you how many times bigger the shape is.

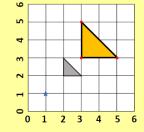
#### Enlargements from a Point

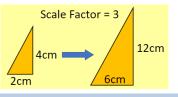
When a shape is enlarged from a point, the distance from the point is also enlarged

Example: Enlarge by a scale factor of 2 from the point (1,1)

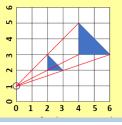
Step 1: Pick up a point and see how far away it is from the centre of enlargement

Step 2: Multiply the distance of both horizontal and vertical by the scale factor, and mark the new point





You can find the centre of enlargement by joining up the corresponding corners of the shapes. The point where the lines intersect is the centre of enlargement.

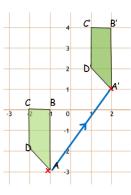


=(0, 1)

#### Sparx U632

# **Vectors**

A vector is a displacement with a **fixed direction** and A **fixed length** 



Here Object ABCD

has been translated (moved) by a vector which can be described using the

COLUMN Vector  $\binom{3}{4}$ ;

or using vector notation:  $AA^{i} = \mathbf{a}$  and is represented by an arrowed line on a diagram.

# **Column Vectors**

Column vectors can be added or subtracted; or multiplied by a scalar:

Sparx U903, U564

Example:

$$\mathbf{p} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$$
 and  $\mathbf{q} = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$ 

Write down as a column vector

i) 
$$p-q \qquad {2 \choose 3} - {-1 \choose 1} = {2--1 \choose 3-1} = {3 \choose 2}$$
 ii) 
$$3p \qquad 3x {2 \choose 3} = {3\times 2 \choose 3\times 3} = {6 \choose 9}$$

Here the resultant vector in (ii) would go in the same direction just 3x longer as the original vector **p** 

# **Problem solving with Vectors**

Example Key facts:

 Vectors can be described as the "journey" between two points using a letter designation e.g.

 $\overrightarrow{OA}$  = **a** where **a** is the vector going <u>from</u> point O <u>to</u> A  $\overrightarrow{OC}$  = **c** where **c** is the vector going <u>from</u> point O <u>to</u> C

• Lines described by the **same vector will be parallel.**Similarly if two lines are parallel they can be described using same vector letter e.g. in the example GCSE question...

AB is parallel to OC and twice as long so if

$$\overrightarrow{OC}$$
 = c then  $\overrightarrow{AB}$  = 2c

 Vectors with the same letter but different signs will be parallel but going in the opposite direction

 $\overrightarrow{OA}$  = a and  $\overrightarrow{AO}$  = -a represent the same line but the opposite direction of "travel"

 $\overrightarrow{OC}$  = **c** and  $\overrightarrow{BA}$  = -2**c** represent parallel lines but going in different **directions** 

IMPORTANT: Pay attention to the "direction of travel"
when you calculate a vector, draw an arrow on the diagram going in the right direction for the vector calculated
when calculating and simplifying new vectors remember to check the sign in front as per algebraic simplifying techniques

- **Vectors can be added or subtracted** and those resultant vectors can themselves be used in subsequent calculations.
- Adding vectors is commutative it does not matter which order vectors are added, the result will be the same.
- Vectors can be multiplied by a scalar or divided by a ratio e.g Here AB is divided such that AX:XB = 3:1 i.e. into 4 parts if  $\overrightarrow{AB}$  = 2c then  $\overrightarrow{AX}$  =  $\frac{3}{4}$  of 2c = 1.5c and  $\overrightarrow{XB}$  =  $\frac{1}{4}$ ×2c= 0.5c
- Simplify vector calculations using standard algebraic techniques

Example A

GCSE question:

Diagram NOT accurately drawn OABC is a trapezium. OC is parallel to AB.  $\overrightarrow{OA} = \mathbf{a}, \overrightarrow{OC} = \mathbf{c}$  AB = 2OC. X is the point on AB such that AX:XB = 3:1.

#### **Example Question:**

## (i) Express $\overrightarrow{BC}$ in terms of a and c

## To calculate new vectors,

- Imagine that you can only find a route from one point to another using "known" vectors i.e.
  - to find the vector from B to C you need to "travel" the route B→A→O→C so

$$\overrightarrow{BC} = \overrightarrow{BA} + \overrightarrow{AO} + \overrightarrow{OC}$$

$$= -2c - a + c$$

$$= -c - a$$

Sparx U781, U660

#### (ii) Hence or otherwise, find $\overrightarrow{XC}$

 to find the vector from X to C you need to "travel" the route X→B→C so

$$\overrightarrow{XB} = \overrightarrow{XB} + \overrightarrow{BC}$$

$$= \frac{1}{4} \times 2c + (-c - a)$$

$$= \frac{1}{2}c - 1c - 1a$$
Note: by factorising this can be written:
$$= -\frac{1}{2}c - a$$

$$= -\frac{1}{2}(2a + c)$$

Vectors and Geometric Proof: To prove that....

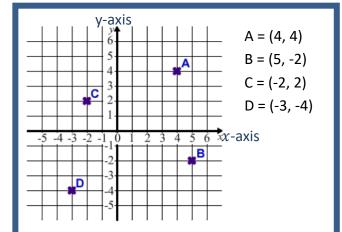
Sparx U560

- 1) Lines are parallel show that the vectors for each line can be written as multiplies of each other i.e. XB (above) will be parallel to any vector which can be written in terms of (2a + c)
- 2) Vectors are collinear (lie on a straight line) show that the vectors are parallel AND share a common point.

# **Straight Line Graphs**

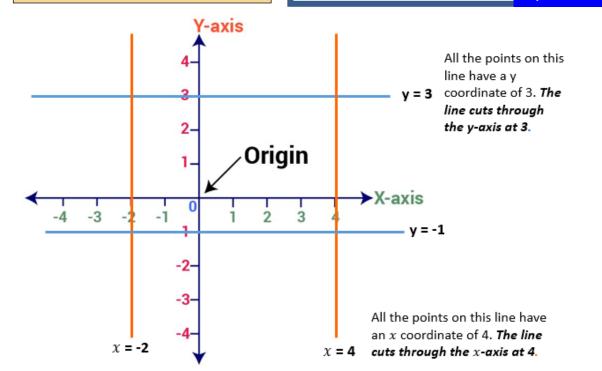
#### What do I need to be able to do?

- Plot and read Cartesian Coordinates
- Identify and plot lines parallel to the axes
- Recognise the line y = x
- Understand what a gradient and y-intercept is
- Recognise a positive and negative gradient
- Give an equation of a line that is parallel to a given line
- Plot lines in the form y=mx + c
- Find the equation of a line



**Coordinates** are used to show a position on a graph. They are written with the notation (x, y). The first coordinate is the horizontal position (x-axis), the second is the vertical position (y-axis).

Sparx U789



# **Plotting a Straight Line Graph**

Sparx U741

Every straight line has an equation in the form of:

the steepness of the line

where the line cuts the y axis

The **GRADIENT** 

The y-INTERCEPT

Suppose we want to plot the graph

$$y = 2x + 1$$

We complete a table of values by substituting (replacing) the  ${\pmb x}$  values from the table into the equation.

E.g. When 
$$x = 0$$

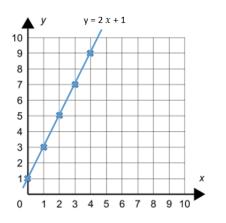
$$y = 2 \times 0 + 1 = 1$$

So the coordinate in the form (x, y) would be (0, 1)

x	0	1	2	3	4	5	6
y = x + 3	1	3	5	7	9	11	13
	(0, 1)	(1, 3)	↓ (2,5)	(3,7)	↓ (4, 9)	(5, 11)	(6, 13)

We then plot these coordinates on the graph, join them with a straight line using a ruler and label the line with the equation.

Notice the link between sequences: in this case you are finding the first 6 terms of the sequence 2n + 1

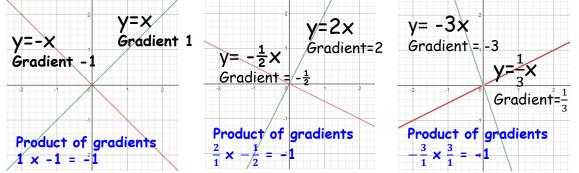


# **Parallel and Perpendicular Lines**

Sparx U377, U898

Parallel lines will have the **SAME** gradient

**Perpendicular** lines have **NEGATIVELY RECIPROCAL** gradients



If 2 lines are perpendicular, the product of their gradients will be -1.

For any gradient ( $^{m}/_{1}$ ), the perpendicular gradient will be ( $^{-1}/_{m}$ )

This means if you know a gradient, to find the gradient of its perpendicular, you need to (i) change the sign of the gradient and (ii) "flip the fraction"

# Finding the equation of a line through a point

Sparx U315

Find the equation of a line parallel to y=2x-1 and passing through (3,4)

Building from general equation of a straight line y=mx+c

Parallel lines have the same gradient  $\rightarrow$  y = 2x + c

From given coordinate (3,4)

substitute known values x=3,y=4

 $\rightarrow \qquad \qquad \mathbf{4} = 2x\mathbf{3} + \mathbf{c}$ 

 $\rightarrow$  Solve: 4=6+c (-6)

→ -2=c

Answer: y = 2x - 2

Find the equation of a line

perpendicular to y = 2 - 4x and

passing through (8,3)

General equation → y=mx+c
Perpendicular lines have negatively
reciprocal gradients

so if m = -4; new gradient  $-\frac{1}{m}$  = +\frac{1}{4}  $\rightarrow$  y =  $-\frac{1}{4}$ x + c

... substitute known values x=8,y=3

 $\rightarrow \qquad \qquad \mathbf{3} = \frac{1}{4} \times \mathbf{8} + \mathbf{c}$ 

 $\rightarrow$  Solve: 3 = 2 + c (-2)

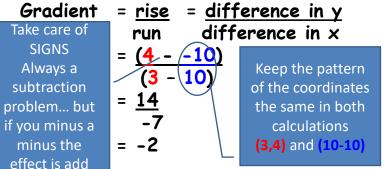
 $\rightarrow$  1 =  $\alpha$ 

Answer:  $y = \frac{1}{4}x + 1$ 

# Finding the equation of a line through two points

Find the equation of a line passing through (3,4) and (10,-10)

Building from general equation of a straight line y=mx+c



Substitute in known coordinate: (3,4)

Equation passing through points is y = -2x + 10

Find the equation of a line passing through (1.4) and parallel to the line between (3,4) and (5,2)

Gradient: 
$$\frac{\text{rise}}{\text{run}} = \frac{(4-2)}{(3-5)} = \frac{2}{2} = -1$$

Has same gradient  $\rightarrow$  y = -2x + c From given spendingts (1.4)

From given coordinate (1,4) substitute known values x=1,y=4

$$4 = -2x1 + c$$

$$\rightarrow \text{Solve:} \qquad 4 = -2 + c \qquad (-6)$$

$$\rightarrow \qquad -2 = c$$

Answer: 
$$y = -2x - 2$$

Find the equation of a line passing through (6,4) and **perpendicular** to the line between (-2,-3) and (2,5)

x (3,4)

x (10,-10)

A sketch of the

problem can help

you

visualise/check

the of type

gradient expected

Has negatively reciprocal gradient so if m = -2; new gradient  $-\frac{1}{m}$  = +  $\frac{1}{2}$ 

$$\rightarrow$$
 y =  $\frac{1}{2}$ X + C

... substitute known values x=6,y=4

$$4 = \frac{1}{2} \times 6 + C$$

$$\rightarrow \text{Solve:} \qquad 4 = 3 + c \qquad (-3)$$

$$\rightarrow \qquad 1 = c$$

Answer: 
$$y = \frac{1}{2}x + 1$$

# **Representing Inequalities...**

(i) ...on a number line Sparx U509

Split double inequality into two: x > -4 and  $x \le 4$  ... the "arrows" from the two join to show the full range

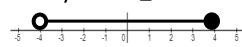
Represent the following equations on a numberline



b) 
$$x \geq 2$$

c) 
$$-4 < x \le 4$$



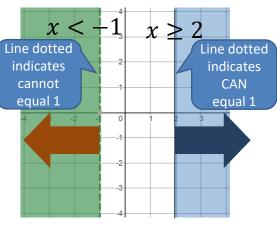


Solid dots indicate the unknown can be EQUAL to that value; an "open" dot shows that the unknown can be greater (or less than) that value but NOT equal to it.

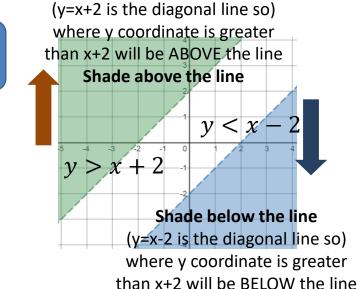
# ...on a graph

Sparx U747

Inequality graphs are plotted in the same way as equations What is different is that the area "satisfying" the inequality is shaded ... and the line joining points can be solid (greater/less than or equal to...) or dotted (greater than or less than but not equal to....)



Area shaded Area shaded where where x coordinate x coordinate is is less than -1 greater than -1



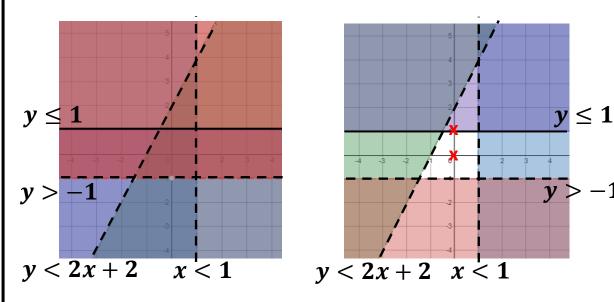
# **Problem Solving with Inequalities**

A common exam problem is to identify areas or coordinates which are true for a number of inequalities e.g. Split double inequality into two:

y > -1 and y < 1

"Find the region that satisfies these inequalities:

$$y < 2x + 2 \qquad x < 1 \qquad -1 < y \le 1$$



BOTH these graphs are representing the same inequalities... but it is much easier on the second to see the area that is true for ALL 4 inequalities... the clear unshaded trapezium in the middle. This is because if you SHADE THE AREAS NOT WANTED it leaves the wanted region clear!

Remember to pay attention to the notation of the lines with inequalities... if the question had been slightly different

"Find the **coordinates** that satisfy these inequalities:.."

It would be important to know whether coordinates lying on one of the lines would be "allowed" in the inequality or not. (0,0) is a solution being in the clear region, but all the all the inequalities are less than or more than EXCEPT  $y \le 1$  ...so the only point on a line which satisfies all criteria is (0,1)

# **Solving Linear Equations**

Sparx U755, U325, U870

# <u>Solving Linear Equations – Balance Method</u>

Functions machines are good at understanding equations but cannot deal with all linear equation. The BALANCE METHOD can.

The principle that you want to "unpick" an equation from around xremains... you just need to remember whatever needs to be done to unpick one side of an equation, must be done to the other side also

 $(\div 2)$ 

# Solving simple 2 step equations:

Solve: 
$$2x + 5 = 11$$
  
 $2x = 6$   
 $x = 3$ 

Check by substituting: 2x3+5 =11 **☑** 

Show workings i.e. what you are going to do to get (-5)to the next line...

Notice that these are exactly the same operations and order as identified in the function machine!

As equations get more complex the principle remains the same... what do you need to do to unpick to get to "x=..." or in other words ...

what looks horrible?... what's needs to be done to get rid of it?!

# **Solving Double Sided equations:**

Solve: 
$$5x - 1 = 11x + 2$$

$$5x - 1 = 11x + 2 \quad (-5x)$$

$$-1 = 6x + 2 \quad (-2)$$

$$-3 = 6x$$
Just switched  $6x = -3$   $(\div 6)$ 

"x" on both sides of equation **Fix?** Get rid of one of them!

**RECOMMENDED: REMOVE** THE SMALLER UNKNOWN by adding or subtracting it (because removing the smaller will always leave a POSITIVE x term

What looks horrible?

**Remember:** Any division problem can be written as a fraction!

# **Solving Linear Equations – Brackets**

Sometimes brackets can be dealt with using the function machine methods but if in doubt - get rid of them by expanding!

Solve: 
$$4(x-3) = 8$$

$$4x - 12 = 8$$

$$4x = 20$$

$$x = 5$$
Check by substituting:

 $4(5-3) = 4x2 = 8 \ \square$ 

$$3(x + 8) = 4 - 2x$$

$$3x + 24 = 4 - 2x$$

$$5x + 24 = 4$$

$$5x = -20$$
(+2x)
(-24)
(÷5)

Check by substituting:  

$$3(-4+8) = 3 \times 4 = 12$$
  
and  
 $4-2x(-4) = 4+8 = 12 \square$ 

x = -4

**SMALLER** unknown is negative... so ADD to remove!

Sparx U505

# <u>Solving Linear Equations – Fractions</u>

Sometimes fractions can be dealt with using the function machine methods but if in doubt – get rid of them by multiplying through by denominator!

Solve: 
$$\frac{2x+5}{6} = 2$$
 (x6)  
 $2x + 5 = 12$  (-5)  
 $2x = 7$  (÷2)  
 $x = 3.5$ 

$$x = 3.5$$

Solve:  $\frac{2}{x} = 5$  (xx)
 $2 = 5x$  (÷5)

$$2 = 5x \qquad (\div 5)$$

After multiplying by the denominator: - original numerator STAYS THE SAME - ALL OTHER TERMS ARE SCALED UP

$$\frac{3x-5}{2} + 1 = x + 2$$

$$3x - 5 + 2 = 2x + 4$$

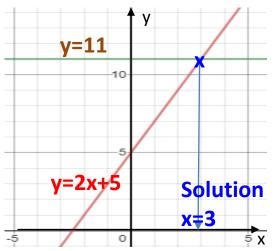
$$3x - 3 = 2x + 4$$

$$x - 3 = 4$$
(x2)
(x2)
(x2)

x = 7

# **Solving Linear Equations**

# **Solving Linear Equations – using graphs**



Graphs can be used to solve equations

$$2x + 5 = 11$$

$$y = 2x + 5$$

$$y = 11$$

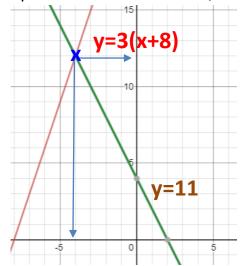
The intersection of the equation and where the y coordinate is 11 is the solution here

$$\underline{x}=3$$

# **Solving Simultaneous Equations using graphs**

Sparx U836

Using graphs is one way that **SIMULTANEOUS EQUATIONS** can be solved. "Simultaneous" just means "happening at the same time" and the solution to a simultaneous equation is the coordinate values which are the same for two equations... in other words, the solution is where the two lines meet.



# Solve these simultaneous equations:

$$y = 3(x+8) \qquad y = 4-2x$$

Graphs cross at (-4, 12) so solution is

$$x = -4$$
$$y = 12$$

Note that this is the same solution for x as solving the linear equation:

$$3(x+8) = 4 - 2x$$

$$y = 3(x+8) \quad y = 4 - 2x$$

$$x = -4$$

v-coordinate needed only if a **SIMULTANEOUS EQUATION** to solve

# **Solving Linear Simultaneous Equations**

Sparx U760

Simultaneous equations can be solved algebraically

Solve these simultaneous equations

$$3x + 2y = 11$$
$$x + y = 3$$

These equations cannot be solved individually as they have TWO unknowns but can be COMBINED and one unknown ELIMINATED ... the other unknown can then be found and its value substituted back to find the other.

Simultaneous equations often given in **IMPLICIT** form (where x and y are on the same side) rather than **EXPLICIT** form i.e. y=mx+c. If they are given in different forms, one will need to be changed to match the other.

## **KEY PRINICIPLES:**

- Add or subtract the two equations to ELMINATE 1 unknown
- Unknowns will only be eliminated if the have the SAME coefficient
- If there is not a common coefficient scale one or both equations up so that the number in front of one unknown is the same in both equation. Same -

**PROCESS:** 

A) Get a common coefficient 2nd equation needs multiplying by 2 (or by 3) to get the same number in front of one of the unknowns

$$3x + 2y = 11$$

$$x + y = 3 \quad (\times 2)$$

$$\Rightarrow 3x + 2y = 12$$

$$\Rightarrow 2x + 2y = 6$$

B) Add or subtract to eliminate unknown Same Signs SUBTRACT; Different signs ADD (2y-2y=0) and solve any subsequent equation for the remaining unknown

$$x = 5$$

subtract

C) Substitute value back into ORIGINAL equation to find an equation to solve for the second unknown

$$x = 5$$
 then  $5 + y = 3$   
(-5)  $y = -2$ 

D) Check solutions by substituting BOTH values into OTHER original equation

Solution: 
$$x = 5$$
,  $y = -2$ 

CHECK: if 
$$x = 5$$
 and  $y = -2$  then for  $3x + 2y = 11$   
 $3 \times 5 + 2 \times (-2) = 15 - 4 = 11 \ \square$ 

# KS4 Biology: B2 Cell division

Keyword	Definition
Mitosis	Cell division where one set of chromosomes are pulled to each end of the cell and the nucleus divides
Differentiation	When a cell becomes a specialised cell
Cell Cycle	The process in which a single cell grows and divides
Chromosomes	A thread like structure of coiled DNA found in the nucleus of eukaryotic cells.
DNA	The genetic material of eukaryotic cells. A polymer made up of two strands forming a double helix.
Meristem	Plant tissue found in the growing tips of roots and shoots
Cloning	Creating a genetically identical copy of a cell or organism

#### The Cell cycle and Mitosis

Your body needs to make new cells to do the following;

- Growth and development as an organism
- Replace damaged or worn out cells

Cell division is part of the cell cycle, part of the cell cycle divides cells into genetically identical cells- this is called Mitosis

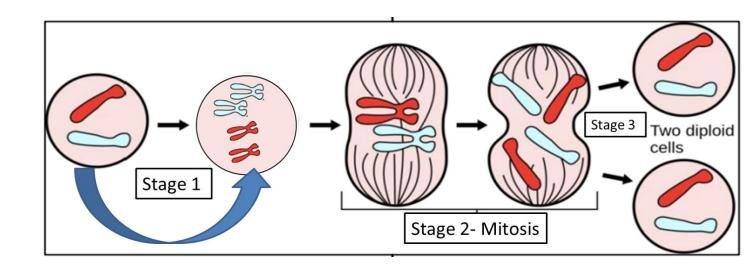
#### Chromosomes

In the nucleus of a human cell there are 23 pairs of chromosomes. These contain a double helix of DNA



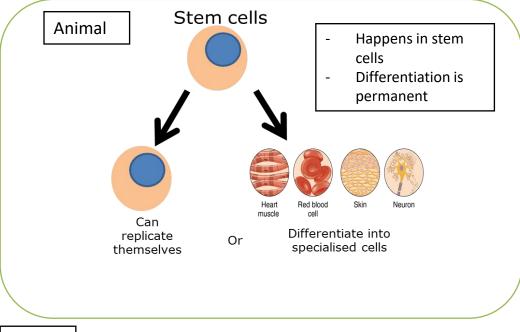
# Cell division

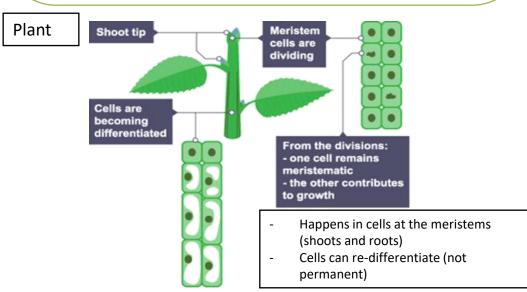
Stage 1	Stage 2	Stage 3
<ul> <li>Longest stage of the cell cycle</li> <li>Cells grow larger- increase in number of organelles such as mitochondria and ribosomes</li> <li>DNA replicates into two copies of each chromosome</li> </ul>	<ul> <li>Mitosis occurs</li> <li>One copy of each chromosome is pulled to the end of the cell – the nucleus then divides</li> </ul>	<ul> <li>The cell divides to form two cells</li> <li>These are diploid cells which contain a full set of chromosomes</li> </ul>



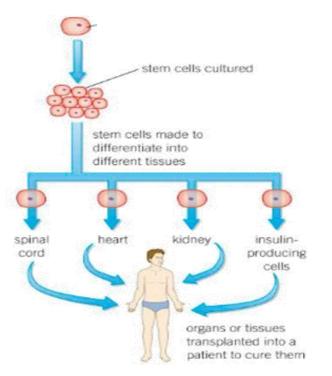
#### Differentiation

Differentiation is where stem cells become specialised cells, this happens in both animals and plants





Type of cell	Properties	Clinical use
Human embryonic stem cell	Can be cloned and forced to differentiate into any cell type	Therapeutic cloning using the same DNA so the body does not reject the cells
Adult stem cell	Can form any cell related to its origin. Very few types of cell can be formed	Can be used to replace cells and tissue such as blood, skin and muscle. Must be match to avoid rejection
Plant Meristems	Can differentiate into any plant cell type throughout the life of the plant.	Can be used to produce genetic clones quickly and economically- can save rare species and provide disease resistance

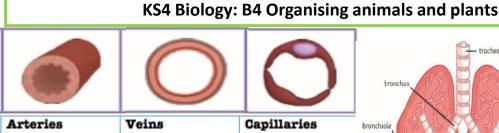


#### Pros of stem cells

- Can be cloned to treat diseases such as diabetes and use same DNA to avoid rejection
- Potential in the future to be used to grow whole organs to transplant

#### Cons of stem cells

- People object on religious and ethical reasons as most stem cells come from aborted foetuses and the potential risk of viral transfer from the cells



From heart to From rest of Connects rest of body body to heart arteries and veins Carries mostly Carries mostly Carries both deoxygenated [deloxygenated oxygenated

Low pressure

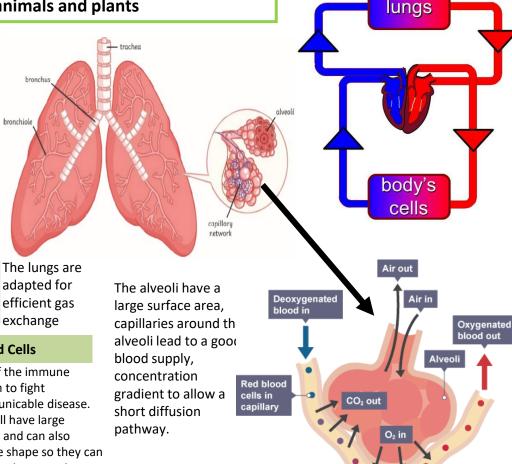
with thinner

Has valves

blood

walls

blood Walls only onecell thick for diffusion No valves



Aorta The artery leaving the left ventricle. Artery Blood vessel that carries blood away from the heart. Smaller top chambers of the heart. Atria **Blood vessel** How blood is transported around the body. Capillary Blood vessel that connects arteries and veins. Coronary blood The heart muscle needs its own blood supply. This comes from branches from the aorta as vessel soon as it leaves the heart called coronary arteries. The blood vessel leaving the right ventricle, **Pulmonary** carrying blood to the lungs. artery Vein leading from the lungs back to the heart **Pulmonary vein** (to the left atrium). Valves Prevent back flow of blood. Allows blood to only flow the correct way. Vein Blood vessel that carries blood towards the heart. The major vein transporting blood from the Vena cava whole body back to the heart (to the right atrium) Ventricle The larger bottom chambers in the heart.

#### **Red Blood Cells**

blood

walls

High pressure

with thicker

No valves

Disc shaped and biconcave This increases the surface area so can absorb and more oxygen. Don't have a nucleus so more room for haemoglobin.

#### **White Blood Cells**



Part of the immune system to fight communicable disease. They all have large nuclei, and can also change shape so they can engulf microorganisms

# **Platelets**

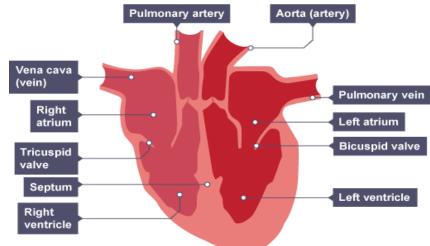


Fragments of cells. They start the process of clotting at a wound which blocks the injury until proper healing happens, preventing blood loss.

When the heart 'beats' the muscles contract to pump the blood.

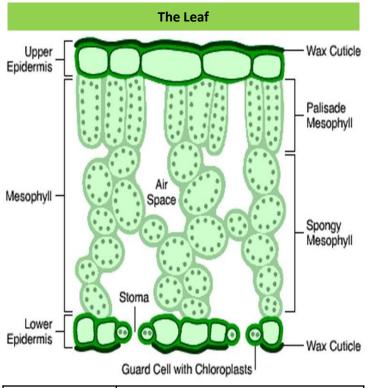
Heart rate is controlled by a group of cells in the right atrium that act as a pacemaker. These cells set off the impulses that make the heart muscle contract.

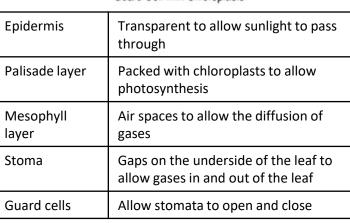
Artificial pacemakers are electrical devices used to correct any irregularities in the heart rate.



#### Plasma

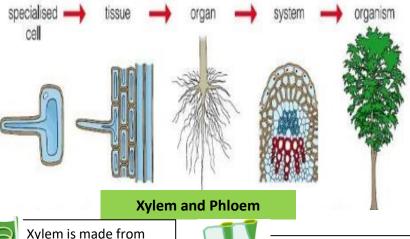
This makes up 55% of the blood. It is mostly made of water, but with substances like glucose, proteins, ions and carbon dioxide dissolved in it. The other blood components are suspended in the plasma.





Water vapour is lost through the stomata on underside of the leaf by evaporation but the stomata need to be open to allow carbon dioxide to diffuse into leaf and oxygen to diffuse out

Plants, like humans, are made of cells, tissues, organs and organ systems.



hollow tubes made from cell walls of dead cells and strengthened by lignin.

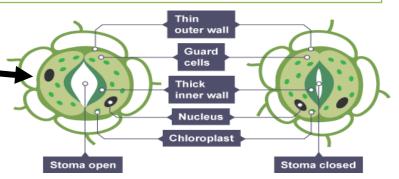


Phloem is made of living cells elongated and stacked to form tubes.

#### **Translocation**

Phloem transports dissolved sugars from the leaves to other parts of the plant in a process called translocation. Cell sap, containing the dissolved sugars, is able to flow from

one phloem cell to the next through pores at the end of each wall.



Active transport	Movement of particles against a concentration
	gradient
Diffusion	Movement of particles from high concentration to
	low concentration
Organ	A group of different tissues working together to
	perform a specific function
Organ system	Group of organs working together to carry out
	specific functions and to form organisms
Phloem	Living tissue which transports dissolved sugars around
	plant
Tissue	Group of specialised cells with similar structure and
	function working together
Translocation	Movement of dissolved sugars from leaves to rest of
	plant through phloem
Transpiration	Movement of water through a plant
Vascular bundle	Strand containing the xylem and phloem
Xylem	Non-living tissue which transports water and minerals
•	from the roots to the leaves and shoots

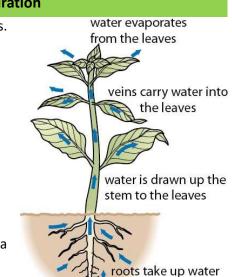
# **Transpiration**

Plants absorb water through the roots. It is transported against gravity from roots to leaves. Plants are constantly losing water as vapour through the leaves.

Transpiration can be increased by:

- Brighter light
- Increased temperature
- Increased air movement (wind)
- Decreased humidity (steeper concentration gradient)

Rate of transpiration measured using a potometer



from the soil

# **KS4 Biology: B5 Communicable diseases**

Key term	Definition
Communicable disease	Disease caused <b>pathogens</b> that can be passed from <b>one organism to another</b> .
Pathogen	Microorganisms that cause disease may be viruses, bacteria, fungi or protists.
Bacteria	Prokaryotes that reproduce rapidly inside the body and may produce poisons (toxins) that damage tissues and make us feel ill, treated with antibiotics.
Virus	Live and reproduce inside cells, causing cell damage.
Protist	E.g. malaria
Vaccine	Dead or inactive pathogenic material used in vaccination to develop immunity to a disease in a healthy person.
White blood cells	Macrophages ingest pathogens (phagocytosis), lymphocytes produce antibodies, other white blood cells produce antitoxins.
Antibody	Special proteins that target particular bacteria or viruses and destroy them. You need a unique antibody for each type of pathogen.  When your white blood cells have produced antibodies once against a pathogen, they can be made very quickly if that pathogen enters your body again.
Antitoxin	Made by white blood cells, these counteract (cancel out) toxins made by pathogens.
Antigen	Proteins on the surface of cells that act like markers – your immune system can detect antigens that are not your own.
Cilia	Tiny hair-like projections on cells lining the trachea which beat out dirt/pathogens to the throat to be swallowed.

#### How pathogens are spread:

- By air (including droplet infection). When you are ill, your you expel tiny droplets full of pathogens when you cough, sneeze or talk.
- By direct contact:
  - E.g. when one plant touches another hence you have to **remove and burn/destroy** infected plants.
  - E.g. in humans; sex, cuts, scratches, and needle punctures (drug users).
  - Animals can act as vectors transferring pathogens.
- · By water:
  - E.g. fungal spores carried by water to plants.
  - E.g. Humans eating raw, undercooked or contaminated food or drinking water containing sewage. Pathogens enter via the digestive system.

#### **Preventing infection:**

- Wash hands for 60s in warm water with soap.
- Use disinfectants on kitchen work surfaces, toilets etc.
- Keep raw meat away from food that is eaten uncooked.
- Cough/sneeze into a tissue bin it wash hands.
- Vaccines (see B6 topic).
- Maintain hygiene of agricultural equipment.
- Isolate someone who has the disease.
- Destroy or control the vector e.g. use mosquito spray/nets.

## Human defence responses (stop the pathogens getting in!):

- Skin acts as a barrier and produces antimicrobial secretions and is covered in microorganisms that are not pathogenic.
- Respiratory system defences:
  - **Nose** full of **hairs** and produces **mucus** which trap pathogens to be blown out.
  - Trachea and bronchi secrete mucus and have cilia which trap dirt and beat it up to the throat to be swallowed.
  - **Stomach** produces **acid** which destroys the microorganisms in the **mucus** and in any **food/drink**.

# Petri dish setup for culturing microorganisms inoculating loop plastic or glass petri dish agar jelly growing bacteria

#### **ASEPTIC TECHNIQUE**

- Sterilise Petri dishes and culture media to prevent contamination.
- Pass inoculating loops through a flame to sterilise.
  - **Secure lid of the Petri dish with tape** (to prevent transfer of pathogens) and store upside down to prevent condensation build up.
- In school laboratories, cultures should be incubated at 25°C to prevent growth of human pathogens which survive best at body temperature.

# REQUIRED PRACTICAL: Investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition.

**IV:** this could one of a variety e.g. type of disinfectant, concentration of antibiotic, type of antibiotic. I have chosen one for this example.

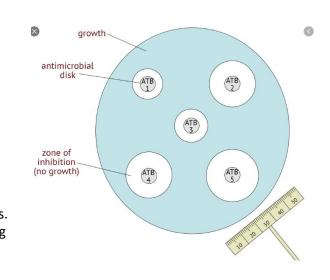
E.g. IV: type of disinfectant

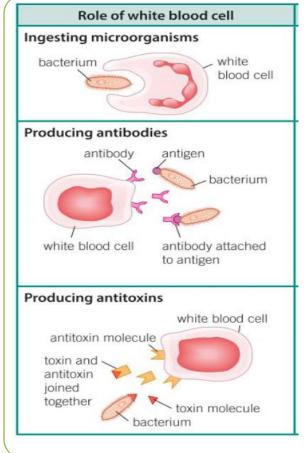
DV: zone of inhibition (area of bacteria killed around the disc of disinfectant) – **measure the radius** (or half the diameter).

CV: concentration of disinfectant, size of disc.

#### Method:

- 1. Set up a culture plate using aseptic technique (mention the steps in the box above).
- 2. Place a drop of bacteria on the growth media and spread it with a sterile lawn spreader.
- 3. Add discs of filter paper soaked in the different disinfectants.
- 4. Leave for 24h.
- 5. Measure the diameter of the circles of clear area around the discs.
- 6. Divide the diameter by 2 to find the radius.
- 7. Calculate the area of the clear circles using  $\pi r^2$ .
- 8. The larger the area the more effective the disinfectant.





The immune system – internal defences

#### Plant diseases can be detected by:

- Stunted growth
- Spots on leaves
- Areas of decay (rot)
- Growths
- · Malformed stems of leaves
- Discolouration
- The presence of pests

#### Identification can be made by:

- Reference to a gardening manual or website
- Taking infected plants to a **laboratory** to identify the pathogen
- Using testing kits that contain monoclonal antibodies (see B6 topic)



# KS4 Rinlogy: R6 Preventing and treating disease

KS4 Biology	: B6 Preventing and treating disease
Key term	Definition
Vaccine	Dead or inactive pathogenic material used in vaccination to develop immunity to a disease in a healthy person.
White blood cells	Macrophages ingest pathogens (phagocytosis), lymphocytes produce antibodies, other white blood cells produce antitoxins.
Antibody	Special proteins that target particular bacteria or viruses and destroy them. You need a <b>unique antibody for each type of pathogen.</b> When your white blood cells have produced antibodies once against a pathogen, they can be made <b>very quickly</b> if that pathogen enters your body again.
Antitoxin	Made by white blood cells, these counteract (cancel out) toxins made by pathogens.
Antigen	Proteins on the surface of cells that act like markers – your immune system can detect antigens that are not your own.
Antibiotic	Cure bacterial diseases by killing the bacterial pathogens inside your body.
Placebo	A medicine that does not contain the active drug being tested, used in clinical trials of new medicines.
Double blind trial	Neither patient or prescribing doctor know if they are taking/giving the drug or the placebo so they cannot be <b>biased.</b>
Mutate	Change in DNA.
Pre-clinical testing	Carried out on a potential new medicine in a laboratory using cells, tissues, and live animals.
Clinical testing	Test potential new drugs on healthy and patient volunteers for safety, efficacy and dosage.
Clone	Identical copy
B Lymphocyte	White blood cells that produce antibodies
Tumour cell	Cells able to divide repeatedly
Hybridoma cell	Cells made in a lab by fusing antibody specific B-lymphocytes and tumour cells together. Once screened and cloned, they produce monoclonal antibodies.

#### Vaccination:

Introduce small quantities of **dead** or **inactive** forms of a **pathogen** into the body to stimulate the white blood cells to produce antibodies.

If the same pathogen re-enters the body the WBC recognise the pathogen and respond guickly to produce the correct antibodies, preventing infection.

MMR = measles, mumps, rubella vaccine

## **Herd immunity**

If a large proportion of the population is immune to a pathogen, spread of the pathogen is reduced. Vaccination can speed up herd immunity e.g. measles.

#### **Treating symptoms:**

Viruses have no cure (it is difficult to develop drugs that kill viruses without damaging the body's tissues).

You can treat the symptoms of both viral and bacterial infection though.

e.g. Aspirin and paracetamol are pain killers.

e.g. Ibuprofen targets inflammation.

#### Antibiotics e.g. penicillin:

Kill bacteria whilst they are inside the body without damaging body cells – either taken as a pill or put straight into the blood stream.

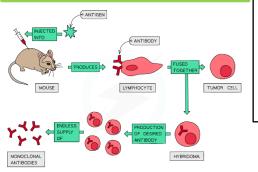
#### Specific bacteria treated by specific antibiotic.

Decreased deaths from bacterial infections but some bacteria are now becoming resistant to antibiotics e.g. MRSA.

To prevent this: don't prescribe for viral infections, limit use in agriculture, take the full course.

ANTIBIOTICS DO NOT TREAT VIRAL INFECTIONS.

## **Biology only** - Making monoclonal antibodies



New medical drugs have to be tested for:

- Toxicity is it safe to use, do the benefits outweigh the side effects?
- Efficacy does it prevent, cure a disease or make you feel better?
- Dosage how much to take to be effective but limit side effects?

The heart drug digitalis originates from foxgloves.



The painkiller aspirin originates from willow.



Penicillin was discovered by **Alexander Fleming** from the **Penicillium** mould.

- Traditionally drugs were extracted from plants and microorganisms.
- New drugs synthesised by chemists in the pharmaceutical industry. The starting point may still be a chemical extracted from a plant.

Antibiotic goes through the Discovery and Development

Pre-clinical stage: Lab testing on cells and tissues and then live animals

Clinical trial (Phase 1): Low dose of the drug are tested on healthy people

Clinical trial (Phase 2): Testing on small number of people who have the disease. Placebos as well as drug is given > double blind trials

Clinical trial (Phase 3): Testing on large number of people who have the disease. Placebos as well as drug is given > double blind trials

Review and approve: Results of testing are peer-reviewed to make sure that the results are valid and unbiased. The results then published in journals

# **KS4 Chemistry: C3** Structure and Bonding

States of matter			
State	Colid	Liquid	

Very close

Liquid

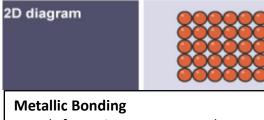
Close

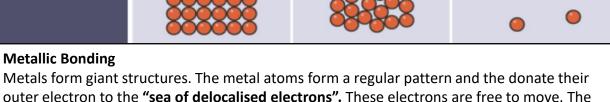
Gas Far apart

Randomly Randomly arranged

Regular arranged pattern Vibrate around Move around a fixed position each other Low energy Greater energy

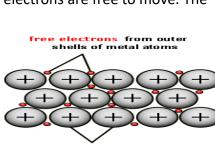
Move quickly in all directions Highest energy





2D structure of metallic bonding looks like this: Metals are good conductors of electricity and heat because the delocalised electrons are

free to move and transfer energy.



Closeness of

Arrangement

Movement of

particles

Energy of

particles

of particles

particles

**Alloys** Alloys are mixtures of 2 or more elements, one of which is a metal. Metal alloys are stronger because the atoms have different sizes which distorts the regular structure of the metal and the layers of ions can no longer slide over one another.

# **Delocalised electron**

Dot and cross diagram

**Keyword** 

Alloy

**Covalent bond** 

**Fullerene** form of the element carbon that can exist as large cage-like structures, based on hexagonal rings of carbon atoms **Giant covalent structure** a huge 3D network of covalently bonded atoms, such as the bonding

**Giant lattice** 

Ionic bond

in silicone dioxide a huge 3D network of atoms or ions

lelectrons

Ithe atoms or ions in a substance

latom

Intermolecular forces the relatively weak attraction between the individual molecules in a covalently bonded substance

**Metallic bonding** 

Nanoscience

charged ions

The bonding that occurs in metals, due to the electrostatic force between positive metal ions and negative electrons the study of very tiny particles or structures between 1 and 100

**Polymer** 

nanometres in size, where 1 nanometre = 10<sup>-9</sup> metres a substance made from very large molecules made up of many repeating units

the electrostatic force of attraction between positively and negatively

**Definition** 

a mixture of two or more elements, at least one of which is a metal

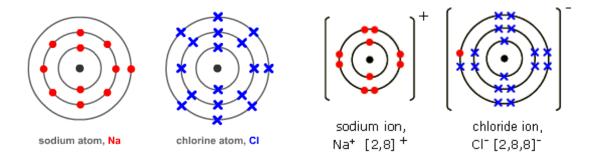
bonding electron that is no longer associated with any one particular

a drawing to show only the arrangement of outer shell electrons of

the bond between two atoms that share one or more pairs of

#### **Ionic Bonding**

When a metal atom reacts with a non-metal atom electrons in the outer shell of the **metal** atom are transferred to the non metal atom. This means the metal has a positive charge and the non metal has a negative charge. This means there is an **electrostatic attraction** between the two ions, this is what forms an ionic bond. Both atoms will have a **full outer shell** (this is the same as the structure of a noble gas) see example below of sodium chloride.



#### **Properties of Ionic compounds**

Ionic compounds have high melting points, due to

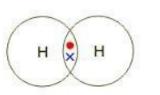
strong electrostatic forces between the oppositely charged ions. This means a lot of energy is required to break these bonds. For example the melting point of sodium chloride is 801 °C. Ionic compounds do not conduct electricity as a solid. They do conduct electricity if they are dissolved in water (aqueous) or in the liquid state. This is because the ions are free to move, carrying the electric charge.

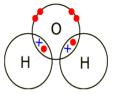
Substance	Diagram	Description	Properties
Diamond		Each carbon is covalently bonded to four other carbons	Very hard, very high melting point, due to strong covalent bonds. Does not conduct electricity – no free electrons/ions.
Graphite		Each carbon is covalently bonded to 3 other carbons, there are weak (non covalent) bonds between the layers.	High melting point, conductor of electricity due to delocalised electrons which can carry a charge. Slippery as layers can slide over each other
Silica	1	Every silicon atom is bonded to 2 oxygen atoms and vice versa	High melting point

#### **Covalent Bonding**

Covalent bonding occurs between non metals. Electrons are shared between the atoms, so that they have a full outer shell. Covalent bonds are strong and require a lot of energy to break.

When drawing covalent molecules we use "dot cross diagrams" as we do with ionic compounds. It is important to represent the electrons on one atom with a dot and on the other atom with an X.





# **Properties of Simple Covalent Compounds**

Simple covalent compounds have low melting points and are often gases at room temperature. Although the covalent bonds between the atoms are strong, the **intermolecular forces between the molecules are weak.** This means that only a small amount of energy is required to overcome these weak forces.

Covalent compounds **do not conduct electricity,** because they have no free electrons or ions and therefore there is nothing to carry the electric charge.

#### **Giant Covalent Compounds**

In a giant covalent structure all atoms are bonded to each other by strong covalent bonds. Giant covalent compounds have a **high melting point** because many strong covalent bonds need to be broken and this requires a lot of energy. Examples include: diamond, graphite and silicone dioxide.

#### **Graphene and Fullerenes**

Graphene is a single layer of graphite so it is 1 atom thick.

Fullerenes are molecules of carbon with hollow shapes.

Fullerenes have use in drug delivery and as catalysts.

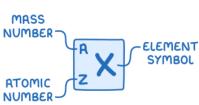
Carbon nanotubes are cylinder shaped fullerenes, these are strong and are excellent conductors of both heat and electricity.

# KS4 Chemistry: C4 Chemical calculations

# Relative atomic mass (Ar)

The relative atomic mass of an element is the relative mass of its atoms compared to the mass of a carbon-12 atom. The Ar values for elements are given in the periodic table.

A, has no units.



## Relative formula mass (Mr)

This is the mass in grams of 1 mole of the substance. To calculate it you need to: add up the atomic mass (bigger number) of all of the atoms in the molecule.

e.g. 1. NaCl = Na + Cl = 23 + 35.5 = 58.5

e.g. 2. 
$$MgF_2 = Mg + (2 \times F) = 24 + (2 \times 19) = 62$$

Reyword	Delilililion
Yield	The amount of product made in a chemical reaction
Atom economy	The percentage of atoms that form useful products
Limiting reactant	The reactant that is all used up during a reaction
Molar gas volume	the volume occupied by one mole of any gas, at room temperature and pressure

Definition

Keyword	Definition
Law of conservation of mass	The law of conservation of mass states that no atoms are lost or made in a chemical reaction
IRPIATIVE ATOMIC MASS	An average value of mass that takes account of the abundance of the isotopes of the element.
Relative formula mass	the total mass of atoms in a compound
Avogadro constant	The number of atoms, molecules or ions in one mole of a substance. Its value is $6.02 \times 10^{23}$ per mole
	Unit of measurement in chemistry, calculated using $moles = \frac{mass}{Mr}$

## **Moles**

A mole of any substance contains  $6.02 \times 10^{23}$  particles.

A mole is the relative atomic or formula mass in grams.

So a moles of Carbon has a mass o 12 g and contains  $6.02 \times 10^{23}$  of carbon atoms A mole of water molecules has a mass of ((2x1) + 16) = 18g and contains  $6.02 \times 10^{23}$  water molecules

# Molar Gas Volume (Separates, H only)

At a given temperature and pressure, one mole of any gas occupies the same volume.

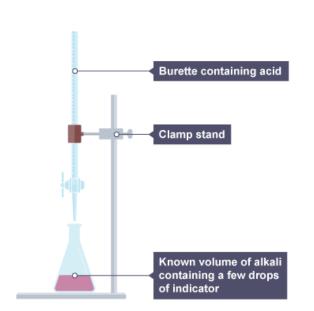
The molar volume is the volume occupied by one mole of any gas, at room temperature and pressure.

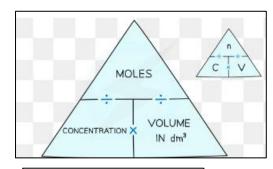
The molar volume is equal to 24 dm<sup>3</sup> (24,000 cm<sup>3</sup>).

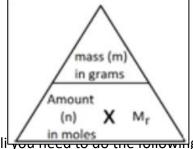
# **Titration - Separate science only**

#### **Titrations**

Titrations are used to find out an unknown concentration of a solution, this is often used to find out the concentration of an acid or an alkali in a neutralisation reaction.







To carry out a titration to find the concentration of an alkali you need to do the romown g:

1. A pipette is used to measure 25 cm3 of alkali, this is then transferred to a conical flask.

- 2. 3-4 Drops of indicator is added (phenolphthalein).
- 3. An acid of known concentration is placed in the burette
- 4. The solution from the burette is allowed to slowly run into the conical flask. As the end point approaches the acid is added one drop at a time. When phenolphthalein is used as an indicator, the end point is where the solution turns from colourless to pink.
- 5. The volume of acid used from the burette is noted to calculate the concentration of the alkali in the conical flask.

## Indicators – triple students only

For titrations universal indicator is not a suitable indicator to use. As the colour changes are too gradual. For a titration, a sharp colour change is required .

Relative formula mass	Sum of all Ar
Percentage by mass	= (mass of element ÷ Mr) x 100
Conservation of mass	Mass of reactants = mass of products
Moles	= Mass ÷ Relative formula mass
Percentage yield	= (actual mass ÷ theoretical mass) x 100
Atom economy	= Mr of useful product ÷ Mr of all reactants
Componention	(g/dm³) = mass (g) ÷ volume (dm³)
Concentration	(mol/dm³) = moles ÷ volume (dm³)
Volumes of gases	Volume (dm³) = moles x 24

# **KS4 Physics: P1 Energy transfer**

# **Types of energy store**

Kinetic energy store > Energy stored by moving objects

Elastic potential energy store > Energy stored in compressed springs or

Thermal energy store stretched elastic bands

Stretched elastic ballus

Gravitational potential energy store ➤ Energy stored by lifting something against the force of gravity

**Chemical energy store** Energy stored in chemical bonds examples

include batteries, coal, gas, and food. Released

by chemical reactions.



Chemical energy store the battery

Energy pathways: Energy can be transferred

Mechanically when work is done by a force

**Electrically** by electrical current when a moving charge does work

By **Heat transfer,** when energy is transferred from a hot object to a cooler one for example by conduction

By **Radiation**, in the form of sound waves, light waves and other electromagnetic radiation like infrared radiation

thermal energy

store of the

# **Energy transformations**

Electrical current

pathway

Energy transformations describe how energy transforms from one form to another.

Radiation

pathway

thermal energy

store of the

bulb surroundings (via light waves) Thermal kinetic Chemical Chemical Mechanical energy store energy pathway pathway of the engine store of store of the the car fuel

**Describing energy transfers:** Energy transfers are described in terms of **decreasing** and **increasing** energy stores.

For example:

**Bow and arrow:** The elastic potential energy store of the bow string <u>decreases</u>, the kinetic energy store of the bow string <u>increases</u>.

**Falling ball:** The gravitational potential energy store of the ball <u>decreases</u>, the kinetic energy store of the ball <u>increases</u> and the thermal energy store of the ball and surroundings **increases** due to air resistance.

**Friction:** When you apply the brakes in a car, the brake pads do mechanical work on the brake disks causing the wheel's kinetic energy store to transfer to the thermal energy store of the brake disks, resulting in the car slowing down.

# **Energy is measured in Joules (J)**

Nuclear energy store

Magnetic energy store

Key words	
Power	The amount of energy transferred per second measured in Watts (W).
Work (work done)	The energy transferred by a force.  Work done means Energy transferred. Work is not a store of energy - it is one of the ways in which energy can be transferred.
Conservation of energy	Energy can not be created or destroyed, only transformed from one store to another.
Energy dissipation	Energy transferred to the surroundings, usually as thermal energy or sound.
Friction	A force the opposes the motion of an object.
Efficiency	The proportion energy transferred in a useful way. Given as a percentage, decimal of fraction of the total energy input.
A system	An object or group of objects – In a closed system the energy before and after energy transformations always remain the same.

Gravitational potential energy (J) = mass (Kg) x gravitational (N/Kg) x height (m) field strength

 $E_n = mgh$ 

m x g x h

Exa pe

**Example Calculation**: Calculate the work done if a person lifts a 10N weight 1.5m off the ground?

Work done = Force x distance

$$W = F \times d$$

$$W = 10 \times 1.5$$

$$W = \underline{15J}$$

Always write out the equation you will use, substitute in the numbers in, calculate the answer and give the unit

Energy stored = 
$$\frac{1}{2}$$
 x Spring constant (N/m) x extension  $^2$  (m) in a spring(J)

$$E_{e} = \frac{1}{2} k e^{2}$$

Kinetic energy (J) = 
$$\frac{1}{2}$$
 x mass (Kg) x velocity  $\frac{2}{m}$  (m/s)  
 $\mathbf{E_k} = \frac{1}{2}$  m  $\mathbf{v}^2$ 

Efficiency = 
$$\frac{\text{(Useful power output)}}{\text{Total power input}} \times 100$$

Efficiency = 
$$\frac{\text{Useful energy output}}{\text{Total energy input}} \times 100$$

Work done (J) = Force (N) x distance (m)
$$W = F x s$$

$$Power (W) = Energy (J)$$

$$F x s$$

$$F x s$$

$$F x s$$

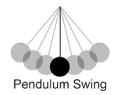
E Energy	F Force
P Power	d distance
g gravitational field strength	t time
E <sub>k</sub> Kinetic energy	v velocity
<b>E</b> <sub>p</sub> Gravitational potential energy	e extension
E <sub>e</sub> Elastic potential energy	h height

# Orders of Magnitude:

1mW	<b>0.001</b> W	MilliWatt	1 x 10 <sup>-3</sup>
1W	1W	Watt	1
1kW	<b>1,000</b> W	Kilo Watt	1x10 <sup>3</sup>
1MW	<b>1,000,000</b> W	Mega Watt	1x10 <sup>6</sup>
1GW	<b>1,000,000,000</b> W	Giga Watt	1x10 <sup>9</sup>



**Energy dissipation:** When a ball falls, its gravitational potential energy store decreases and its kinetic energy store increases. When it bounces some energy is transferred to the thermal energy store of the ball and ground. Eventually the original energy input is transferred to the thermal energy store of the surroundings, and the ball comes to rest



**Energy dissipation:** A pendulum eventually comes to rest as **energy is transferred to the surrounding**. Energy is **dissipated** to the thermal energy store caused by friction and air resistance.

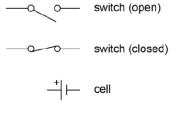
# **KS4 Physics: P4 Electrical circuits**

Key words	Definition
Current	Current is a measure of how many Coulombs of charge passes a point every second.
Charge	Charge is a property of a body which experiences a force in an electric field. Charge is measured in coulombs (C).
Potential difference (Voltage)	A measure of the difference in electrical energy between two parts of a circuit. Measured in Volts. It tells us how many joules of energy is transferred by each coulomb of charge.
Resistance	The wires and the other components in a circuit reduces the flow of charge through them. This is called resistance. Resistance is measured in Ohms.
Parallel circuits	In parallel circuits, electrical components are connected alongside one another, forming extra loops. When two components are connected in parallel, an individual charge will flow-brough one of the components only, not both.
Series circuits	When components are connected in series a charge will flow through all the components in the circuit

**Conventional current** goes from electron flow positive to negative. It is shown on circuit diagrams using arrows on the lines(wires). This is important when considering which way round to put diodes in a circuit! electron flow

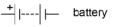
Static electricity - Separate Science only Friction can remove or add electrons to objects Opposite **Polythene rod** – becomes negative as charges electrons transfer from the cloth to the rod attract **Acetate rod** – becomes positive Like as electrons transfer from the rod Charges to the cloth repel

> Circuit symbols



An **electric field** is a region around a charged object or particle, in which another charged object/particle will experience a force.







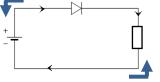




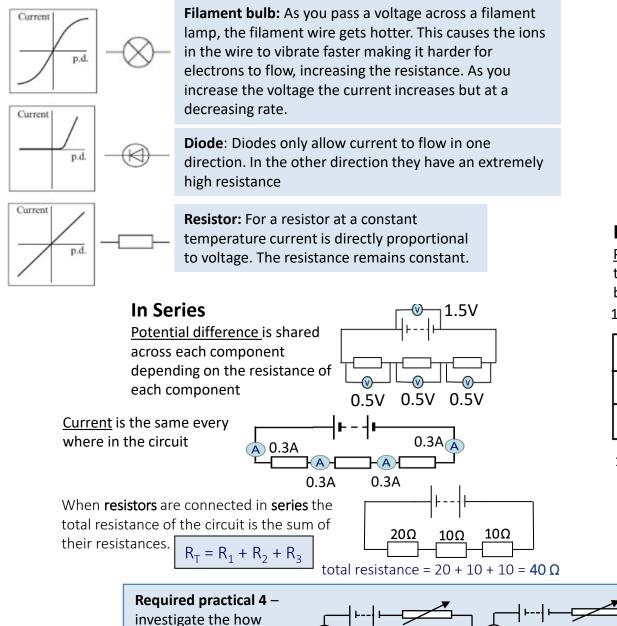


variable resistor





They later discovered electrons flow in the wires from negative to positive, this is shown with arrows outside the circuit.

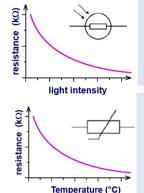


potential difference

affects current for a diode,

filament lamp and resistor

at constant temperature.



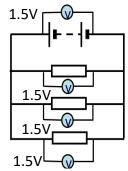
**Light dependent resistor (LDR):** As the light intensity increases the resistance of an LDR deceases. They are often used as light sensors.

**Thermistor:** As the temperature of a thermistor increases the resistance deceases. They are often used in thermostats and temperature sensors.

#### In Parallel

<u>Potential difference</u> the same across each

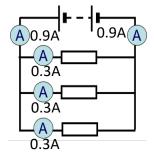
the same across each branch of the circuit



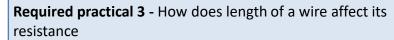
(A)

Component being tested

<u>Current</u> is shared across each branch of the circuit depending on the resistance of each component



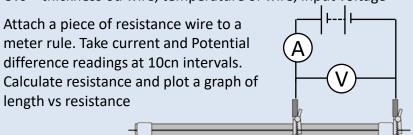
When **resistors** are connected in **parallel**, then the total resistance of the circuit decreases. Even though you have added another resistor, you have given more pathways for charges to flow, thus reducing the overall resistance.



IV - length of wire

DV – current and voltage (to calculate resistance)

CVs – thickness od wire, temperature of wire, input voltage



John von Neumann

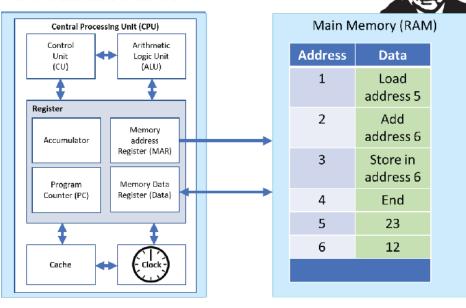
# **OCR GCSE Computer Science (J277)**

The CPU operates a **Fetch-Decode-Execute Cycle**. It fetches an instruction/data from the **Main Memory (RAM)**, takes it back to the **Control Unit** to have it decoded and then it carries out the instruction before repeating (hence it being a cycle).

1 cycle is 1hz.

Component

# 1.1.1 Architecture of the CPU

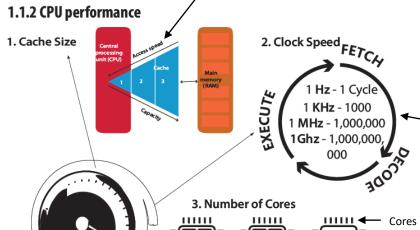


Category

John von Neumann invented the stored program concept that many modern computers now adopt as their architecture. Known as the von Neumann architecture.

**SPEED** 

Cache size affects performance as the more cache you have, the more frequently used data and instructions you can store so the CPU does not have to travel to the Main Memory (RAM) as often.



Questions in this section may ask you to perform the following:

- Recall CPU components and their roles including the main units, registers, and cache.
- Compare two given computers and come to a judgement on which one might perform better when considering factors that affect CPU performance.
- Identify and describe why a device might be an example of an embedded system.
- Understand and be able to explain the steps of the Fetch-Decode-Execute cycle.

Clock speed affects performance as it represents the number of Fetch-Decode-Execute cycles that can be performed in the pulse of a clock. The higher the number, the faster it can perform these cycles.

 Cores is the term we give to show the number of **microprocessors** that a CPU might have. A **dual-core** processor has two processors working in tandem, a **quad-core** processor has four and so on. The number of cores affects performance as the more cores you have, the more likely it is that you can carry out instructions in parallel. Dual-core? Potentially this can double the speed of the clock speed. A 2Ghz processor is now operating like a 4Ghz processor. It is worth noting that some operations cannot be performed simultaneously and so it is not a given that more cores improves performance.

An embedded system is a computer system that uses programmed

a small number of specific tasks very efficiently.

processors embedded onto a single circuit board. They are often used as part of a larger device. Embedded systems are designed to carry out

# 1.1.3 Embedded systems

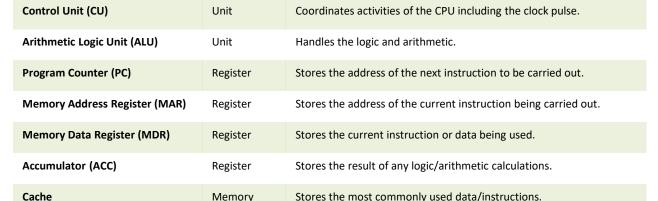








It is worth noting that cars are made up of a large amount of embedded systems for example things such as ABS, rear-cameras and sensors, entertainment systems...



Purpose

# J277/01 - Computer Systems: 2. Primary and Secondary Storage

# **OCR GCSE Computer Science (J277)**

# 1.2.1 Primary Storage (Memory)



**Purpose** Stores data and instructions during processing

**Volatility** Volatile, data lost without power

**Read/Write** Read and write

 Capacity
 Usually several gigabytes
 A few megabytes in size

Political

Stores boot-up instructions set by the manufacturer

**ROM** 

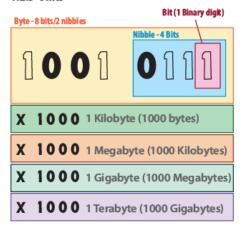
Non-volatile, data remains after power switched off

Read only

Primary storage is referring to Memory within the computer. You need to know the difference between the two main types shown here (RAM and ROM) and the fact that cache memory and registers also belong in the category of primary storage.

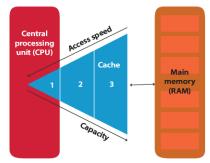
# Cloud storage USB memory stick Optical disk drive at

#### 1.2.3 Units



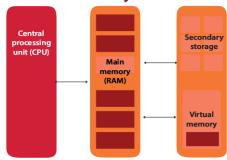
Decimal (base 10)	Hexadecimal (base 16)	Binary (base 2)
1	1	0000 0001
2	2	0000 0010
3	3	0000 0011
4	4	0000 0100
5	5	0000 0101
6	6	0000 0110
7	7	0000 0111
8	8	0000 0100
9	9	0000 1001
10	A	0000 1010
11	В	0000 1011
12	C	0000 1100
13	D	0000 1101
14	E	0000 1110
15	F	0000 1111
16	10	0001 0000

# Cache



Cache Memory was covered in the first subsection for this unit. What is explored in this subsection is that Cache memory comes in a number of levels. Level 1 is the smallest and fastest memory to access and it usually can be found on a core (microprocessor) itself. Level 2 is slightly larger and is slightly less accessible as it sits on the processor as a whole and Level 3 (the largest and least accessible) sits between the RAM and the processor.

# **Virtual Memory**



Virtual Memory is something that is created if the Main Memory (RAM) runs out of space. It is created in secondary storage and it allows the computer to continue to function and not run out of memory. It is a slower form of memory as the CPU must travel so much further to access data and instructions and it requires resources to manage the swapping in and out of pages (blocks of memory). The only solution to the problem of having to use Virtual Memory so much is to make sure that you have installed adequate memory (RAM).

# **Characteristics of secondary storage**

Reliability

ווסוסס אוסוס<sub>י</sub>/

**Portability** 

Cost



**Durability** 

t STORAGE TYPES

in ly
ual ave

# 1.2.4 Data storage Numbers



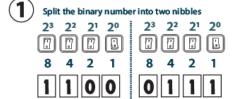
<b>Binary Addition Rules</b>
------------------------------

0 + 0	=	0	
0 + 1	=	1	
1+0	=	1	
1 + 1	=	10	— CARRY THE 1
1 + 1 + 1	⊦ <b>1</b> =	1	CARRITIE
		1	— CARRY THE 1

01111	0101
Overflow 1 0 1 1	0110
0110	1011
1 1 1 1	1

# Converting between Binary and Hexadecimal The NIBBLE Method

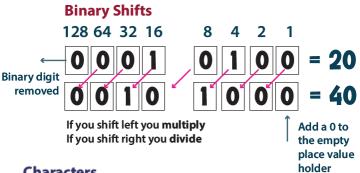
2 <sup>7</sup> 2 <sup>6</sup> 2 <sup>5</sup> 2 <sup>4</sup>	2 <sup>3</sup> 2 <sup>2</sup> 2 <sup>1</sup> 2 <sup>0</sup>
128 64 32 16	8 4 2 1
1 1 0 0	0 1 1 1 = 199





NOTE: You can do this in reverse i.e. take the Hexadecimal number and turn it into a nibble and then join the nibbles together to create the binary number.

# **OCR GCSE Computer Science (J277)**



# Characters

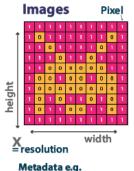
Character	Character code (denary)	Character code (binary)
a	97	0110 0001
b	98	0110 0010
С	99	0110 0011

#### The two main character sets to know are:

**ASCII** (American Standard Code for Information Interchange) Originally 7 bits (128 chars), extended to 8 bits (256 chars) **Unicode** including *UTF-8*, *UTF-16*, and *UTF-32*, can range from **8 bits** up to **48 bits** allowing for over a *million characters* to be represented (great for other languages).

Questions in this section may ask you to perform the following:

- · Know the difference between the memory types (RAM and ROM).
- Be able to explain the purpose and operations of Virtual
- Understand the need for secondary storage and the different types.
- Be able to recommend a particular storage device dependent on a scenario and using the characteristics of secondary storage as a justification for the choice.
- Convert between the following number bases: Denary (Base 10, Binary (Base 2), and Hexadecimal (Base 16).
- Understand how text/sound/image/ is converted to a binary code.
- Understand the need for compression and the different types.



- Dimensions

- File Format

# 3 8 16

Colour

depth (bits)

# Image file size (in bits) = width (in pixels) x height (in pixels) x colour depth Bitmap - .bmp

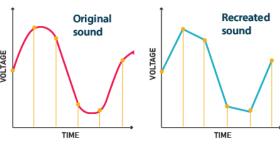
PNG (Portable Network Graphic) - .png JPEG (Joint Photographic Experts Group) - .jpg/jpeg GIF (Graphics Interchange Format) - .gif

Amount of

colours

NOTE: Increase resolution and Colour Depth = Increased quality and file size

# Sound



Sound is a wave. To turn it into a digital representation, it needs to be sampled and stored as a binary value. The measurements of sound are the sample rate (how many samples have been taken) and the **bit depth** (how much space has been given to store the samples).

Many of the questions to do with images and sound are similar. In each case, the quality and size of each type of file is dictated by the following: the more data that has been captured (colours for images and samples for sound) and the higher the amount of bits that has been reserved to store that data (bit depth) then the greater the quality of the file and the higher the file size.

# high quality = high sample rate + high bit depth

# 1.2.5 Compression

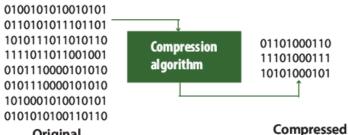
Original

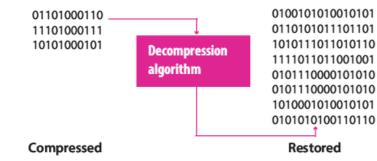
Date/Time of creation

- Camera Settings

- Geographical location

- Details about the device





**Lossy:** always results in a loss of data **Lossless:** can be eturned to original state Examples: MP3, JPEG, MPEG 1& 2 Examples: PNG, GIF, ZIP

Use: When quality loss is impercetible to senses

Use: With text and software

	True	False
The sample rate is the number of times the amplitude is recorded per second		
The smaller the bit depth the smaller the range of sounds recorded		
The larger the sample rate the larger the bit depth		
The frequency and pitch of the sound wave are measured		
Sound is stored using pixels		

- 1. Convert the binary number 11001011 into denary.
- 2. Convert the binary value 1110 0011 into hexadecimal.
- 3. Convert the denary value 105 into an 8 bit binary number.
- 4. Give two reasons why computer scientists use hexadecimal to represent numbers instead of binary.
- 5. Explain why you would compresses images and videos before uploading them.
- 6. A student wants to reduce the file size of the images and videos by the largest amount possible. Identify the method of compression that would be most appropriate. Justify your choice.

# Weimar and Nazi Germany 1918-39 Key Topic 1: The Weimar Republic, 1918-29

	<b>AA/</b>			
IDO	M	חחר ח	וומח	$\mathbf{n}$
	Wein	ומו ה		

This was the name given to Germany after the Kaiser had abdicated in November 1918. This was a time of despair and hope for Germany. At first, the country faced lots of chaos but under Gustav Stresemann, there was some stability.

# Key events

1918 World War One ended. The Kaiser abdicated and Germany became a country without a monarch (a Republic).

1919 January Spartacist Uprising

1919 June Signing of the Treaty of Versailles

1919 August Weimar Constitution finalised

1920 Kapp Putsch

1923 French occupation of the Ruhr and hyperinflation
1924 Dawes Plan

1925 Locarno Pact

1926 Germany joins League of Nations

1928 Kellogg Briand Pact

1929 Young Plan

# **Key Concepts**

The Weimar Republic faced much opposition, It was disliked by the left wing who wanted Germany to be like Communist Russia and it was disliked by the right wing who wanted the monarchy back.

The Treaty of Versailles caused many problems for Germany. The German people disliked the politicians for signing it and it caused political problems and economic problems.

Gustav Stresemann helped to bring about recovery in Germany after 1924. He solved economic problems by making friends with other countries. However, historians have very different views about the extent of this recovery.

The Golden Age was the period from 1924-29 and it saw significant changes in culture, the standard of living and the position of women.

Key Words	
Abdication	When a monarch leaves the throne
Republic	A country without a King or a Queen
Ebert	The first President of the Republic
Stresemann	The Chancellor of Germany from the Summer of 1923
Article 48	The President could use this to ignore the Reichstag and rule as he saw
	fit
Kaiser	King
Armistice	An agreement to end war
Weimar	The new government could not meet in Berlin as it was so dangerous,
	so they met here instead
Constitution	This is an agreement about how the country would be ruled
Reichstag	German parliament
D'ala	District of the control of the contr
Dictat	Dictated (forced) peace agreement
Freikorps	Ex military soldiers who wanted to overthrow the Republic
<u> </u>	
Rentenmark	The currency of Germany after November 1923
Hyperinflation	When money looses its value
Dawes Plan	An agreement where the USA would lend Germany money
Young Plan	This lowered the reparations payment and gave Germany longer to pay
Treaty of Versailles	This decided how Germany was going to be treated after WW1
Locarno Pact	An agreement on borders signed by Britain, France, Italy and Belgium
Kellogg Briand Pact	65 counties including Germany agreed to resolve conflict peacefully
Coalition	A government of two or more political parties

# Weimar and Nazi Germany 1918-39

**Key Topic 2: Hitler's Rise to Power, 1919-33** 

# **Hitler's Rise to Power**

Hitler sets up the Nazi Party in 1920 and becomes Chancellor in January 1933. This happens for a variety of reasons – Hitler's strengths, inbuilt problems of the Weimar Republic, and the weaknesses of others.

# **Key events**

1919 Hitler joins the German Worker's Party

1920 Hitler sets up the Nazi Party

1921 Hitler introduces the SA

1923 The Munich Putsch

1925 Mein Kampf published

1926 Bamberg Conference

1928 Nazis win 12 seats in Reichstag

1929 Death of Stresemann and Wall Street Crash

1930 Nazis win 107 seats in Reichstag

1932 July Nazis win 230 seats in Reichstag

1932 November Nazis win 196 seats in Reichstag

1933 January Hitler becomes Chancellor

# **Key Concepts**

The Munich Putsch is a significant event. Although a failure, Hitler gained publicity, he wrote Mein Kampf and he realised that if he was to win power, he needed to do this by votes and not by force.

Stable Stresemann caused problems for the popularity of the Nazi Party. When times were good, voters were not attracted to the Nazi policies.

The Wall Street Crash was a major turning point in the fortunes of the Nazi Party. The Nazi message did not change but people were now prepared to hear it.

The Backstairs Intrigue - At a time when Nazi popularity at the polls was decreasing, Hitler was handed power by political elites who feared a Communist take over and Civil War.

Key Words	
NSDAP	The Nazis
Iron Cross Award	Given for bravery in war
Volk	The notion of pure German people
25 Point Programme	The political manifesto of the Nazi Party
Volkischer Beobachter	People's Observer, a Nazi newspaper
Fuhrerprinzip	Belief that one person should run a Party
Swastika	Emblem of the Nazi Party
SA or Sturmabteilung	Private army of the Nazi Party headed by Himmler
Aryan	Pure German people
Anti-Semitism	Hatred of the Jewish people
Mein Kampf	Hitler's autobiography
Putsch	An attempt to get power illegally
Blood Martyrs	16 Nazis who died at the Munich Putsch
Gaue	Local party branches
SS or Schutzstaffel	Hitler's bodyguards
KPD	German Communist Party
Propaganda	Goebbels attempted to make people think in a certain way
Hindenburg	The President of the Republic from 1925 to 1934
Roter Frontkampferbund	The Communist's own private army

# Weimar and Nazi Germany 1918-39 Key Topic 3: Nazi Control and Dictatorship

# Nazi Control and Dictatorship

This was a time when Hitler formed a legal dictatorship and put in place methods of propaganda and censorship to persuade and encourage all Germany people to support Nazi ideals.

# **Key events**

1933 January Hitler becomes Chancellor

1933 February Reichstag Fire

1933 March Nazis win 288 seats

1933 March Enabling Act passed

1933 July Nazis become the only legal party in Germany

1934 June Night of the Long Knives

1934 August President Hindenburg dies

1934 August Hitler combines the post of Chancellor and President and becomes Fuhrer

1934 August German army swears allegiance to Hitler

1938 Over the course of the year, Hitler removes 16 army generals from their positions

# **Key Concepts**

Removal – From 1933 to 1934, Hitler removed all opposition and established himself as Fuhrer.

Control – There was an attempt to control and influence attitudes. This was done by propaganda and terror.

Opposition – The youth and the churches opposed the regime.

Key Words	
Marinus van der Lubbe	The Reichstag Fire was blamed on this Communist
Enabling Act	Gave the Nazis full power for the next 4 years
Gleichschaltung	Hitler's attempt to bring German society into line with Nazi philosophy
German Labour Front (DAF)	Set up to replace Trade Unions
Dachau	First concentration camp
Centralisation	Germany had been divided into districts called Lander. Now Germany was run from Belin alone
Purge	To get rid of opposition
Gestapo	Secret police headed by Goering.
Night of the Long Knives	Removal on internal and external opposition
Sicherheitsdienst (SD)	The intelligence body of the Nazi Party
Concordat	In July 1933 the Pope agreed to stay out of political matters if the Nazis did not interfere with Catholic affairs
Eidelweiss Pirates and Swing Youth	Groups who apposed the Hitler Youth
Confessional Church	Followed traditional German Protestantism and refused to allow the Nazification of religion. Led by Pastor Martin Niemoller
Mit Brennender Sorge (With Burning Concern)	The Pope wrote to priests in Germany about his concerns over the Nazi attempts to control religion

# Weimar and Nazi Germany 1918-39 Key Topic 4: Life in Nazi Germany, 1933-39

# Life in Nazi Germany

The lives of German citizens were changed after Hitler's appointment as Chancellor. For some, life was better under the Nazis but for others, it was much worse.

# Key events

1933 Boycott of Jewish shops and businesses. Law for the Encouragement of Marriage. Sterilisation Law passed.

1935 The Nuremberg Laws were passed.

1935 Conscription introduced.

1936 Membership of the Hitler Youth made compulsory.

1938 Jewish children were not allowed to attend German schools. Lebensborn programme introduced. Kristallnacht.

1939 The euthanasia campaign began. Designated Jewish ghettos established.

# **Key Concepts**

Anti-Semitism – Persecution of the Jews grew continuously after 1933.

Young—The Nazis placed much emphasis on controlling the young as only then could they secure a 'thousand year Reich'. Youth organisations and education indoctrinated the German youth.

Women – The Nazis had traditional family values but even these were tested by the needs of war and the desire to ensure a growing Aryan population.

Living Standards – The Nazis did reduce unemployment but they did this by banning Jews and women from the workplace and by putting Germany on a war footing. Workers had limited rights.

Key Words	
Kinder, Kuche, Kirche	Children, Kitchen, Church. This summed up the Nazi ideal of womanhood
The Motherhood Cross Award	Given to women for large families
Lebensborn	Where unmarried women were impregnated by SS men.
Napola	Schools intended to train the future leaders of Germany
Nazi Teachers League	All teachers had to swear an oath of loyalty to the Nazis
Reich Labour Service	A scheme to provide young men with manual labour jobs
Invisible unemployment	The Nazi unemployment figures did not include women, Jews, opponent and unmarried men under 25
Autobahn	Motorway
Rearmament	Building up the armed forces I readiness for war
Volksgemeinshaft	The Nazi community
Strength Through Joy	An attempt to improve the leisure time of German workers
Beauty of Labour	Tried to improve working conditions of German workers.
Volkswagon	People's car
Eintopf	A one pot dish
Herrenvolk	The master race or the Aryans
Nuremberg Laws	Jews were stripped of their citizenship rights and marriage between Jews and no Jews was forbidden
Kristallnacht (Night of the Broken Glass)	A Nazi sponsored event against the Jewish community

# **Tectonic Hazards**

Key idea

Key knowledge

Tectonic	Tectonic plates move because the core of the earth is very hot and heats the magma in the mantle, this then	terms	
theory	theory rises as it is less dense, before reaching the crust, travelling in each direction underneath it, cooling again which makes it denser, and sinking back towards the core. As this process happens, friction moves the plates with it. Evidence for this includes matching geology and fossils on different continents, from when they were		Massive slabs of Earth's lithosphere whose interactions shape the planet's surface.
	joined.	Plate boundary	The edge of a plate which interacts with it's neighbour.
Types of plates	There are two types of tectonic plate: <b>Continental plates</b> are less dense and cannot be destroyed or renewed. The Eurasian, plate is an example. <b>Oceanic plates</b> are denser and can be destroyed and renewed at plate boundaries. An example of an oceanic plate is the Pacific plate.	Fault Line	A fracture in the Earth's crust along which significant movement has occurred, often associated with earthquakes.
Global Earthquakes are commonly found in thin narrow distribution belts associated with a plate boundary. Most volcanoes are distributed along the plate boundaries, too, but		Epicentre	The point on the Earth's surface located directly above the focus (origin) of an earthquake.
	only constructive and destructive boundaries/margins. Occasionally, volcanoes are found in the middle of plates (e.g. Hawaii). These are called hot spots.		The point within the Earth where the earthquake occurred.
Collision plate boundary	Two plates of equal density collide and buckle to form Fold Mountains. Found in the Himalayas.	Seismic Waves	Vibrations that travel through the Earth, released by the sudden movement of rock along faults/plate boundaries.
Constructive plate	As 2 plates pull apart, eruptions occur and new crust is formed. Found in the mid-Atlantic ridge.	Subduction	The process by which one (denser) tectonic plate moves under another (less dense) plate, often generating intense seismic and volcanic activity.
boundary  Conservative	Two plates scrape past each other, causing violent earthquakes.	Richter Scale	A numerical, logarithmic scale for expressing the magnitude of an earthquake on the basis of seismograph oscillations.
plate Found in the San Andreas fault. boundary	Found in the San Andreas fault.	Magnitude	The size of an earthquake measured on the Richter Scale.
Destructive plate boundaries	Two plates of different densities move towards each other. The denser oceanic plate is subducted causing earthquakes, volcanoes and tsunamis. Found in the ring of fire.	Natural Hazard	A natural hazard is a naturally occurring event which can cause harm to humans. Types of natural hazard include atmospheric, geological and hydrological hazards

**Definitions** 

Key

	•		
rtai	nic.	Haza	arde
		IIUL	JIMJ

**Key idea** 

Hazard

Factors

hazard

risk

affecting

mitigation

# **Key knowledge**

specific hazard. For example, mitigation strategies for a volcanic eruption are unlikely to be successful in the event of an avalanche. Mitigating the risk of natural disasters is also very expensive – so HICs will have more effective strategies in place and LICs are therefore disadvantaged and more dependent on international assistance.

The process of trying to mitigate – reduce – the effects of natural hazards. This will need to be tailored for each

There are several factors that increase the number of people at risk from natural events. **Poverty** means people are more likely to build in hazardous (cheaper!) areas to a lower standard. Farming relies on nutrients. Hazardous areas such as flood plains and areas near volcanoes inherently have more nutrients – so people put themselves at risk to get higher yields. Climate change is increasing extreme weather events – meaning more people at risk from floods and droughts. With more heat and energy, storms are becoming more powerful. **Urbanisation** means more people in densely populated areas and so natural events will cause more casualties and damage.

# 6. Tectonic hazards vary between contrasting levels of wealth

		LIC \$1190	HIC \$40,000	Explanation	
	EarthquakeNepal 2015New Zealand 2016				
Primary effects \$\displays 8,632 \text{ died.} \\displays 499,000 \text{ homes destroyed.}			<ul><li>2 died.</li><li>Only 36 red tag buildings.</li></ul>	NZ's buildings are EQ proof. Poor quality in Nepal.	Preparation

# Secondary effects

ğ	US\$5 billion in damage
	4 million homeless, no

mages.	US\$8.5 billion in damages
s, no water.	200 homeless from Waiau

	expensive infrastructure.
hours.	Not adequate in Nepal,

NZ damage costs  $\uparrow$  as

**Immediate** India-search/rescue 15mins 200 evacuated in 24 relied on aid. NZ had Shelter- Kathmandu tent city Power restored in 24 hrs. responses plans. Long term Took 2 years to repair road to Tibet. Road/rail repaired in 2yrs. Slow in Nepal. Very fast in NZ as more money. responses

Key idea

Protection

**Key knowledge** 

existing buildings must be built to strict guidelines that would protect people from future earthquake hazards. Protection involves constructing buildings so that they are safe to live in and will not collapse. An earthquake-proof tower block may have steel frames that can sway, rubber shock absorbers in the foundations, and open areas outside for people to assemble. In the context of tropical storms, protection would involve storm shelters to protect people with food and water for the duration of the storm.

Many areas prone to earthquake hazards now use

building codes. Any new building or adjustment to

practise for an earthquake in earthquake-prone countries. They have drills in all public buildings so that people know what to do in the event of an earthquake. This helps to reduce the impact and increases people's chance of survival. *In the context of tropical storms, this involves* people understanding where to go (shelters!).

Hospitals, emergency services and residents

Prediction

Prediction involves using seismometers to monitor earth tremors. This is a big clue about volcanic eruptions and allows good predictions when coupled with other data e.g. temperature changes in the rock or tiltmeters indicating changes in the angle of slope. However, while experts know where earthquakes are likely to happen, it's impossible to accurately predict when. In the context of tropical storms, this is essentially about weather forecasting.

Weather	Weather Hazards		
Key Idea	Key knowledge		
What causes global weather and climate?	It is all to do with the circulation of air and convection currents! The most important influence on variations in climate is LATITUDE. This is because of the Earth's curved surface. The Equator receives much higher INSOLATION (solar heating) than the Polar latitudes. It is, therefore, warmer.		
How does Global Atmospheric Circulation work?	<ul> <li>Air sinks towards the ground surface because it is cool and more dense, forming areas of high pressure (for example, the North Pole); wind on the ground move outward from these areas.</li> <li>Air that is rising from the ground surface because it is warm and less dense forms areas of low pressure (for example, the Equator); wind on the ground move towards these areas of low pressure.</li> <li>These winds are distorted by Earth's rotation, and curve as they move from areas of high to low pressure.</li> <li>Surface winds are important in transferring heat and moisture from place to another.</li> <li>Pressure belts and winds are affected by seasonal changes. The tilt and rotation of the Earth causes changes in the position of the overhead sun, which means the pressure belts and winds move North during the summer and South during the winter.</li> </ul>		
Lifecycle of a	• A strong upward movement of air draws water vapour up from the warm (27°C) ocean surface.		

tropical

Affects of

change on

climate

tropical

storms

storm

# ards

• Evaporated air cools as it rises and condenses to form thunder clouds.

• The storm is carried across the ocean by prevailing winds, gathering strength.

Distribution- Climate change will cause tropical storms to be distributed more evenly all over

the world. This is because there will be warmer oceans able to support storms where they

• Intensity- Climate change will cause tropical storms to become more intense. This is because

the sea is warmer and will be able to provide more energy for stronger storms.

• As the air condenses it releases heat which powers the storm.

• Once the land is reached the storms energy supply is cut off. Friction with the land will cause the storm to weaken.

• Frequency- Climate change will not affect the frequency.

Smaller thunderstorms join to a giant spinning storm.

• The eye of the storm is now formed.

used to be cold.

**Tropical** Storm sinks towards the ground surface because it is cool and more dense, forming areas of high

**Key terms** 

Convection

Distribution

Frequency

Intensity

Air mass

Continental

Maritime

Impact/Effect

Response

Cause

Currents

**Definitions** 

A natural hazard that occurs when warm tropical air rises

over a body of water which is at least 27°C, to create an

reaches high altitudes powerful winds spiral around the

calm central point (the eye of the storm). The moisture

Warm less dense matter rises whilst cooler more dense

Where something occurs, within a geographical and how

area of intense low pressure. As this warm, moist air

condenses leading to heavy rainfall. Also known as:

matter, sinks. This happens in a 'cycle' called a cell.

How powerful something is e.g. a tropical storm.

A large volume of air which acts in certain ways

depending on where it came from, what it has passed

Something originating from a landmass e.g. weather

Something which originates from the seas/oceans e.g.

weather which comes to us from the Atlantic.

The result of what happened. Can be primary

Can be short term (hours/days) or long term

(hours/days) or secondary (weeks/months/years).

How people reacted and tried to overcome the effects.

hurricanes, typhoons and cyclones.

it is spread out i.e. evenly, uneven, etc.

over and whether it is 'hot' or 'cold'.

The reason for something happening.

systems coming from Africa.

(weeks/months/years).

How often something occurs.

# **Weather Hazards**

Key knowledge

Key

Idea

<b>Causes</b> of climate change	<ul> <li>Natural changes are caused by volcanoes, changes in the tilt and orbit of the Earth (Milankovic cycles) and variations in solar output from the sun.</li> <li>Human-induced changes are caused by the burning of fossil fuels (releasing CO2), agriculture (releasing methane) and other activities which contribute to an increase in the three greenhouse gases building up in</li> </ul>	<ul> <li>Ocean temperatures over 27C.</li> <li>Low wind shear – did not destroy storm when</li> <li>it was growing.</li> <li>Coriolis effect helped rising winds to spiral</li> <li>Haiyan did not lose energy passing over</li> <li>Philippines archipelago.</li> </ul>	Heaviest, prolonged rainfall since 1910. 350 mm fell in January and February, 100 mm above average.  High tides and storm surges swept water up the Bristol Channel slowing normal river discharge and causing rivers to overtop banks and flood.  Rivers had not been dredged for 20 years so river channels clogged with sediment.
<b>Effects</b> of climate change	<ul> <li>Positive effects can include increased productivity and crop yields in some areas and enable some areas previously too cold to be habitable, to become useful.</li> <li>Negative effects can include increased extreme weather events (distribution and intensity) alongside rising sea levels displacing millions of people and increased desertification of marginal land (Sahel/Thar).</li> </ul>	Social —  • 50% of houses destroyed  • 4.1 million people homeless  • 6190 people died many due to storm surge.  Economic -  • \$12 billion US of damage  • 75% of farmers and fishermen lost their income (30,000 fishing boats destroyed)  Environmental -	<ul> <li>Social –</li> <li>600 homes flooded.</li> <li>Power supplies cut off to many people.</li> <li>Villages cut off by floods e.g. Moorland.</li> <li>People unable to attend school, visit friends etc.</li> <li>Economic –</li> <li>Cost of floods over £10 million.</li> <li>Local businesses unable to trade.</li> <li>14000 HA of farmland underwater for 4 weeks so</li> </ul>
Climate change <b>adaptions</b>	<ul> <li>Efficient Water Management to help reduce the issues of drought and famine.</li> <li>Adapting agricultural practices to make use of drought/disease resistant crops and sustainable strategies to conserve water/soil/nutrient cycling.</li> <li>Adjust ways of living to reduce impacts of heat stroke,</li> </ul>	<ul> <li>An oil barge was holed and leaked 800,000 L of oil.</li> <li>Huge amounts of debris carried back out to sea.</li> <li>Social –</li> <li>12000 evacuation centres set up to help the homeless.</li> </ul>	<ul> <li>14000 HA of farmland underwater for 4 weeks so crops destroyed.</li> <li>Environmental -</li> <li>Floodwaters contaminated with sewage, oil and chemicals .</li> <li>Stagnant water had to be re-oxygenated before being pumped back into rivers.</li> </ul>
Climate change Cl mitigations	<ul> <li>Carbon capture is where we store carbon rather than releasing to the atmosphere.</li> <li>Afforestation is planting trees to act as a carbon sink.</li> <li>International agreements involve countries agreeing to reduce emissions and overcome issues.</li> <li>Sustainable energy production is not releasing massive amounts of carbon dioxide during energy production.</li> </ul>	<ul> <li>UK government sent family.</li> <li>Shelter kits.</li> <li>Economic –</li> <li>UN and countries e.g UK donated financial aid.</li> <li>British Red Cross helped fund the rebuilding of fishing boats.</li> <li>'Cash for clear up' strategy from government.</li> <li>Environmental -</li> <li>oil spill cleaned up.</li> </ul>	<ul> <li>Social –</li> <li>Homeowners tried to protect homes.</li> <li>Villagers cut off by floods used boats to access shops/school.</li> <li>Economic/ Environmental –</li> <li>£20 million Flood Action Plan to reduce risk of future flooding e.g. raise roads and riverbanks and dredge 8km of River Tone and Parrott.</li> </ul>

**Typhoon Haiyan** 

Somerset floods

# **Christian beliefs**

# **Beliefs**

# Nature of God

- God is all powerful; he created the world, lives as the Trinity, is Transcendent, almighty and divine.
- The Trinity is shown through the incarnation.
   The creation story tells of the "Spirit of God"
   (Holy Spirit) being present in God's creation.
   Trinity is shown in the Apostles Creed.
- God is **omnibenevolent**, shown through the atonement of Jesus and teachings such as the Good Samaritan and the Prodigal Son.

# Jesus

- Jesus was the incarnation of God; he is part of the Trinity. This is why he can perform miracles and was resurrected.
- Matthew and Luke's Gospels talk about the immaculate conception and Jesus as the Messiah.
- Jesus' death atoned the sins of mankind, so they could gain forgiveness and salvation from God.
- Jesus was crucified on Friday. He resurrected on Sunday and lived for 40 days before ascending to heaven.

# Suffering

- Individual suffering is God being JUST. He must punish those than sin.
- God gave mankind Free Will to live as they please. People can be tempted by the devil to commit sin and this results in their suffering.
- Suffering can be a test of faith from God.
- Christians believe that suffering is part of life; it is part of God's plan. He is transcendent and must be trusted.

# The Apostles' Creed

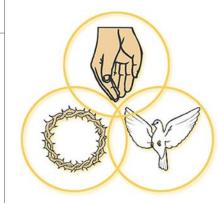
I believe in God, the Father almighty, creator of heaven and earth.

I believe in Jesus Christ, his only Son, our Lord, who was conceived by the Holy Spirit, born of the Virgin Mary, suffered under Pontius Pilate, was crucified, died, and was buried; he descended to the dead.

On the third day he rose again;

he ascended into heaven,
he is seated at the right hand of the Father,
and he will come to judge the living and the dead.

I believe in the Holy Spirit, the holy catholic Church, the communion of saints, the forgiveness of sins, the resurrection of the body, and the life everlasting. Amen.





Key terms	Definitions
Ascension	Jesus went up to Heaven
Atonement	Jesus make up for our sins by dying on the cross. His sacrifice.
Holy Spirit	The power and presence of God around.
Immanent	God is active/involved in our world.
Incarnation	God lives through Jesus.
Judgement	Judgement Day: Day at death Final Judgement: End of time, Jesus returns, dead and living judged a last time.
Omnibenevolent	God is all loving
Omnipotent	God is all powerful
Omniscient	God is all knowing
Reconciliation	To make up, retore a relationship.
Resurrection	Resurrection of Jesus. Resurrection of soul to Heaven. Resurrection of body at Final Judgement.
Salvation	Acceptance into heaven. Through Grace (love), Law (actions), Jesus (atonement).
Trinity	God as 3 parts. Father, Son, Holy Spirit.
Transcendent	God is beyond our world understanding, time and space.

# **Christian beliefs**

Story of Job

**Original Sin** 

**Parables** 

Afterlife

# Religion and Life

_			

# **Beliefs**

- Job is a faithful man to God. Satan (devil) asks God if he can test Job's faith.
- Job is tested by cattle stolen, children killed, Job gets a disease.
- Job remained faithful throughout, God rewarded him for his faith.
- Adam and Eve, tempted by devil (snake) to eat apple from forbidden Tree of Knowledge.
- God punished them by making them mortal; Adam life hardship. Eve - women would have painful childbirth and have to obey men.

**Prodigal Son**: Fathers inheritance spent.

- Forgiveness of son. • Lazarus and rich man: Rich man's sins, went to
- Hell. Sheep and Goats: Judgement day. Sheep to God
- **Heaven:** Spiritual or physical. Place of peace, no suffering. With God.

the shepherd, Goats to hell.

- Hell: separation from God; caused by rejection of
- God.

# **Key Bible Quotes: Christian Beliefs**

- "Nothing is impossible with God"
- "In the beginning God created the heavens and earth"
- "The Word became flesh and lived for a while among us"
- "God loved the world so much he gave his only Son"
- "As we forgive those that trespass against us"
- "Lets not love with words ... but with our actions"

(Quotes also in Apostles Creed)

# **Beliefs: CREATION**

- 6 Days, rested on the 7<sup>th</sup>. God created world as a gift for mankind, because he is omnipotent and omnibenevolent. World is 6,000 years old.
- Belief that the **Holy Spirit** is present in creation "Spirit of God" Genesis.
- Creation in John (Also Literalist)

Literalist Christian

- In the Book of John in the Bible it talks about 'the Son' as part of the Holy Trinity and how the Son was involved in the Creation; showing that God as the trinity was a concept right from the beginning.
- Non Literalist Christian
- World created by God because he is omnipotent and omnibenevolent. Took 6 longer stages because the word in the Bible used to describe the days was 'yom', but Yom can mean period of time, signifying longer.
- Can believe God created the Big Bang to start everything in existence off.
- Can believe Theory of Intelligent Design: Science and religious idea: God created the initial species over billions of years with the ability (intelligence) to evolve and adapt themselves.
- Philosophers (Also non literalist)
- Paley: World is so complex and everything is intertwined and connected, this can't be by chance... there must be a designer... this must be God. (The watch in forest idea)
- Thomas Aquinas: First Cause: Everything in nature has a cause, nothing happens by itself. Therefore tracing back all causes, there must be a cause at the beginning so powerful to not need to be caused. This cause must be God. (Like domino effect)

- Humanists (Science)
- Believe the Big Bang Theory explosion 14 billion years ago started creation. First things to be created: Atoms, gases...over time planets and sun... 3 billion years ago life developed. Believe Theory of Evolution: Species died out (Natural Selection) or adapted and evolved to survive. (Darwin's theory).
- Creation of Man
- Literalists: God made man (Adam) from dust/soil and Eve from Adam's rib. (Genesis). God created man in his image; meaning a connection to God.
- Humanists: Evolution of man from ape, took roughly 6 million years to adapt and evolve.

# **Key Quotes: Creation**

"In the beginning God created the Heavens and the Earth" Genesis "God made man in his image" Genesis, God gave man "Breath of life" Genesis God created man to "rule over" his animal creations. Genesis "We can find beauty and wonder in what science shows us." Richard Dawkins Humanist





	Beliefs: ENVIRONMENT AND ANIMALS		Key terms	Definitions	
<ul> <li>Christian</li> <li>Gods creation needs protecting through stewardship.</li> <li>Groups like Green Christian promote and voice environmental concerns through online social media</li> <li>Pope Francis wrote Papal letter 2015 calling for action to help the environment</li> </ul>			Darwin	Scientist: Theory of Evolution	
		nline and	Dominion	The Christian belief that God created humans with dominance and could rule over the earth	
	• Dominion means Christians can eat meat, animals were given to use by God. Jesus		Genesis	First book of the Bible; where creation is mentioned	
	also. However, they may eat free range. Dominion means <b>animal experimental</b> for human benefit can be justified		Euthanasia	Assisted suicide. Most commonly when someone chooses to end their life due to suffering	
Muslim	<ul> <li>God's creation needs protecting through stewardship.</li> <li>Groups like IFEES promote and voice environmental concerns and scarcity of futur</li> </ul>	e resources.	Halal and Haram	Allowed and forbidden in the Qur'an for Muslims	
	They ruin conservation projects like <b>Green Mosques</b> .  • Muslims will eat <b>Halal</b> meat (killed quickly no suffering). But pork is <b>Haram</b> .		Hippocratic Oath	Oath doctors take to aim to preserve life, benefit patients and do not harm.	
Humanists	• Humanists UK promote stewardship. Campaign slogans "One Life One Planet". Planumanist Forest project 2022. Other events community clean ups, voicing opinion			Centre for end of life care	
Buddhist	Are vegetarian: 5 Precepts do not harm any living thing. 4 Noble Truths avoids suf	fering.	Literalist	Religious person that takes scripture word for word	
	Beliefs: MEDICAL ETHICS		Pro Life	Against abortion because it kills a life	
Catholic	Believe in Sanctity of Life – abortion and euthanasia are a sin	HANASIA	Pro Choice	Support of abortion, so the woman can choose	
	<ul> <li>Only God has the authority and right to take a life.</li> <li>Life begins at conception</li> </ul>	di		Religious person that take the principle ideas of scripture for belief (but not their literal meaning)	
Humanists	If someone is suffering from a <b>terminal illness</b> , it is more <b>humane</b> to allow		Sanctity of Life	Life is precious and special and should not be ended	
and Buddhists	and them to die, if this is their <b>choice</b> .  Buddhists  • Choice over our own bodies and death  • 4 Noble Truths is to avoid suffering		Stewardship	Belief that religious people have been given the responsibility by God to look after his creation	
Muslims	Abortion - last resort. Abortion allowed before ensoulment – when a foetus	Key Quote	s: Environment /	Medical Ethics	
	<ul> <li>has soul/life at 120 days.</li> <li>Abortion allowed if mothers life at risk, rape or disability.</li> <li>Always against euthanasia – Sanctity of Life and life is a gift from God. It is against predestination</li> </ul>	"The world "We need to		earth is the Lord's and everything in it" Bible world is green and beautiful, and Allah has appointed you his stewards over it." Hadith need to use all our science and knowledge to protect the future." Richard Dawkins ur God, give life and take it away" Bible	
Christians	<ul> <li>Christians allow abortion if mothers life at risk, rape and disability.</li> <li>Most Christians against euthanasia, however God gave free will and is all loving – would he want to see suffering?</li> </ul>	"Thou shall not kill" 10 Commandments			

# **Key Grammar**

# **Describing yourself – using key basic verbs**

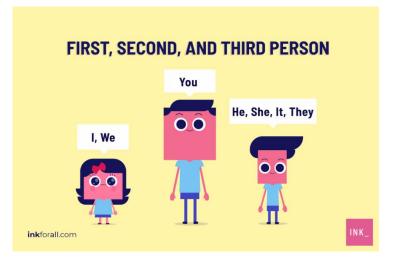






In Spanish, you normally don't bother using the words for 'I', 'you', 'he' etc

Pronoun	ser (to be)	tener (to have)	llamarse (to be called)
yo (1)	soy (am)	tengo (have)	me llamo (am called)
tú (you)	eres (are)	tienes (have)	te llamas (are called)
él / ella / Usted (he/she /you)	es (is)	tiene (has)	se llama (is called)
nosotros (we)	somos (are)	tenemos (have)	nos llamamos (are called)
vosotros (you)	soís (are)	tenéis (have)	os llamáis (are called)
ellos / ellas (they)	son (are)	tienen (have)	se llaman (are called)



NB:

**tú** (you) = you (informal; talking to younger people, people you know)

**Usted** = you (formal; talking to older people, adults, people you don't know)

# Using reflexive verbs

This is a group of verbs which have an extra **pronoun**. You have met one already when you give your name.

me llamo = I am called LITERALLY I call myself. This is what the 'me' stands for.

<b>llevarse</b> (to get on with)	pelearse (to argue)	П
me llevo	me peleo	
te llevas	te peleas	
se lleva	se pelea	
nos llevamos	nos peleamos	
os lleváis	os peleáis	
se llevan	se pelean	
	me llevo te llevas se lleva nos llevamos os lleváis	me llevo me peleo te llevas te peleas se lleva se pelea nos llevamos nos peleamos os lleváis os peleáis

# **Examples:**

me llevo bien con mis hermanas = I get on well with my sisters mi tío se pelea a menudo con la policía = my uncle often argues with the police mis primos se llevan bien con sus padres = my cousins get on well with their parents nos peleamos siempre = we always argue



# **Key grammar**



# **Using infinitives**

The *infinitive* form of the verb can be used to help give opinions.

me gusta **ver** / odio **ver** / me encanta **leer** (I like **to watch** / I hate **to see** / I love to **read**). Most infinitives end in –ar, but al large group end in either –ir or –er too!

If you want to say 'in order to do something' use para + infinitive

uso mi móvil para mandar mensajes – I use my phone to send photos

# Using adverbs of time

<u>Develop your sentences by making references to when / how often you do something.</u>

Notice that a lot of the time, words ending in —**Ily** in English will end with —**mente** in Spanish

normalmente - normally

generalmente – generally

tipicamente - typically

a veces – sometimes

a menudo – often

una vez por la semana – once a week

# Using negatives

Making negative sentences will help give your responses contrast.

**no** – not / don't

**nunca** – never

Examples:

**no** veo la tele– I don't watch TV

**nunca** veo los programas de deporte – I never watch sports programmes



# **Using past tenses**

When talking about something you've done, you will be using either the **preterite** or **imperfect** tense.

Reminder – it's all in the endings!

Preterite – states something you did, a one-off event.

escuché – I listened

compré – I bought

**fui** – I went / I was

**veí** – *I saw* 

tuve - I had

Imperfect tense will describe what something was like or what you were doing; it can also mean what you used to do

escuchaba – I was listening / I used to listen

compraba – it was

iba − I was going / I used to go

era - I was / I used to be

**veía** – I was watching / I used to watch

tenía – I used to have / I had



Useful guide if you're confused by past tenses!





# **Key Grammar**

# Describing yourself – using key basic verbs







Pronoun	être (to be)	avoir (to have)	s'appeller (to be called)
je (/)	suis (am)	ai (have)	m'appelle (am called)
tu (you)	es (are)	as (have)	t'appelles (are called)
il / elle / on (he/she/one)	est (is)	a (has)	s'appelle (is called)
nous (we)	sommes (are)	avons (have)	nous appellons (are called)
vous (you)	êtes (are)	avez (have)	vous appellez (are called)
ils / elles (they)	sont (are)	ont (have)	s'appellent (are called)

# FIRST, SECOND, AND THIRD PERSON You I, We I, We Indicate the second of the second

NB:

**tu** = you (informal; talking to younger people, people you know)

vous = you (formal; talking to older people, adults, people you don't know or
groups)



# Using reflexive verbs

This is a group of verbs which have an extra **pronoun**. You have met one already when you give your name.

Je m'appelle' = I am called LITERALLY I call myself. This is what the 'me' stands for.



Pronoun	s'entendre (to get on with)	se disputer (to argue)
je (I)	m'entends	me dispute
tu (you)	t'entends	te dispute
il / elle / on (he/she/one)	s'entend	se dispute
nous (we)	nous entendons	nous disputons
vous (you)	vous entendez	vous disputez
ils / elles (they)	s'entendent	se disputent

# Examples:

je m'entends bien avec mes soeurs = I get on well with my sisters mon oncle se dispute souvent avec la police = my uncle often argues with the police mes cousins s'entendent bien avec leurs voisins = my cousins get on well with their cousins nous nous disputons toujours = we always argue

# **Key grammar**



# **Using infinitives**

The *infinitive* form of the verb can be used to help give opinions.

j'aime **regarder** / je déteste **voir** / j'adore **lire** (I like **to watch** / I hate **to see** / I love to **read**)

If you want to say 'in order to do something' use pour + infinitive

j'ustilise mon portable **pour** envoyer des photos – I use my phone to send photos

# Using adverbs of time

<u>Develop your sentences by making references to when / how often you do something.</u>

Notice that a lot of the time, words ending in —**Ily** in English will end with —**ment** in French

normalement - normally

géneralement – generally

habituellement - usually

quelquefois – sometimes

des fois – at times

une fois par semaine – once a week

# **Using negatives**

Making negative sentences will help give your responses contrast. <u>Notice</u> <u>they go round the verb.</u>

**ne...pas** – not / don't

**ne...jamais** – never

**ne...que** – only

Examples:



je ne regarde pas la télé – I don't watch TV

je **ne** regarde **jamais** des émissions de sport – I never watch sports programmes

je n'écoute que la musique hip-hop (I only listen to hip-hop)

# **Using past tenses**

When talking about something you've done, you will be using either the perfect or imperfect tense.

Reminder:

use 'avoir' or 'être' + past participle to make the **perfect tense**:

j'ai vu – I have seen / I saw

j'ai regardé – I have watched / I watched

nous avons écouté – we listened (to)

je suis allé au cinéma – I went to the cinema

nous sommes allés à un concert – we went to a concert

The **imperfect tense** will describe what something **was** like or what you **were doing**.

c'était – it was

j'aimais – I used to like

j'habitais – I used to live

**je regardais** – I was watching / I used to watch

j'avais – I used to have / I had

# avoir – reminder!

j'ai = I have tu as = you have il / elle a = he / she has

nous avons = we have
vous avez = you have
ils / elles ont = they have

# être – a reminder!

je suis = I am
tu es = you are
il /elle est = he / she is

nous sommes = we are
vous êtes = you are
ils / elles sont = they are

Useful guide if you're confused by past tenses!



# LINE

A LINE is the path left by a moving point, eg. A pencil or a brush dipped in paint. A LINE can take many forms, eg. horizontal, diagonal or curved. A **LINE** can be used to show contours, movements, feelings and expressions.

# **TEXTURE**

**TEXTURE** is the surface quality of something, the way something feels or looks like it feels. There are two types of texture: ACTUCAL TEXTURE and VISUAL **TEXTURE.ACTUAL TEXTURE**: really exists so you can feel it and touch it VISUAL **TEXTURE**: created using different marks that represent actual **TEXTURE** 

# SHAPE

A SHAPE is an area enclosed by a LINE. It could be just an outline or it could be shaded in.

**FORM** is a three dimensional shape such as a sphere, cube or a cone.

Sculpture and 3D design are about creating FORMS

# TONE

**TONE** means the lightness or darkness of something. This could be a shade or how dark or light a colour appears.

# COLOUR

There are 3 primary COLOURS: RED, YELLOW, BLUE

By mixing any 2 PRIMARY **COLOURS** together you create **SECONDARY** COLOURS; ORANGE, GREEN, **PURPLE** 

# **PATTERN**

**PATTERN** is a design that is created by repeating LINES, SHAPES, TONES or COLOURS.

Patterns can be manmade or natural.

# TERM 1 and 2





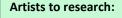












**Billy Kidd Rocio Montoya** Georgia O'Keeffe Karl Blossfeldt **Ellsworth Kelly Ernst Haeckel Christian La Croix Helen Ahpornsiri** Kate Malone Micheal Brennand-Wood Angie Lewin **Henry Moore Polly Morgan** 



# Natural forms are organic objects found in nature.

# This includes:

- Shells, seaweed, fish, sea life
- Plants, flowers, seedpods, leaves, trees
- Skulls, bones, DNA
- People, portraits, figures
- Patterns found in nature
- Fruit, vegetables, roots
- Animals, insects, birds, wings, feathers



















# **KEW GARDENS**

Kew Gardens is a botanic garden in southwest London. It houses 'the largest and most diverse botanical and mycological collections in the world'.

Founded in 1840, over the centuries, collections of plants have been displayed in glass houses and continues with pioneering research to this day.

One of the most famous glass houses is The Palm House. Designed and built by Decimus Burton and Richard Turner, the iron and glass building works with the natural textures and architecture of the plants it houses.

One of the other glass houses is The Temperate House, which is the world's largest surviving Victorian glass structure. It contains rare species of plants and tress from temperate regions of the world.



EXPERIMENT EXPLORE DIFFERENT IDEAS AND MEDIA OTHER ARTISTS WORK A RANGE OF TECHNIQUES

& PROCESSESS

SELECT

ANALYSE

ANNOTATE



EVIDENCE RECORD **PRESENT IDEAS** 

PRIMARY OBSERVATION DRAWING, PAINTING, PRINTING, PHOTGRAPHY, WRITING, PHOTPGRAPY... ANNOTATE

OUTCOME **PRESENT** FINAL IDEAS

CLEARLY RESPONDS TO ARTISTS EXPLORED

CONNECTION

CONCLUSION

# **ART ANALYSIS GUIDE**

# CONTENT/DESCRIPTOPN OF AN IMAGE

- What is it? (portrait/landscape/painting/mixed media etc)
- What is it about? What is happening? (describe the contents)
- Type of image? (black and white/colour/pencil etc)
- What is the theme of the image? Is there a greater meaning to the image?
- Materials/techniques used?
- Is there greater context to the image?
- What message does the image communicate?
- Do you know the year of the piece? What was happening in the world at the time? Does that have an influence on the piece?

# COLOUR

**BRIGHT BOLD** VIBRANT **PRIMARY SECONDARY TFRTIARY RADIANT VIVID** DULL CONTRASTING COMPLIMENTARY **HARMONIOUS** MONOCHROME **NATUARL** SATURATED **PASTEL** 

COOL

WARM

# SHAPE/FORM/SPACE

CLOSED OPEN DISTORTED FLAT **ORGANIC POSITIVE** NEGATIVE **FOREGROUND BACKGROUND** COMPOSITION **ELONGATED** LARGE **SMALL** 2D 3D **TWISTED JAGGED** 

# PATTERN AND TEXTURE

**BRIGHT** REPEATED DARK **UNIFORM FADED GEOMETRIC SMOOTH RANDOM** HARSH SYMMETRICAL **CONTRASTING SOFT INTENSE IRREGULAR SOMBRE UNEVEN** STRONG ROUGH **POWERFUL BROKEN** LIGHT **GRID MEDIUM FLAT** DARK **WOVEN** LAYERED **ORGANIC** DEPTH **SMOOTH** DEVELOPED **ABSTRACTED SOFT** 

TONE

# **PROCESS**

- What type and direction of light was used/created? (harsh, soft, artificial lamp/natural lighting)
- How was this image 'built'?
- What materials were used in this image and does that impact how you will work/experiment?
- What kind of patterns and/or textures are in the image? How would you describe them?
- Describe the use of tone/texture/detail/scale/ perspective/composition/colour within the image.

# FORM/VISUAL ANALYSIS

- What do you look at first?
- How does your eye move around the frame?
- How is the image composed: lines, shapes, areas of tone?
- What was the artist's viewpoint? (worms eye view/birds eye view)
- Tone is the image high or low contrast? How and why?
- Line describe the lines in the image? How have they been positioned in relation to the rest of the composition? What effect does his have?

# **PERSONAL OPINION**

- What was your first reaction?
- What is the mood of the image?

LINE

FLUENT

**CONTINUOUS** 

CONTROLLED

LOOSE

**POWERFUL** 

STRONG

**ANGULAR** 

**FLOWING** 

LIGHT

DELICATE

SIMPLE

THICK

THIN

**BROKEN** 

**OVFRI APPING** 

LAYFRED

MARK MAKING

- What is the message of the image?
- What do you like or dislike and why?
   Use art specific language and justify your opinions.
- How will this work influence your own work? Create a clear link between them.
- How does the image make you feel?
   Why do you think you feel like this?
- Does the colour, texture, form, detail, tone or theme of the image affect your mood? How and why?



# **GCSE Business Studies (Edexcel)**

# **Topic 1.1.1 Dynamic Nature of Business**

# **Core Knowledge**

The world changes constantly, and therefore so do consumer needs, and so businesses must therefore be dynamic to respond to these changes, or they risk failure.

Business ideas come about because of:

Changes in technology Changes in what consumers want Products and services becoming obsolete

Business ideas come about because

An entrepreneur has a completely original idea – this is invention Adapting an existing idea – this is innovation

Adaptions to products can be:

New flavours
Different colours / pack sizes
Online access to a product or service
Offering personalisation

# Topic 1.1.2 Risk & Reward

# Core Knowledge

Starting and running a business are risky activities. A large percentage of start -up businesses fail in the first five years.

Risks are things that can go wrong. These include:

Business failure Financial loss

Lack of security due to not having a regular income

Business can fail because:

An entrepreneur does not know the market well Not having enough capital to start the business Poor decision making Competition from other businesses Not meeting the needs of customers

Rewards are what can be achieved through business success.

These include:

- Profit
- Personal independence

# **Topic 1.1.3 Role of Enterprise**

# Core Knowledge

A business will produce goods or services

Goods or services must meet the customer needs, or they will not sell

The entrepreneur is the uses and organises the four factors of production in order to produce goods or services.

A business can sell its product at a higher price than the cost of the manufacturing by adding value. This can be through:

**Branding** – creating an image for a product that sets it apart, e.g. Apple logo

Quality – for example using better cuts of meat in a pie

Design – unique features and designs can lead to consumers paying higher prices

**Convenience** – when something saves a customer time, this can lead to them paying a higher price, e.g. pre-prepared vegetables

BUSINESS: Creating informed, discerning employees, consumers and future leaders

USPs – a characteristic or feature of a product that can not be replicated by an alternative

A business will be likely to use a combination of the above.



# **GCSE Business Studies (Edexcel)**

# **Topic 1.2.1 Customer Needs**

# Core Knowledge

Customer needs are the specific wants or needs that buyers have when purchasing goods

Different customers have different needs

If a business knows and understands its customers' needs it is in a better position to produce the products that customers want, in the way that they want them, leading to increasing sales, and so contributing to long term survival

Customer needs are:

- Price that reflects the quality of the product, and is low enough to match consumer incomes
- Quality usually more important for those with higher income levels
- Choice consumers like to select from a range of options, e.g. different flavours, colours or packet sizes
- Convenience making life easier for customers
- Efficient and reliable service such as having enough stock, or longevity of a product
- Design how good a product looks

BUSINESS: Creating informed, discerning employees, consumers and future leaders

# **Topic 1.2.3 Market Segmentation**

# **Core Knowledge**

Markets can be segmented by

**Location**, i.e. where you live **Demographics**, e.g. targeting families rather than single people; home owners rather than renters

**Lifestyle**, i.e. the choices made about how to spend free time and hobbies consumers have

Income, i.e. by how much you earn, the job you do or your social class Age, i.e. by how old you are

A market map can be used to position and compare products in a market

Allows a business to identify the competition the business faces and any potential gaps in the market

BUT....this may be simplistic and is based on subjective opinion so may not be reliable



# **Topic 1.2.2 Market Research**

# Core Knowledge

The purpose of market research is:
 To identify and understand customer needs
 Identify market gaps
 Reduce risk
 Inform business decisions

Methods of research are:

- Primary collecting brand new data to meet the specific needs of the business
- Secondary using research that has already been gathered

	Benefits	Limitations
Primary		
	Information secret from competitors	Can be time consuming Results may be inaccurate
Secondary	Easy to find	May be inaccurate
	Cheap or free to obtain Can be out-of-date	
	Good overview of whole	Likely to be unrelated to busi-
	market	ness needs

Social media has made it easier to collect data using comments, reviews, surveys, and online focus groups Trends can be identified from tracking hashtags

# **Topic 1.2.4 Competitive Environment**

# **Core Knowledge**

A business will need to compete in different ways depending on how competitive the market is. Some firms will choose to use differentiation to stand out from the others, e.g. through the use of branding or offering a USP.

Ways to compete:

**Price** – offering lower prices can increase demand, but reduces profit margins, and can increase costs. Other businesses may do the same and result in a price war

**Quality** – improving the quality of raw materials or ingredients, but this increases costs, although customers may be willing to pay higher prices

**Location** – can attract customers if it is easy to access, has parking, or has a lot of passing trade. However, good premises cost more

Product range – offering lots of choice to the consumer or specialising to provide a better service

**Customer service** – through great staff, although this costs to train them, or excellent after-sales service

A business may be able to gain a competitive advantage though one of these methods to order to encourage repeat custom and great reviews



# Welcome to the GCSE Music Journey

# **AOS1 Musical Forms and Devices**

# <u>Topic 1 – The Development of Music</u>

# The Baroque Era: 1600-1750

Main composers: Bach, Handel, Vivaldi, Purcell Main features of the music:

- Use of ornaments and terraced dynamics.
- Energetic rhythmic movement.
- Major/Minor key system (diatonic).
- · Orchestras are mainly strings.
- Use of harpsichord, recorders, flute and horns.
- Use of basso continuo (see AOS 2).

# The Classical Era: 1750-1810

Main composers: Mozart, Beethoven, Haydn Main features of the music:

- Four sections to the orchestra.
- Melodies less complex than Baroque.
- More variety and contrast in the music.
- Frequent changes in mood, timbre and dynamics.
- Harpsichord replaced by piano.

# The Romantic Era: 1810-1910

Main composers: Chopin, Liszt, Wagner, Tchaikovsky

Main features of the music:

- Thematic ideas and use of the leitmotif (see AOS 3).
- Increased variation in dynamics.
- Use of chromatic notes and extended chords.
- Further expansion of the orchestra.
- Development of the brass section.
- Descriptive music and links to other art forms

# <u>Topic 2 – Musical Form and</u> Structure

In GCSE music, you must be able to identify the following forms:

Binary from - A B

**Ternary form** – A B A

Rondo form - A B A C A

Minuet and Trio – Minuet Trio Minuet

Variation from – Theme Variation 1, 2. 3 etc

Strophic form – A A A A

# Other key terms

- Monophonic One unaccompanied part or voice.
- Homophonic Many parts that move together. Melody and accompaniment is a type of homophonic texture.
- **Polyphonic** 2 or more different parts that are of equal importance.
- Unison All together. Could be considered monophonic if played at the same pitch.
- Parallel motion Parts move in the same direction.
- Contrary motion Parts move in different directions.
- Interval The gap/space between 2 different notes.

# **Topic 3 – Devices**

- Repetition The exact repeat of a musical idea.
- Contrast A change in the musical content.
- Anacrusis A lead in. A note or beat before the first full bar of a piece.
- **Imitation** When a musical idea is copied in another part.
- **Sequence** The repetition of a motif (short melody) in the same part but at a different pitch.
- Ostinato A musical pattern repeated many times. This is known as a riff in modern music.
- **Syncopation** Off beat or where the weaker beats of a rhythm are emphasised.
- Dotted rhythms A dot placed after a note. This increases
  the note by half its own value, giving a jagged effect to the
  rhythm.
- **Drone** A repeated or sustained note or notes held throughout a passage of music. The drone will be diatonic and use either the Tonic or the Tonic and Dominant notes.
- **Pedal** A held or repeated note, against which changing harmonies are heard.
- Canon A device in which a melody is repeated exactly in an other part while the initial melody continues and develops.
- **Conjunct movement** When the melody mainly moves in step.
- **Disjunct movement** When the melody 'leaps' from one note to another.
- Broken chord/Arpeggio A chord played as separate notes.
- Alberti bass A type of broken chord accompaniment.
- Regular Phrasing The balanced parts of melody.
- Motif A short melodic or rhythmic idea that has a distinctive character.
- **Chord progressions** A sequence or series or chords related to each other and in a particular key.
- Modulation The process of changing key.



# Essential Listening











# SOUGRITY

Flute, String orchestra (violins, violas, cellos, double basses) and harpsichord

(basso continuo)

# STRUCTURE

BINARY FORM



# Section A (repeated) Section B (repeated) Bars $0^2 - 16^1$ Bars $16^2 - 40^1$

(16 bars) (24 bars)

# Homophonic

melody and accompaniment



# BADINERIE

Knowledge organisor

7th movement of orchestral suite No. 2 by J.S BACH Composed in 1738-1739



# TEMPO

Allegro

### METRE RHYTHM 8



2/4

Anacrusis

Ostinato rhythms

mainly Quavers / semiguavers

Flute range (2 octaves pitch range):



2 main musical ideas. Use of ornaments and melodic devices (motifs, sequences). Triadic, disjunct and conjunct in places





# HARMONY & TONALITY

Diatonic with modulation to dominant minor B minor to dominant minor: F# minor





# **AOS2 Music for Ensembles**

# <u>Topic 1 – Timbre, Sonority and Texture</u>

**Timbre** - The tone colour or tone quality associated with a particular instrument. Refer to your instrument recognition sheet for more detail.

**Sonority** – The relative loudness and 'feel' of a sound when compared with other sounds.

**Texture** – The number of layers/parts in a piece and how they relate to each other:

- Monophonic A single melodic line with no accompaniment
- Homophonic Many parts that move together (same rhythm)
- **Polyphonic** A number of different melodic lines heard independently of each other.

**Unison** – When 2 or more musical parts that are the same, are played together (monophonic). **Chordal** – A type of texture where the parts

move together producing a series of chords (homophonic).

**Layered** - when more parts are added on top of each other to produce a richer texture.

**Melody and accompaniment** – A type of homophonic texture, where the tune is the main focus and is accompanied by other parts that move together.

**Countermelody** – When a new melody is heard at the same time as a previous melody.

**Round** – A type of **canon** in which voices sing the same melody but beginning at different times. The music repeats (goes round & round).

# <u>Topic 2 – Musical Ensembles</u>

The word ensemble applies to the number of performers in a group. If there are lots of performers in an ensemble it becomes a choir or an orchestra.

An ensemble may group together any combination of instruments from the same family or different families.

- **Duet** 2 performers
- Trio 3 performers
- Quartet 4 performers
- Quintet 5 performers
- Sextet 6 performers
- Septet 7 performers
- Octet 8 performers

# <u>Topic 3 – Chamber Music</u>

Basso Continuo – A type of accompaniment used in the Baroque era. The term means 'continuous bass' and consisted of a bass instrument and a chordal instrument.

**Baroque Sonata** – A piece of music that is played rather than sung.

**Trio Sonata** – A piece of instrumental music for 3 parts.

**String quartet** – One of the most popular types of ensemble with in the Classical era. It consisted of 2 violins, a viola and a cello.

# <u>Topic 4 – Musical Theatre</u>

In musical theatre, the music helps tell and support the storyline and characterisation. The audience will see the storyline or plot unfolding through the music, the acting and the dance, supported by the accompanying orchestra/band.

Different types of musical. Can you research an example of a musical for each type?

- Musical drama
- Disney musical
- · Classic musical
- Romantic musical
- Musical comedy
- Sung-through musical
- Juke box musical
- Film-to-stage musical

# MUSIC GCSE

# Essential Viewing



# Topic 5 – Jazz and Blues

Jazz and Blues are styles of music that emerged at the start of the 20<sup>th</sup> century in America.

- Pentatonic scale A scale consisting of 5 notes.
- **Blues scale** A minor pentatonic scale with an extra note (flattened 5<sup>th</sup>).
- Improvisation When music is spontaneously created during a performance.
- 12 Bar Blues A type of structure used in Jazz and Blues that consists of 12 bars.
- **Swing style** Characteristic of Jazz, in which notes are played with a relaxed dotted feel.
- Riff A short motif or pattern that is repeated.
- Rhythm section Typically consists of a bass player, a drummer and someone playing chords (pianist or guitarist).
- Standard A Jazz or Blues song that is really popular.

# **Texture**

Monophonic – single melodic line for an instrument or voice or when instruments/voices are unison

Homophonic – One main melody plus harmonic accompaniment of chords (inc. broken chords)

Polyphonic Texture – Number of melodic lines heard independently of each other.

# **Textural Devices**

**Unison** (2 or more musical parts sound at the same pitches at the same time - can be in octaves) (monophonic)

**Chordal** - parts move together producing a series or progression of chords (homophonic)

**Melody and accompaniment** – the tune is the main focus of interest and importance, and it is 'accompanied' by another part/parts which support the tune (homophonic)

**Canon** or imitation - the melody is repeated exactly in another part while the initial melody is still being played (polyphonic)

**Countermelody** – a new melody played at the same time as a previous melody

**Layered** – when more parts are added on top of each other

**Sforzando (sfz)** – a sudden, forced accent on a note or chord

**Colla voce** – When the accompaniment has to follow the vocal part, without strictly sticking to the tempo

**Recitative** – a vocal style that imitates the rhythms and accents of the spoken language

**Declamatory writing** – a type of vocal writing, similar to recitative in that it has speech-like quality

Sforzando (sfz) – a sudden forces accent on a note or chord

Rhythm Section – underlying rhythm, harmony and

Improvisation – music is made up on the spot

Swing style – dotted rhythm feel to the beat

**Call and Response** – Music sung or played by the leader

**Blues scale** – minor pentatonic scale + flattened 5<sup>th</sup>

Basso Continuo – continuous bass line

pulse of the accompaniment

Pentatonic – a 5 note scale

Stanza – another word for a verse

responded to by the rest of the group

Blues notes – flattened 3rds, 5<sup>th</sup>, 7<sup>th</sup> notes

Riffs – short repeated musical pattern

Duet – 2 performers

Trio – 3 performers

Quartet – 4 erformers

Quintet – 5 performers

Sextet – 6 performers

Septet – 7 performers

Octet – 8 performers

Jazz and Blues Trios

Vocal Ensembles: duets, trios, backing vocals

A work in several movements for 1 or 2 soloists + basso continuo

# **String Quartet**

Mvt 1 (sonata form)

Mvt 2 – slow (ABA or T&V)

Mvt 3 – moderate dance (minuet and trio)

# 12-bar structure

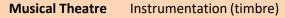
1, 1, 1, 1,

# **Trio Sonata**

Mvt 4 – fast sonata or rondo form

IV, IV, I, I,

V, IV, I, I/V



**Dynamics** Texture



and













S	keletal Syste	m
int	Bones @	

	<u> </u>			
Joint	Bones @ the joint	Type of joint	Movement	Muscles
Shoulder	Scapular Clavicle Humerus	Ball and Socket	Flexion, Extension, Abduction, Adduction, Rotation, Circumduction	Deltoid, Trapezius, Pectorals, Latissimus Dorsi, Rotator Cuff
Elbow	Humerus Radius Ulna	Hinge	Flexion, Extension	Biceps, triceps
Hip	Pelvis Femur	Ball and Socket	Flexion, Extension, Abduction, Adduction, Rotation, Circumduction	Gluteals, hip flexors
Knee	Femur Patella Tibia Fibula	Hinge	Flexion, Extension	Quadriceps, Hamstrings
Ankle	Tibia Fibula Talus	Hinge	Dorsiflexion Plantar Flexion	Gastrocnemius, Tibialis anterior

# **Types of Bone**

- Short
- Long
- Flat
- Irregular

# Functions of the skeleton

- Support
- Shape and Structure
- Protection of the vital organs
- Movement
- Mineral storage
- Blood cell production

# Features of a joint

- Tendon:
- Bursae
- Cartilage
- Joint capsule
- Synovial membrane
- Synovial fluid
- Ligaments

# **Muscular System**

Muscle	Movement	Sporting example	
Latissimus dorsi	Extension, adduction or rotation at the shoulder	Butterfly stroke	
Deltoid	Flexion, extension, abduction or overarm rotation at the shoulder	Front crawl	
Rotator cuff	Rotation and abduction at the shoulder	Bowling in cricket	
Pectorals	Adduction and horizontal flexion at the shoulder	Forehand drive in tennis	
Biceps	Flexion at the elbow	Upward phase of a bicep curl  During a jump shot in basketball	
Triceps	Extension at the elbow	During a jump shot in basketball	
Abdominals	Flexion at the waist	During a sit up	
Hip flexors	Flexion of the leg at the hip	Lifting the knee when sprinting	
Gluteals	Extension, rotation and abduction of the leg at the hip	Pushing the body forward when running	
Hamstrings	Flexion at the knee	Bringing the foot back before kicking a football	
Quadriceps	Extension at the knee	When performing a drop kick in rugby	
Gastrocnemius	Plantar flexion at the ankle	Standing on your toes in ballet pointe work	
Tibialis anterior	Dorsiflexion at the ankle	Bringing the toes up towards the shin when extending the legs in the long jump	

# **Antagonistic Muscle Action**

Muscles work in 'antagonistic muscle pairs'. One muscle of the pair contracts to move the body part, the other muscle in the pair then contracts to return the body part back to the original position. Muscles that work like this are called antagonistic pairs.

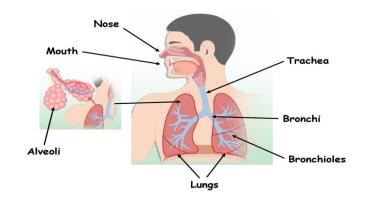
In an antagonistic muscle pair as one muscle contracts the other muscle relaxes or lengthens. The muscle that is contracting is called the agonist and the muscle that is relaxing or lengthening is called the antagonist.

When you perform a bicep curl, the **biceps** will be the **agonist** as it contracts to produce the movement, while the **triceps** will be the **antagonist** as it relaxes to allow the movement to occur.

# **Muscle Contraction**

*Isotonic muscle contraction* – results in movement

- Concentric muscle contraction muscle shortens
- Eccentric muscle contraction muscle lengthens *Isometric muscle contraction* – muscle contracts but no visible movement



# **Mechanics of Breathing**

# **Inspiration:**

- · The diaphragm contracts and flattens.
- The intercostal muscles contract which causes the rib cage to rise.
- Both these actions cause the chest cavity to increase in size / volume.
- This reduces the pressure in the chest cavity, due to this the air passes from the higher pressure outside of the lungs to the lower pressure inside the lungs.
- This causes the lungs to expand and fill the chest cavity

# **Expiration:**

- The diaphragm relaxes and bulges up, returning to its original dome shape.
- The intercostal muscles also relax causing the ribs cage to lower.
- Both these actions cause the chest cavity to decrease in size / volume.
- The reduction in the size of the chest cavity increases the pressure of the air in the lungs and causes it to be expelled.
- The air passes from the high pressure in the lungs to the low pressure in the bronchi and trachea.

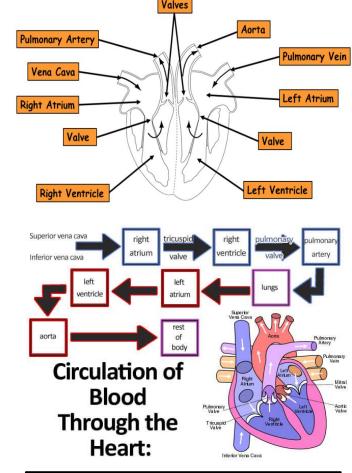
# Additional muscles used during inspiration and expiration during exercise:

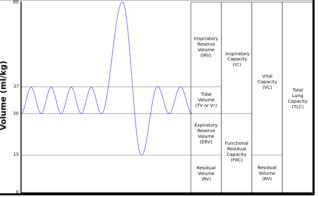
# **During inspiration:**

When exercising the **PECTORALS** and **STERNOCLEIDOMASTOID** muscles contract assisting the performer inhale air. These allow the chest cavity to further increase in size (have a larger volume) so more air can enter the lungs.

# **During expiration:**

When exercising the **ABDOMINAL** muscles contract assisting the performer exhale air. They help force air out of the lungs faster and so speed up expiration.





# **Redistribution of blood**

When we exercise blood is redistributed. The working muscles need more oxygen than other inactive areas of the body such as the stomach. Blood is diverted away from inactive areas to the working muscles.

**Vasoconstriction** means that the blood vessels constrict to make them smaller. Chemical changes signal the nervous system to constrict blood vessels to inactive areas.

**Vasodilation** means that the blood vessels dilate to make them bigger. Chemical changes signal the nervous system to dilate blood vessels that supply active areas.

# **Aerobic and Anaerobic Exercise**

Aerobic Exercise	Glucose + O <sub>2</sub> -> CO <sub>2</sub> + H <sub>2</sub> O + Heat + Energy
Anaerobic Exercise	Glucose -> lactic Acid + Energy

# **Excess Post-Exercise Oxygen Consumption (EPOC)**

- Is the additional amount of oxygen consumed after anaerobic exercise.
- Often referred to as Oxygen debt
- Refers to the amount of oxygen needed to recover after exercise
- Enables lactic acid to be converted to glucose, carbon dioxide and water
- Explains why we breathe deeply and quickly after vigorous exercise

# **Recovery from Vigorous Exercise**

Cool down

Massage
Ice baths

Manipulation of diet - Carbohydrates

Rehydration

# **Effects of Exercise**

# Immediate Effects of Exercise

Getting hot

**Getting sweaty** 

Having red skin

Increased depth and rate of breathing

Increased heart rate

# **Short-Term Effects of Exercise**

Tiredness and fatigue

Light headedness or nausea

Aching muscles

Cramp

**DOMS** 

# **Long-Term Effects of Exercise**

Change in body shape

Improved stamina

Increase in size of the heart

Lower resting heart rate (bradycardia)

# **Interpreting Heart Rate Graphs**

A = Heart rate is at its lowest at rest

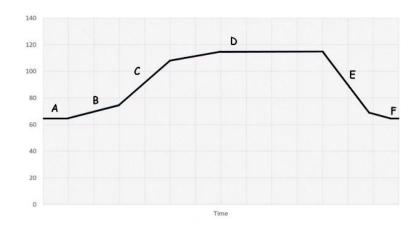
**B** = Immediately before exercise resting heartrate will increase. This is called an **anticipatory rise**; this is due to the release of the hormone adrenaline.

**C** = When you start to exercise the heart rate increases sharply. This is due to the demand of oxygen. **Cardiac output** increases

**D** = During continuous exercise heart rate levels because the heart rate is sustaining the amount of oxygen needed.

**E** = Immediately after exercise heart rate decreases sharply, this is because exercise has stopped and the demand for oxygen has reduced.

**F** = Heart rate slowly returns to its resting rate



# Non-ferrous metals

These do not contain iron, so have a higher resistance to rust and corrosion. They are not magnetic and tend to be more malleable than ferrous metals.

Туре	Properties	Composition	Melting point	Example uses
Aluminium	Greyish white: corrosion resistant, malleable, ductile, easily machined, good heat/electrical conductor, excellent strength-to- weight ratio, polishes well	Pure metal	660°C	Aircraft, foil, window frames, engine parts, drinks cans
Copper	Reddy brown: corrosion resistant, malleable, ductile, tough, easily machined, good heat/electrical conductor, good hot or cold working, polishes well	Pure metal	1100°C	Electrical wire, gas and water pipes, printed circuits, roofing
Brass	Yellow: corrosion resistant, easily machined, good heat/ electrical conductor, casts well, harder than copper, polishes well	Alloy: 65% copper 35% zinc	900–940∘C	Plumbing fittings, door fittings, locks, musical instruments

# Key terms

**Ductility:** ability of a material to deform by bending, twisting or stretching; ability to be drawn out without breaking. Ductility in metals increases with temperature.

**Malleability:** ability of a material to be permanently deformed in all directions without fracture. It increases with temperature.

**Hardness:** ability of a material to resist deformation, indentation or penetration. Hard materials can resist abrasion, drilling, impact, scratching, and wear and tear.

# **Properties**

The mechanical properties of metals define how they react to forces. A large force will deform metal. A temporary change is called elastic deformation and the metal will spring back into shape. A permanent change is called plastic deformation and the metal stays in the new shape. Three properties are ductility, malleability and hardness. All ductile materials are malleable but not all malleable materials are ductile.

Hard materials are often brittle, with a low resistance to impact, and break easily. This property is important for cutting tools such as saws, drills and files. Diamond is the hardest naturally occurring material and is measured at 10 on the Mohs scale (a scale that measures hardness). The mineral, talc is 1, aluminium is 2–2.9 and steels are 5–8.5.

# Ferrous metals

Ferrous metals contain iron (ferrite), so most have magnetic properties. Small amounts of other metals or elements may provide other properties. Ferrous metals are vulnerable to rust when exposed to moisture, except for stainless steel and wrought iron.

Туре	Properties	Composition	Melting point	Example uses
Mild steel	Tough, ductile, malleable, magnetic, high tensile strength, easily joined, poor corrosion resistance	Iron + 0.1–0.3% carbon	1400°C	Screws, nails, bolts, girders, car body panels
Stainless steel	<ul> <li>Corrosion resistant, hard, tough, sometimes magnetic, resists wear, difficult to cut</li> <li>Specific properties can be altered by varying the alloyed metals</li> </ul>	Alloy: Carbon steel + 10.5–18% chromium 8% nickel 8% manganese	1400°C	Kitchenware, sinks, cutlery, medical equipment
Cast iron	Hard skin, brittle, soft core, good in compression, self- lubricating, magnetic	Iron + > 2–6% carbon	1200°C	Machine parts, vices, brake discs, manhole covers



# Summary

# Key points to remember:

- Metals are categorised as ferrous or non-ferrous.
- · A mixture of two or more metals is called an alloy.
- · Metals have useful mechanical properties such as ductility, malleability and hardness.

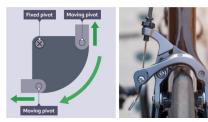
There are three categories of **levers**. They are chosen for their ability to produce the most mechanical advantage for a particular task. These classes of lever arrange the effort, fulcrum and load in a different order:

	Class 1	Class 2	Class 3
Reason for mechanical advantage	A large input movement can produce a small output movement but with greater force	A large input movement can produce a smaller output movement with greater force, but the fulcrum is at one end	Limited; the force applied by the user is greater than the output force
Example	Pliers or crowbar	Wheelbarrow or nutcracker	Tweezers or spade
	Class 1 lever  Fulcrum  Class 1 lever	Fulcrum Class 2 lever  Pivot  L  nutcracker	Class 3 lever Fulcrum  Fulcrum  Fulcrum
	1	2	3
	F	L	E

- Rotary Motion around a central point Example: a fan or a bike wheel
- Oscillating Motion that swings backwards and forwards in an arc from a central point Example: child on a swing or a pendulum
- Linear Moving in a straight line in one direction Example: chain on a bike
- Reciprocating Moving backwards and forwards in a straight line Example: sewing machine needle or car piston
- A person lifting a load of 200 N but only using 100 N of effort:
- Therefore, the mechanical advantage =  $200 \div 100 = 2$ .
- This can also be written as 2:1. The person is able to lift twice the load using 100 N of effort.
- The mechanical advantage can also be calculated theoretically by measuring the distance between the load and pivot and the effort and pivot.
- In the picture below the distance between the load and fulcrum is 2 m. The distance between the effort and fulcrum is 6 m.
- Therefore, the mechanical advantage =  $6 \div 2 = 3$  or 3:1
- The person will find this load three times easier to lift.

Reverse motion linkages change the direction of input so that the output goes the opposite way. A fixed pivot forces the change in direction. These are often used on foldable clothes horses.

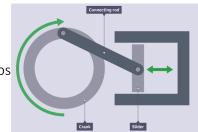




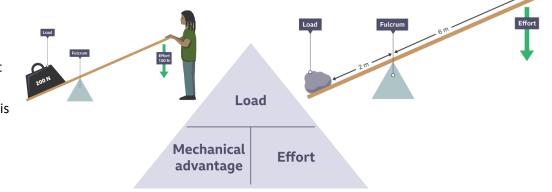
**Bell crank** linkages change the direction of force through 90°. The amount of output force can be changed by moving the fixed pivot. When used in bicycle brakes, the rider can pull the brakes from the handlebars, which changes direction through the bell crank to make the brake pads touch the wheels.

**Crank and slider** linkages change rotary motion from the crank into a reciprocating motion of the slider, or vice versa.

The crank and slider are connected through a connecting rod which helps convert the motion. There are arrangements in which a crank and slider can be used. The crank arm can be used as the driver in a car engine piston, the ignition of petrol by the spark plugs pushes the slider up, moving the connecting rod and turning the crank.



Alternatively, the slider can be used as the driver in a steam engine where the wheels turn because of the pressure that moves the slider.



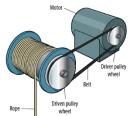


Figure 1.5.5 Example of winch using simple pulley system

#### Apply it

Identify the machines in your school workshop that have a pulley system as the drive mechanism. What are the advantages of using pulleys? How can different speeds be achieved?

Cams

# Pulleys and belts

Pulleys and belts transmit rotary motion from a driver shaft to a driven shaft and are a drive mechanism for tools such as a pillar drill. A pulley is a wheel with a shaped groove and the belt fits in the groove, connecting **Figure 1.5.6** Graphic symbol of a pulley two pulleys. Motion is transferred by friction. In this configuration, the



driver pulley and driven pulley rotate in the same direction.

#### V-belt

V-belts are shaped to increase the force that can be transferred. The V-shape increases the gripping area by having sloping sides. This increases efficiency by reducing any slipping and it also tightens the drive surfaces as it runs, as it wedges into the pulley wheel.

#### Velocity ratio

When using pulley wheels of different sizes, the smaller one will spin faster. By comparing the size of the two pulleys we can calculate the velocity ratio (VR).

#### Maths in practice 3

#### Calculating velocity ratio in a pulley system

Calculate the velocity ratio of the pulley system shown below.

VR = Driven pulley diameter Driver pulley diameter

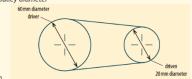


Figure 1.5.7 Pulley system

For one turn of the driver pulley, the driven pulley will rotate three times.  $\frac{20}{60} = \frac{1}{3} = 1:3$ 

#### Input and output speeds

Pulleys are usually connected to a motor or another power source. The input speed is known and the output speed of the pulley system can be calculated.

#### Maths in practice 4

Pear-shaped

#### Calculating output speed of a pulley system

In the pulley system above, the input speed is 1800 revolutions per minute (rpm). Calculate the output speed of the pulley system.

Output speed =  $\frac{Input speed}{Input speed} = \frac{1800}{100} = 5400 \text{ rpm}$ Velocity ratio 1/3

Eccentric/circular

The driven pulley is rotating at 1800 rpm and the output speed is 5400 rpm.

Drop (Snail)

#### Idler gear

In a simple gear train of two meshed spur gears, the driver gear and the driven gear rotate in opposite directions. The driver and driven gears rotate in the same direction. It does not have any impact on the output speed.

The velocity ratio is still based on the driver and driven gears.

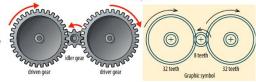


Figure 1.5.10 Idler gears

#### Revolutions per minute calculations

Revolutions per minute (rpm) is the number of times a device, such as a gear or wheel, rotates around a fixed axis in 1 minute. The driver gear and driven gears rotate at different speeds, if they are different sizes. This is dependent on the velocity ratio (often called gear ratio in relation to gears).

#### Maths in practice 7

#### Calculating output of a gear system

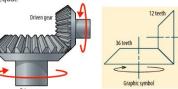
A driver gear rotating at 100 rpm is connected to a gear system with a gear ratio of 1:18. Calculate the output speed of the gear system.

Output speed =  $\frac{input speed}{gear ratio} = \frac{100}{1/18} = 100 \times 18 = 1800 \text{ rpm}$ 

The output speed is 18 times faster than the input speed, but the torque has been reduced.

#### Bevel gears

These specialist gears can transmit rotary motion through 90 degrees. An example is a hand drill. Bevel gears vary in size to achieve different gear ratios and output speeds. Figure 1.5.11 has a gear ratio of 1:3. Two same-sized gears are called mitre gears; they still turn through 90 degrees but the output and input speeds are equal.



Identify another gear mechanism that transfers motion through 90° and find an example of where it may be used.

Exam-style question

A designer needs to have an

input speed of 800 rpm and

output speed of 3200 rpm in a

simple gear system. If the driven

gear has 20 teeth, calculate how

many teeth does the driver gear

Torque: a measure of a system's

(3 marks)

need to have?

Key term

turning power.



Figure 1.5.11

Bevel gears

This system uses a gear wheel and a rack to change rotary motion to linear motion or vice versa. Examples are a pillar drill or a car steering system. The rack's movement is determined by the number of teeth on the pinion gear and the number of teeth per metre (TPM) on the rack.



Figure 1.5.12 Rack and pinion

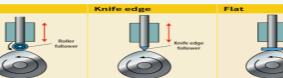
# Graphic symbol

#### Followers

Roller

#### Effect of shape · Motionless (dwells) for · Gives a slow rise Circular to give a about half the cycle smooth continuous with a spiral cross-· During the second movement as the section and then a sudden fall half it rises and falls follower rises or falls Example Opens and closes • In a fuel pump or in · Used in hammers/ valves in a car steam engines punches or machines engine needing a sudden drop

Different followers are used for specific purposes, but all slide or roll on the external profile of the cam.



- · Used when higher speeds are required.
  - such as in engines Rolling motion reduces friction so it will wear better
- Has separate parts in the roller mechanism and contends with forces pushing them to the side



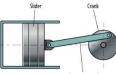
- Used when accuracy is required, such as in an embroidery machine. as the cam's profile is followed closely
- Suffers from a rapid rate of wear and contends with forces pushing them to the



- Used when higher load bearing capabilities are required, such as in a steam engine
- Has reduced forces pushing it, but suffers from increased friction
- The larger surface area means it could rotate. but has larger load carrying abilities

#### Apply it

Investigate how a steam engine converts energy from steam into motion.



Connecting rod Cranks and sliders

#### Exam-style question

Calculate the length of the crank arm used in a crank and slider mechanism if the slider has a maximum movement of 30 mm. (3 marks)

# Driver gear

Figure 1.5.8 Simple gear train

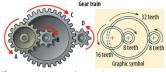


Figure 1.5.9 Compound gear train

A gear is a toothed wheel fixed to a shaft that connects (meshes) with other gears to change the speed or direction of rotation of a driving mechanism. Gears have an advantage over pulley systems, because the meshing prevents slippage so that greater forces can be applied.

These mechanisms convert the rotary motion in a crank to reciprocating motion

in a slider. The distance the slider moves depends on the size of the crank arm.

The slider can also operate as the driver and turn the crank, for example in steam

The distance moved by the slider is twice the radius of movement of the crank arm.

engines, where the wheels are driven by the pressure of the steam pushing the slider.

The crank arm can be used as the driving force, such as in the crankshaft and

pistons of a car or to compress air in the cylinder of a compressor.

#### Simple gear trains

Cranks and sliders

A simple gear train is when two spur gears are meshed and fixed on parallel shafts. Simple gear trains reverse the driver gear's direction of the rotation and the driven gear will turn in the opposite direction. When the gears are different sizes (with more or fewer teeth) speeds can be increased or decreased. The amount of change in speed is called the velocity ratio.

### Maths in practice 5

# Calculating velocity ratio of a simple gear system

Figure 1.5.8 shows a driver gear with 32 teeth and a driven gear with 16 teeth.

Calculate the velocity ratio of the gear system.

 $VR = \frac{Number \ of \ teeth \ on \ driven \ gear}{Number \ of \ teeth \ on \ driver \ gear} = \frac{16}{32} = \frac{1}{2} = 1:2$ 

For every revolution of the driver gear, the driven gear will rotate two times.

#### Compound gear trains

With simple gear trains, the speed change is limited to the number of teeth on the two gears. A large difference is impractical because, for larger speed changes, several pairs of meshing gears can be combined for a higher velocity ratio. A compound gear train has more than one gear on a shaft.

This time, the VR is calculated by working out the combined VR of both pairs of gears. Figure 1.5.9 shows a compound gear train where gear A is driving gear B (simple gear train 1). Gear B is connected to gear C and spins at the same speed. Gear C then drives gear D (simple gear train 2).

## Maths in practice 6

Graphic symbol

#### Calculating velocity ratio of a compound gear system

Figure 1.5.9 shows a compound gear train. Gear A drives gear B. Gear B is connected to gear C and spins at the same speed. Gear C drives gear D. Calculate the velocity ratio of the gear system.

Total VR = VR of gear train 1 (A to B)  $\times$  VR of gear train 2 (C to D)

 $= 1:2 \times 1:4 = 1:8 = 8$ 

For every revolution of the driver gear, the driven gear will rotate eight times. Further gears can create a significant speed change.

# AQA Design & Technology 8552 Materials and Working Properties Textiles

# Fabrics

# **Natural Fabrics**

Cotton	Soft, good absorbency, prints well, machine washable, strong breathable	Origins from the Cotton Plant.	Uses: Jeans, towels, Shirts, dresses, underwear
Wool	High UV protection, flameproof, breathable, durable insulating	Origins from Sheep.	Uses: Jumpers, Coat, blankets
Silk	Smooth, Soft, Strong	Origins from the silk worm.	Uses: Wedding dresses, lingerie.
Linen	Strong, cool in hot weather	Origins from the flax plant	Uses: Trousers, tops.
Leather/Suede	Strong, hardwearing, durable.	Origins from the skin of animals, mainly cows.	Uses: Jackets, Trousers, Shoes.

# **Synthetic fabrics**

Polyester	Durable, wrinkle resistant, stain resistant	Uses: Shirts, jackets. Also used in safety belts, conveyor belts and tyre reinforcement.	
Polyamide (Nylon)	Durable, high abrasion resistance	Uses: Sportswear, carpets.	
Elastane (Lycra)	Stretchy, durable, high stain resistance	Uses: Sportswear, Swimwear, tights.	
Viscose	Soft, comfortable, absorbent, easily dyed.	Uses: Dresses, linings, shorts, shirts, coats, jackets and outerwear.	
Acrylic	Absorbent, retains shape after washing, easily dyed, resistance to sunlight.	Uses: Jumpers, tracksuits, linings in boots.	

# **Blended and mixed Fabrics**

These fabrics take on the positive characteristics of their combinations

Cotton/Polyester	Easy care and crease resistant	Uses: School shirts.
------------------	--------------------------------	-------------------------

# Woven

# 2. Fabric Construction

Plain Weave	Extremely strong and hard wearing	
Twill Weave	Extremely high strength and abrasion resistant.	

# **Knitted**

	Knitted fabrics	Stretchy, soft and comfortable.	
--	-----------------	---------------------------------	--

# Non-Woven

Bonded Fabrics	These are webs of fibres held together by glue or stitches.		
Felted Fabrics	Felt is made by combining pressure, moisture and hear to interlock a mat of wool fibres.		

# Care Labels

$\Box$	Machine wash It will usually			
	have a max.			
	temp number			
	included			



Hand Wash only



Do not wring



Line Dry



Iron on low heat. The more dots the higher the heat setting



Tumble Dry



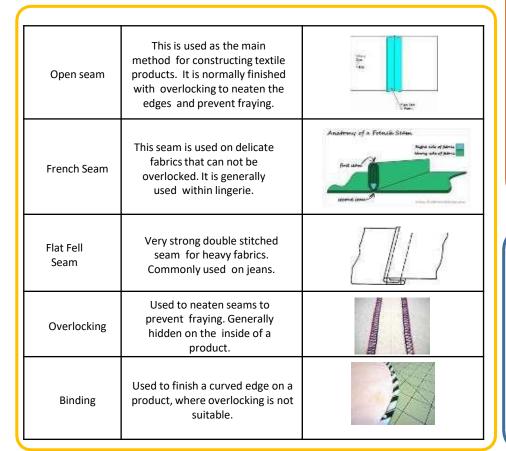
Do not bleach



Dry Clean

# AQA Design & Technology 8552 Working with textile based Materials and Fixings

# Construction Techniques







# **Construction Terminology**

#### Pattern

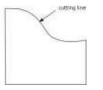
This is the term given to a paper template to aid in the cutting out of fabric for accurate construction.

# **Seam Allowance**

This is usually a 1cm 'boarder' around your pattern to allow for construction to be the correct size.







# **Right Side**

This is the 'correct' side of the fabric that you wish to see.

# Wrong Side

This is the side of the fabric that you do not wish to see.



# Pressing

This is the term given when ironing your product; e.g. press your seams open, would refer to when an open seam is sewn and they need to pressed outwards to give a flat finish.

# AQA Design & Technology 8552 New and emerging Technologies - People, Culture and Society

# **People**

#### **Consumer Choice**

Growth of global manufacturing has lead to a wider variety of products being available, prices of products are kept low because of the wider competition. <a href="Technology Push">Technology Push</a>
Advances in technology and science lead to the development of new products. Research and Development (R&D) Departments are used within large companies to ensure they can create new and exciting products.







Advances in touchscreen technology

# **Market Pull**

The demand for new products from the consumer market. Market Pull is the pressure put on a company to improve or redevelop their products by consumers to meet the consumers changing needs.

# **Changing Job Roles**

The development of new technologies and automation has meant there is less reliance on manual labour. Workers need to be 'skilled up' and be more flexible.

### Fairtrade

A farm, business, or other organization which is owned and run jointly by its members, who share the profits or benefits.

Trade between companies in developed countries and producers in developing countries in which fair prices are paid to the producers.

# Co-operatives

A farm, business, or other organization which is owned and run jointly by its members, who sharethe profits or benefits.

# Virtual Marketing and Retail

Virtual marketing the use of search engines positioning and ranking, banner advertising, e-mail marketing and social media in order to reach a wider audience to promote a product.

# Industry - Automation and the use of Robots

As industry has grown new and emerging technologies have changed the way designers, architects and engineers work.

Intelligent machines and robotics have replace machine operators and engineers.

The development of work now almost always involves the use of Computer Aided Design (CAD).

This software can carry out complex tasks such as virtual stress testing this is called **Computer Aided Testing (CAT)**. Designs can be produced to look 3D so customers ca give opinions before

prototyping begins.

# Societ

Companies putting the environment and people before profit. Examples:

- Carbon Neutral Products
- Use of renewable materials
- Reduction of carbon emissions/greenhousegasses
- Use of recycled materials
- Products designed to be 100% recyclable
- Promotion of Fairtrade
- Reduction of transportation
- Non profit organisations that reinvest money to support good causes
- Consideration to designing products for the elderly ordisabled
- Consideration to different religious groups

# 4 main ways to consider the population when designing

Type of Production	Example	
One size fits all	Door Frames Baths	
A range of sizes to cover all	Shoes Clothes	
Adjustability to allow use by all	Car Seats Shower head height	
Adaptability to support location or user	Children's boosterseats Car roof bars	

# Culture

A combination of ideas, beliefs, customs and social behaviours of a society or group of people.

# Fashion and Trends

Designers developing products that are influenced by 'the latest thing'.

# **Faiths and Beliefs**

Designers being responsible for the impact their design choices may have on a community.

Types of establishment			Chefs  Head Chef: The boss. The head chef is responsible for menu planning, food production, costing and purchasing, staff work rotas and					
(	Commercial – Residential A place that you can stay at	Commerci Non – Reside (A place you o stay overni	ential (Providing a service	training, hygiene of the kitchen and staff, stock control  Sous Chef - The Sous chef (sous=under in french) is directly in charge of food production, the minute by minute supervision of the kitchen staff, and food production  Pantry chef - aka garde manger - A pantry chef is responsible for the preparation of cold dishes, such as salads and pâtés				
Gu Ber Far Mo Ho	overnight)  Itels  Just houses	Restaurants Fast food outle Public houses Bars Delicatessens Take away out School meals	Hospitals Prisons Meals on wheels Residential care homes	Pastry chef - aka le patissier - The King or Queen of the pastry section; baked goods, pastries and desserts are this chefs forte.  Sauté chef - aka saucier or sauce chef - They're responsible for sautéing foods, but their most vital role lies within the creation of the sauces and gravies that will accompany other dishes.  Soup Chef - aka le potager - Responsible for making soups and preparation of accompaniments for the dishes  Vegetable Chef - aka le legumier - The vegetable chef prepares all vegetables for dishes, in smaller restaurants the vegetable chef would also make soups.  Fish chef - aka le poissonnier - An expert in the preparation of fish dishes, and often responsible for fish butchering as well as creating the appropriate sauces.				
S	tyles of service	neals from the	Suppliers to the hospitality a catering industry:  • Specialist markets – e.g butchers, fish markets.	Supervisor 21-24 £7.70 p/h 9- Waiter/waitress 18-20 £6.15 p/h monthly, Entitled to sick pay and holiday pay (in proportion) Entitled to				
SERVICE	meal or a decorat cuisine style  Family: Dishes are table where spoor	put on the ns are customers s. Suited to such as	deliver  Local suppliers – local deliveries are better for environment but migh have a wide selection stock  Equipment suppliers – equipment and applied to the catering industrial	Chambermaid Receptionist Porter Concierge  Temporary Employed for a specific length of time such as the summer tourist season or the month of December. Temporary staff have the same rights as permanent staff for the duration of their contract. Temporary staff employed for longer than 2 years become permanent by law  Temporary Employed for a specific length of time such as the summer tourist season or the month of December. Temporary staff for the duration of their contract. Temporary staff employed for longer than 2 years become permanent by law  Temporary Employed for a specific length of time employed through an agency. They do not have a contract or set hours of work. They are needed at busier times of the year e.g. At Christmas or for weddings. New years eve				
TABLE	Silver: Food is serve using spoon and fo Gueridon: Food is: side table or a troll spoon and fork. So dishes are assemb in front of the cust	served from a ley using a ometimes iled or cooked	Large wholesalers – lar quantities of stock, car premade and proport food but can be expe     Independent suppliers  Michelin guide	Catering providers operate    Costs   Costs	2.			
Ģ.	Cafeteria: A single counter but can so multiple counters Buffet: Set up in a r	ometimes be	Anonymous inspectors visestablishments and have meal and write a review of the establishment can appear of the establishment can be stabled to the establed to the establishment can be stabled to the establishme	or hotels and write a review of the establishment -award rosettes for restaurants,	3.			
COUNTER SERIVCE	along one long ta self service or staff customers. Carver where joints of me in front of custome	ble. If can be can serve y service is at are carved	award stars for excellence	eating  Other places nearby, prices, delivery companies, new restaurants  Political factors Increasing regulations new restaurants  Political factors Increasing I	4.			
ONAL	Fast Food: Takeaw areas where custo food from one smo	aniers collect all counter assembled a choice of m a trolley	Good food guide  Members of the general public who have visited the establishment fill in a review which is compiled into a guide. Award poin	Online and written reviews There are a number of online review sites where anyone can post their reviews of an establishment.  with a large number of with a large number of online review.				
PER	Home Delivery: De house individually	elivered to	for excellence.	reviews, a restaurant's average score is likely to be reasonably accurate.  whole food, healthy fast food etc.				

Key questions to check your learning Objective 1:

- 1. Recap what makes a business successful e.g. social media, prices of food, customer service and the atmosphere of the restaurant
- 2. What are the different salaries for jobs in the H&C industry?
- 3. What are the different types of service available?
- 4. What is the difference between commercial and non commercial?

# Documentation

Temperature charts: fridge, freezer, display, point of sale. Taken at least twice per day.

Bookings/

Electronic

electronic

reservations

reservations

Feedback

system, diary

with bookings

booking

system.

and

forms

of House

reservations:

Time sheets: logging staff working hours

Personnel

worked.

personal

details.

Wages.

Taxation,

National

Training.

insurance,

Accidents.

timetables

Staff rotas and

records: Hours

Accident report forms: used to report any accidents and near misses

**Financial** 

Incomings

Income tax,

VAT, Wages.

Insurance,

Profit & loss.

Staff costs,

Heating.

lighting

and outgoings

records:

Food safety information: blast chill records, food related incidents and cleaning rotas

Health and

safety: Fire

certificate.

records.

hygiene

checks.

Cleaning

checks, First

aid records

Accident

book, Food

Staff training

Equipment fault reports: What was the issue and how was it dealt invoice,

Purchasina:

drink orders

Packaging

equipment

Tables, chairs

Consumables

disposables.

Cutlery and

uniforms

crockery, Staff

orders.

etc.

and

Food and

Stock usage reports: order books, stock control sheets. delivery notes

Stock control:

Monitor stock

frequency of

stock check,

First in First out

for items with

LO2 Understand how

hospitality and catering

provisions operate

a shelf life

levels for re

ordering,

Decide

Legible (readable)

At correct interval (daily, hourly), completed accurately. Signed and dated. Remember

Documents should be:

Some information is confidential or sensitive i.e. staff personal information. There is a legal requirement under the data protection act to store this type of information securely

Kitchen Workflow Workflow in the kitchen should follow a logical process by using different areas so that the clean stages in food production never come into contact with the "dirty" stages Delivery Storage

Food preparation

Cooking Holding

Food service area

Wash up

Waste disposal

Customer needs

# **Business Customers**

Local Residents

- · Value for money
- · Good standard of customer service so they return
- Catering for local needs (culture, religion)
- Consistent dishes served
- Loyalty schemes Recognised by staff- feel welcome
- Menu specials
- Theme nights
- OAP discount day

for special offers

- Child friendly
- Entertainment Mailing list or email
- meals-buffet or restaurant Accommodation if

Lunch or other

breaks

Dedicated

corporate

(business) contact

at establishment

Discounted rates

Meeting rooms

Water, juice on

Presentation

equipment,

projector, tv.

Office facilities-

printer, phone, fax.

internet, stationery

Tea and coffee for

- attendees are from a long distance
- Quick service for lunch meetings

#### Leisure Customers

- · Value for money
- · Good facilities
- Families want child menus, play area. child friendly
- Tourists want local food, easy to communicate
- Older people may want more formal service
- Good customer service
- · Varied choice of menu
- Dietary needs eg alleraies. intolerances, vegetarian catered for without havina to ask for special foods
- Facilities for physically impaired customers







Bain Marie









Blast Chiller

# Customer Rights

Hot plate

- The right to be protected (against hazardous goods)
- The right to be informed (about quality, quantity, allergies etc.)
- 3. The right to have their complaints be
- The right to seek redressal (compensation.)
- the right to receive satisfactory goods that match their product description



POS Till Point





Perculator





DRESS CODE: Chef's jacket Chef's pants Neckerchief Apron Hand towel Slip-resistant shoes

# Key questions to check your learning for Learning Objective 2:

- What documentations are used in an establishment by law?
  - What is the workflow of a kitchen?
  - What are the different types of customers you may come across in an establishment and what do they require?
- What are customer rights?
  - What is a correct dress code to have when working in a kitchen?

# Commodities - Fruit and Vegetables

# **Vegetables**

Vegetables are classified according to which part of the plant they come from. Examples include fruit vegetables which are aubergines, tomato and cucumber or seed and pods which are peas and beans.

# <u>Fruit</u>

Fruits contain a variety of vitamins and minerals, they are also a good source of fibre. Fruits are classified into groups. Examples are soft fruits such as raspberries and blackberries. Citrus fruits such as orange and lemon and tree fruits such as apples and pears.



# **Potatoes**

Although potatoes are vegetables, a potato is actually a tuber. Tubers grow from the roots. In the Eatwell guide, potatoes are included in the starchy food section.

# **Farming Fruit and Vegetables**

# Intensive farming

Increase food production.

Pesticides, fertilisers are used to grow high-yield crops.

# **Organic farming**

Natural food production with no chemical or synthetic treatments – **low yield.** 

Natural compost and manure used as fertilisers.

GM-free

No evidence that organic food is more nutritious – it is a lifestyle choice.

# **Seasonal Fruit and Vegetables**

Cheap

Good for the local economy reduces air miles and carbon footprint

Most nutritious



# **Nutritional Value**

Carbohydrates- starch/sugar
Vitamin A (retinol for your retina\_ in orange/yellow
Vitamin C - most - citrus fruit
Iron - green leafy vegetables
Dietary Fibre - found in the skins

# **Cooking Fruit and Vegetables**

Colour: brightens but goes dull if overcooked

**Flavour:** flavour intensifies and sweetens as starch

converts to sugar

**Texture:** softens due to starch degradation

**Nutrition:** water and fat soluble vitamins lost depending on method used so if you boil vegetables the vitamins B and C dissolve, if you fry then the vitamins A and D dissolve.

# **Avoiding Vitamin loss**

Prepare close to time
Do not soak
Use as little water as possible
Cook quickly/short time
Use cooking liquid

# **Preserving**

Freeze, dried, bottled, canned, MAP (modified atmosphere packaging)



# The Trafalgar School AT DOWNTON

# How to use a knowledge organiser – step by step guide

	Look, Cover, Write, Check	Definitions to Key Words	Flash Cards	Self Quizzing	Mind Maps	Paired Retrieval	
Step 1	Look at and study a specific area of your knowledge organiser	Write down the key words and definitions	Use your knowledge organiser to condense and write down the facts and or information on flash cards	Use your knowledge organiser to create a mini quiz.	Create a mind map with all the information you can remember from your knowledge organiser.	Ask a partner or family member to have the knowledge organiser in their hands, read out what you remember.	
Step 2	Cover or flip the knowledge organiser over and write down everything you remember.	Try not to use your knowledge organiser to help you	Add pictures to help support. Then quiz yourself using the flash cards. You can write questions on one side and answers on the other.	Answer the questions and remember to use full sentences	Check your knowledge organiser to see if there were any mistakes with the information you have made.	They can test you by asking you questions on different sections of your knowledge organiser.	
Step 3	Check what you have written down. Correct any mistakes in green pen and add anything you missed. Repeat.	Use a different coloured pen to check and correct your work.	Use a parent/carer or friend to help quiz you on the knowledge.	You can also use family to quiz you. Keep self-quizzing until you get all questions correct.	Try to make connections that link information together.	Write down your answers.	