The Trafalgar School at Downton

# Knowledge Organiser

**Year 9: Terms 5 and 6**

**2024/2025**

# Contents

Name.................................................House.........................

## Being Trafalgar

### WHAT *WE* EXPECT FROM *YOU*

- BE ON **TIME**

- BE **EQUIPPED**
  PEN, PENCIL, RULER, KNOWLEDGE ORGANISER & EXERCISE BOOK (AS A MINIMUM)

- LISTEN TO STAFF AND **ALWAYS** COOPERATE

- DO NOT INTERRUPT **LEARNING** TIME

- COMPLETE **ALL WORK** SET
  *BEST WORK, FIRST TIME*

- SHOW **RESPECT**

- WEAR UNIFORM **PROPERLY** AND WITH **PRIDE**

- MOBILE DEVICES/SMART WATCHES TO BE IN **YONDR** CASE

GREAT PEOPLE - GREAT TEACHING - GREAT OUTCOMES

At the end of your time at the school your knowledge organisers will provide you with lots of help and support when your prepare for your GCSE exams.

To help yourself you should:

- Keep your Knowledge Organisers as tidy as possible

- Highlight parts of them as you go through learning lessons or add in post-it notes etc. to help you learn key knowledge

- Keep your used Knowledge Organisers safe at home. If you have used them since Year 7 you will end up at the end of Year 11 with 14 Knowledge Organisers. Line them up on your shelf at home and keep coming back to them for your revision, homework and learning

- Show them to your parents and talk through with them the facts and knowledge you have learned about in lessons – help them to learn new things too!

- Take your Knowledge Organiser for the term you are in to school every day and use it in every lesson you can!

# Using a Knowledge Organiser well

**What is a Knowledge Organiser?**
A Knowledge Organiser is a document that sets out the key information you need to understand, learn and memorise in each of the subjects you study this term.

**Why do I have to carry my Knowledge Organiser around with me?**
Your teachers will want you to use your Knowledge Organisers in lessons. They are yours forever and you may want to annotate or highlight on them when your teacher talks about things in them. They will certainly be used in lessons when you have a cover teacher and you can use them whenever you find yourself with some spare time.

**How should I use my Knowledge Organiser?**
You should use your Knowledge Organiser to learn this key information and commit it to memory. Your teachers will often quiz you on the information on the Knowledge Organiser in your lessons. The best way of using it is to use the look, cover, write, check method which you will have been introduced to in your Knowledge Organiser launch assemblies.

**What do I do with my Knowledge Organiser at the end of the term?**
You don't have to carry your Knowledge Organiser around with you anymore but you should keep it somewhere safe where you can easily get it out and use it. Remember that the information on the Knowledge Organiser includes things you will need to remember for your GCSE exams, so your teachers will continue to quiz you on it.

**Why is a Knowledge Organiser important?**
GCSE specifications require students to memorise more facts, equations, quotations and information than ever before and there are things you will learn right from the start of year 7 that you will need to know in year 11 when you sit your GCSE exams – the Knowledge Organiser helps you to identify the things that you need to try and commit to your long term memory and return to over and over again during your time at secondary school. There are also things that we think it is important you learn about and remember that might not be in a GCSE exam but represent useful knowledge for life.

# How to use a knowledge organiser – step by step guide
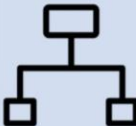
Your Knowledge Organiser is a vital document. It contains all the key things from your lessons that you will need to work on committing to your long-term memory.

Here are some useful methods to use that will help commit the information to your long-term memory

| | 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. |

# Language Methods to Practise in your Fortnightly Writing Challenge and Examine in your Reading

**alliteration:** the repetition of a consonant sound to begin a series of words.

**anecdote:** a short story to prove a point e.g. a dad, talking to his children about the dangers of running in the house, a dad might include an anecdote about falling in his home as a boy and breaking his arm.

**antithesis:** putting two opposite ideas together to highlight contrasts.

**emotive language:** words and phrases that are used to make the reader feel a particular emotion.

**extended metaphor:** a version of metaphor that extends over the course of multiple lines, paragraphs, or stanzas of prose or poetry.

**foreshadowing:** the writer hints at an event that will happen later in his story/poem/play/writing.

**imperative verbs:** instructional/command words that give the action the speaker/writer wants you to do.

**metaphor:** like a simile, but instead of using 'like' or 'as' it compares two things by suggesting that something is something else.

**modal verbs:** help show the level of possibility, ability, obligation or permission of the main verb/action e.g. might, can, must, may …

**pathetic fallacy:** the projection of human emotions/mood onto non-human objects found in nature e.g. the weather.

**sensory description:** employing the five senses in writing to evoke a mental image and/or sensation for the reader.

**simile:** a comparison which finds similar characteristics in two objects and compares them, always by using the words 'like' or 'as'.

**statistics:** factual data used in a persuasive way.

**superlative:** an adjective or adverb that shows the highest or lowest degree of comparison e.g. best, worst, finest, most, etc.

**onomatopoeia:** using words that sound like the noise they represent.

**personification:** a type of figurative language that gives an object human characteristics (emotions, sensations, speech, physical movements).

**rhetorical question:** a question asked for a purpose other than to obtain the information the question asks e.g. create a dramatic effect; emphasise a point; make you think about/eager to learn the answer.

## COMMON MISTAKES

### Apostrophe To Show Ownership

**1** normal singular noun — the **man's** idea ✓ — add 's

**2** normal plural noun — the **girls'** idea ✓ — add '

**3** singular noun ending s — **Moses'** idea ✓ — add ' — or… — **Moses's** idea ✓ — add 's

**4** plural noun not ending s — the **children's** idea ✓ — add 's

### Using Apostrophes (Showing Joint Ownership)

**The Rules**

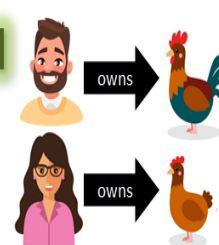**Joint possession?** Make the last word in the series possessive.

**Individual possession?** Make all parts possessive.

**Examples**

Janet and John's chickens

Janet's and John's chickens

Fortnightly Writing Challenge Year 9

**Use fronted adverbials:**

Rather slowly, (manner)
During the night, (time/temporal)
Every minute or two, (frequency)
At the end of the corridor, (spatial)

Just beyond the stairwell on his left, he opened the door.

**Use a two and then three word sentence:**

It hurt. I was dying!

Snow fell. Flakes floated precariously.

**Use anaphora:**

Now is the time for action. Now is the time to take up arms. Now is the time to fight for your country.

**Use epiphora (epistrophe)**

I can't believe I was robbed. Everything is gone. My television and electronics are gone. The money I left on my nightstand is gone.

**Use a range of sentence structures:**

The spotted green frog jumped into the pond.
(simple)

The spotted green frog jumped into the pond and he splashed water on me.
(compound – coordinating conjunction: for, and, nor, but, or, yet, so)

The spotted green frog jumped into the pond when the hawk flew overhead.
(complex – subordinating conjunction: if, although, as, before, because, when, after, since, until, so that, while etc.)

When the hawk flew overhead, the spotted green frog jumped into the pond.
(subordinate/dependent clause start)

The frog, which had been lurking underwater, jumped on the lily pad.
(embedded clause)

**Use a past participle - 'ed' start:**
Glazed with barbecue sauce, the rack of ribs lay nestled next to a pile of sweet coleslaw.

**Use a present participle - 'ing' start:**
Whistling to himself, he walked down the road.

**Use a tricolon (tripartite list):**

'I stand here today humbled by the task before us, grateful for the trust you have bestowed, mindful of the sacrifices borne by our ancestors.'

Snap! Crackle! Pop! (Rice Krispies slogan)

**Use a conditional sentence:**

When people smoke cigarettes, their health suffers.

If I had cleaned the house, I could have gone to the cinema.

**Use paired adjectives to describe a noun:**

Take a look at this bright red spider.

Luckily, it isn't a wild, dangerous one.

**Use anadiplosis (yoked sentence):**

Building the new motorway would be disastrous, disastrous because many houses would need to be destroyed.

'Fear leads to anger. Anger leads to hate. Hate leads to suffering.'
Yoda, *Star Wars*.

SENTENCES

**Use different sentence types:**
The wind is blowing. (declarative)

Put your pen down. (imperative)

Who do you trust most in the world? (interrogative)

Pollution is killing us! (exclamation)

**Use discourse markers to begin paragraphs and start/link some sentences:**
First of all, To begin with, Firstly,

Therefore, Consequently, Hence, As a result,

Furthermore, In addition, Additionally, Moreover,

Meanwhile, Later that day, Seconds later, Subsequently, That afternoon,

On the whole, Interestingly, Basically, In short, Broadly speaking,

Alternatively, Conversely, Similarly, On the other hand, Despite this, Likewise, However,

To conclude, Finally, In conclusion, Eventually, In the end,

# PUNCTUATION PIT STOP

## 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) dependent clauses and phrases.
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 don't expect me before 11.'

## Question Mark

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

## 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       I am →I'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 he'd ever been.

## 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 …

## PUNCTUATION PIT STOP

# Writing Forms

## Writing the text for a Leaflet/Guide

### Stay Safe and Sound Online
*(clear/apt/original title)*

### Manage your online reputation
*(subtitles)*

Anything that you upload, email or message could stay online forever. Therefore, before you post anything online, consider whether or not you would want your parents, teacher or a future employer seeing it. If the answer is no, don't post it! Your privacy is key here.

### Privacy Matters

Make sure you set high privacy settings... networks. Regularly you should change passwords and never share or put online any of your personal details like a phone number, address or your school details. Make sure your safety and privacy settings are activated on your mobile devices too, so you aren't sharing private information. Be aware that using public WiFi might not filter inappropriate content, so look for friendly WiFi symbols when you're out and about.

*(effectively/fluently sequenced paragraphs)*

....

### Remember:
*(bullet points)*
- make sure you know how to block abusive comments and report worrying content;
- don't arrange to meet people in real life that you've only talked to online;
- use secure and legal sites to download music and games;
- when using the internet for homework, use information appropriately and explain things in your own words rather than copying.

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## Text for a Speech/Talk
## 'Address to Nation on the Challenger' by Ronald Regan (28th January, 1986)

Ladies and Gentlemen, I'd planned to speak to you tonight to report on the state of the Union, but the events of earlier today have led me to change those plans. Today is a day for mourning and remembering. Nancy and I are pained to the core by the tragedy of the shuttle Challenger. We know we share this pain with all of the people of our country. This is truly a national loss.

*(a clear address to an audience)*

…

For the families of the seven, we cannot bear, as you do, the full impact of this tragedy. But we feel the loss, and we're thinking about you so very much. Your loved ones were daring and brave, and they had that special grace, that special spirit that says, 'Give me a challenge and I'll meet it with joy.' They had a hunger to explore the universe and discover its truths. They wished to serve, and they did. They served all of us.

*(rhetorical indicators that an audience is being addressed throughout)*

…

The crew of the space shuttle Challenger honoured us by the manner in which they lived their lives. We will never forget them, nor the last time we saw them, this morning, as they prepared for the journey and waved goodbye and 'slipped the surly bonds of earth' to 'touch the face of God.'

Thank you.

*(a clear sign off e.g. 'Thank you for listening'.)*

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## Article

### Andy Murray's Appliance of Science
*(clear/apt/original title)*

By Jim White
*(by-line)*

**If the Caledonian superman wins Wimbledon this year, it will be thanks to [pieces] of sushi a day, a magic potion and a battalion of experts.**
*(strapline)*

If you want to know what it is about Andy Murray that makes him stand out from the rest of us – apart from that fizzing backhand return and the huge-mouthed celebratory yodel – it is summed up in one word: science!

*(introductory (overview) paragraph)*

### Sample Check
*(sub-headings)*

Today, before he even steps out on to the Centre Court for his Wimbledon semi... huge-hitting Pole Jerzy Janowicz, Murray will... ve been subject to several of these. He does... time he pops to... lavatory. The osmolar... eck is conducted by one of his staff, its purpose to gaug... the percent... water and min... s in his urine, to show whether his body is correctly hydrated. The fact is, if Murray wins tod... will... ly be thanks to the bloke who inspects his wee.

*(fluently sequenced paragraphs)*

### Daily Diet

At 7.30 this... ng, while many of... arriving at Wimbledon's press restaurant will have begun their day assaulting a... ttering Himalaya of fried starch, Murray will have eaten yogurt, fruit and a bagel smeared in peanut butter …

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## Writing to Review
### Feeling Icy About Frozen?
*(clear, engaging title)*

*(effective introduction)*

*Last weekend* I **was forced to endure** a new DVD that has been added to **my little sister's** ever-growing Disney collection: Frozen 2. For those of you who have been living on a different planet for the last few years, the Frozen franchise is particularly big business for girls under the age of around 7 or 8.

*At first*, **I have to be honest**, I was pretty reluctant to watch it. The first version of Frozen followed the usual Disney drama of: boy meets girl, dramas occur, friends are made, and annoyingly catchy songs are sung. There were the conventional talking animals too and (**I have to admit it**), a cute little snowman. In hope of reacquainting myself with the humour of this cold, carrot-nosed cutie – **I gave up the fight**, and decided **I'd try to grin and bear it** through the sequel...!

*(use topic specific language)*

*(use your tone to make the reader feel like you are sharing personal information and advice.)*

*Surprisingly*, having sat through the whole of the movie, **I'm willing to confess**: it actually wasn't too bad. The music is slightly better than the first one. In Frozen 2, there are some instrumental versions of songs and the riffs are well pitched and engaging. This was a definite **positive for me**, although I was a little annoyed when **I started humming the tune** on the school bus yesterday morning!

*(effectively/fluently linked paragraphs to sequence a range of ideas (no room to produce the other paragraphs/conclusion here).)*

*As for the* characters... Elsa and Anna are still the leading ladies, with Sven, Olaf, and the talking reindeer, (whose name I can't actually remember). Elsa is still a little too overly heroic as she constantly runs off to try and fix things with the customary 'we know it's going to end badly' music tinkering away in the background...

## Writing a formal letter

writer's address

35 Hibiscus Crescent
Andover
Hants
SP10 3WE

221B Bakers Street
London
NW1 6XE

reader's address

date

20th February, 2020

Dear Sir or Madam

Formal Salutation: Sir/Madam/Mr Roderick/Mrs Roderick

I am writing because you chair a committee in charge of the compulsory wearing of school uniforms. I am a student at Brinsley High School, a friendly and successful school where uniforms are not worn.

Of course, [I am aware when writing] that students won't spend all morning choosing what to wear or beg parents for clothes that [I will impress] [others] there is another side to this case: uniforms breed uniformity. We are a culturally diverse nation and we all dress the same, this encourages us to be the same. At Brinsley High, we are encouraged to express [our] individuality, yet this seems to be in contradiction of the message enforced uniform sends to us.

fluently sequenced paragraphs

Furthermore, …

Yours faithfully
**Boris Johnson**

formal sign off: Yours faithfully (Sir/Madam = Faithfully) (Mr/Mrs = Sincerely)

## Writing a Report          Fundraising at Frecklewood

clear title

The Frecklewood Donkey Sanctuary is a charity that cares for rescued and unwanted donkeys. The sanctuary is based a mile away from Frecklewood Academy and the school has a long history of partnership, having sent many year 10 students there for work experience week. The charity is currently in need of funds, having seen a 12% dip in charitable giving during the past few years….

introductory paragraph outlining aims

**Benefits of fundraising**

subheadings

As part of this investigation we have spoken with school leaders at the five state secondary schools in the Danshire area about the fundraising activities that they undertake. Collectively they raise funds for numerous causes, including Shelter (a charity that tackles homelessness), Stonewall (a charity that promotes equality for lesbian, gay, bi and trans people) and Young Dementia UK (who provide support for people whose lives are affected by young onset dementia).
…

Formal tone

One team leader said 'Some of our students have pursued careers in the charity sector as a result of their fundraising work at school.' …

**Suggestions for activities**

subheadings

As Frecklewood has a student …

clear conclusion addressing task and recommendations

Ultimately the benefits of fundraising events are huge. Whichever approach Frecklewood Academy takes, the charity, students and staff are all set to benefit.

## 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 pre-echo 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!

## Thesis / Argument Graphic Organiser

**Thesis:** statement that defines argument/ problem and your viewpoint on it.

**Main reason** your viewpoint is valid/ superior **1**:
- Counter **or** Fact/example to support/validate1a:
- **Fact/example** to support/validate1b:
- **Fact/example** to support/validate1c:

**Main reason** your viewpoint is valid/ superior **2**:
- Counter **or** Fact/example to support/validate 2a:
- **Fact/example** to support/validate 2b:
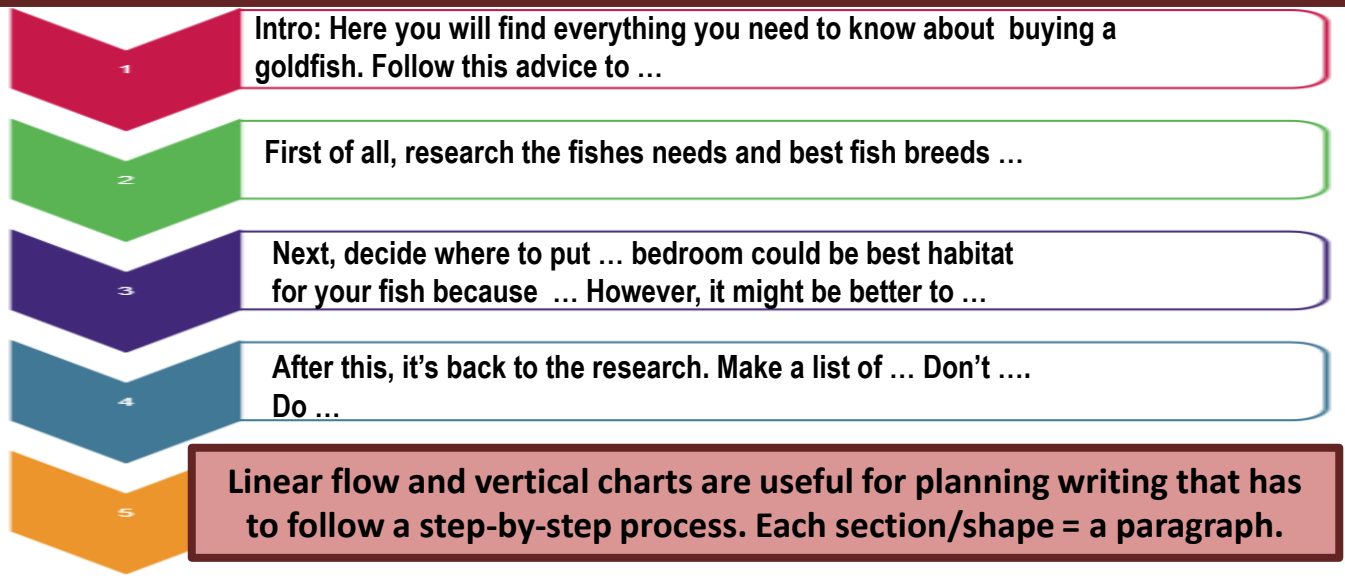- **Fact/example** to support/validate 2c:

**Main reason** your viewpoint is valid/ superior **3**:
- Counter **or** Fact/example to support/validate 3a:
- **Fact/example** to support/validate 3b:
- **Fact/example** to support/validate 3c:

**Conclusion:** restate argument/ problem, and repeat again what reader should now think/feel/ do.

**Plan non-fiction writing (include a counter-argument for writing to argue) using a graphic organiser.**

**Fail to Plan**
**Plan to Fail!**

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## Linear Flow Chart

1. **Intro:** Here you will find everything you need to know about buying a goldfish. Follow this advice to …
2. First of all, research the fishes needs and best fish breeds …
3. Next, decide where to put … bedroom could be best habitat for your fish because … However, it might be better to …
4. After this, it's back to the research. Make a list of … Don't …. Do …
5. **Linear flow and vertical charts are useful for planning writing that has to follow a step-by-step process. Each section/shape = a paragraph.**

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**The Grid Plan is good for making sure you include lots of different methods, or to compare two/more things side-by-side. Each row/column = a paragraph.**

| Paragraph content/ topic | Language method/vocab | Sent structures | Punc |
|---|---|---|---|
| 1: waves engulfing and devouring the sea side town -  noisy and disruptive, movement | onomatopoeia crash, whip, smash  personify so violent/threatening | 'ing' start verbs (pres part) | ! ; |
| 2: train victim moving across railway line past houses towards destination | personify - victim,  alliteration, metaphor: A caterpillar, the train sways and pitches precariously along the track to its daily destination. Snatching bites, the sea salt nips at its metal skin as it passes, eating away at it, killing it. Rattles. Will it survive? | Chain/ tricolon Question | ? - - |
| 3: zoom in on one carriage window, motion sick | Windows hit by spray that 'like a tamed ca' has 'turned savage' today. Passenger pitched side-to-side; bubbling sickness rising bile from stomach! | Anadiplosis (yoked) | ' ' ; ! |
| 4: houses | Like soldiers standing to attention they are defending their inhabitants. Diff pastel colours of a seaside town: prawn pink, salmon peach, oyster grey, seaweed green, cracking paintwork | Fronted spatial adverbials | ( ) : |
| 5: canopy of sky above threatening | Adjectives for mood: grey sky, stuffed clouds full of cold, sharp rain, Verb: beating down, attacking, | Two then three word sentences | … ; |

**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.

**Fail to Plan Plan to Fail!**

**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.

**Falling action (turning point, height of action/problem at its worst):**
- what events happen to solve the problem?

**Freytag's Pyramid/ the Story Mountain is the best for planning narratives (stories).**

**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 cliff-hanger ending?

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

Yours Sincerely

**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.

P1

**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

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

**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?

P2

P3

**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**

| Writing Purposes | Key Language/Structural methods | Chocolate Model! |
|---|---|---|
| **Inform:** tell the reader <u>what</u> they want/need to know. | ➤ Use interesting facts details;<br>➤ use brackets to explain technical **terms**. | **Interestingly, chocolate** is actually made from the seeds of a cacao tree. After fermentation, the beans are dried, cleaned, and roasted. The shell is then removed to produce cacao nibs **(unadulterated chocolate in rough form).** |
| **Explain:** tell the reader <u>how</u> and <u>why.</u> | ➤ Use connectives: 'as a result', 'because', 'so that', when;<br>➤ use sequence discourse markers: Eventually, Another, Furthermore. | **Often, when** in need of comfort or reassurance, or in stressful situations, people crave chocolate. Primarily, this is **because** dopamine is released into your brain **when** you eat chocolate, and **as a result** it can lower levels of anxiety … |
| **Describe:** help the reader to <u>picture</u> it and <u>imagine</u> the <u>experience</u>. | ➤ Use similes, metaphors, personification, interesting adjectives/verbs, sensory description. | **Enticingly,** the **dome** of **dark** chocolate**, flecked sporadically** with **lime slivers, remained encased** in its **fluted carapace. Around** the outside of it **cleaved** the **diminutive remains** of its **neighbour:** a **praline** long ago eaten**! Velvety smooth,** this **solitary bead** of **ganache glistened, revelling** in its **escape**, yet **mourning** its **rejection.** |
| **Narrate**: tell the reader <u>a tale</u> that will have them <u>hanging on your every word</u>. | ➤ Use the mountain/ pyramid structure;<br>➤ use some description;<br>➤ use a few lines of direct speech.  | **Suddenly**, she was aware she had arrived at her destination! On the door in front of her, a **scarlet square of shiny plastic printed** with the words 'Chocolate Laboratory' stood out on its **splintering wood. Why she was standing on this doorstep, though, and what, or who, had led her here in the first place?** |
| **Persuade:** try to <u>get the reader to do as you ask</u>/agree with you. | ➤ Use APE FOR REST: anecdote, personal pronouns, emotive language, fact, opinion, rhetorical questions, repetition, experts, statistics, triples. | **One of** the **world's greatest comfort** foods, Chocolate, is **the unrivalled 'go-to'** when **life takes a bad turn**, an **easy gift** to **thrill** just about **everyone,** and a **tasty treat** that will **uplift even the most melancholy of moods.** |
| **Argue:** <u>present two sides</u>, but ensure <u>your side appears strongest</u> so <u>reader agrees</u> with you. | ➤ Use sequence discourse markers;<br>➤ use 'Some believe ..', 'However, most people would agree that';<br>➤ use APE FOR REST (above). | **First of all, some believe that as chocolate** is high in calories, it is bad for you. **However, scientific experts have proven** that chocolate, as it contains high levels of antioxidants, could **lower cholesterol levels, improve mood and prevent memory decline**! |
| **Advise:** help <u>warn</u> and <u>guide</u> reader, but <u>reassure</u> with carefully considered advice. | ➤ Use imperative verbs (stop, do, don't, wait etc.), and modal verbs (if, could, might, should).<br>➤ use second person (you, your). | **Most importantly, if you** are feeling bored and craving chocolate, **don't** give in to your yearning. Instead, **you could go** for a walk, **run** errands, **call** a friend or **read** a book. **If you** can take your mind off food for a short time, the craving **may** pass. |

# READING LITERARY FICTION TEXTS

## KEY THINGS TO CONSIDER ABOUT THE SOURCE TEXT YOU ARE GIVEN...

**Genre**: What type of story is it? Is it horror? Romance? A mystery? What makes you recognise it as that genre? Which conventions does the story include that make it fit into that genre? Why has the writer chosen this genre?

**Reader**: How is a reader supposed to respond to this text? Are they meant to be scared? Happy? Confused? How does the writer achieve this? What would you say was the writer's **intention**?

**Atmosphere**: What type of mood or tone does the writer create in their story? How do they achieve it?

**Characters**: Which characters are named? What are they called? Which characters are **not** named? Why might this be? Why might their names by important?

**Description of character**: How are the characters described? What does this information reveal to us about them?

**Dialogue**: Do characters speak to each other? Why? Why do they talk about? What does this tell us about character, theme or plot? What do characters say about each other? How might this influence a reader?

**Archetypes**: What **types** of characters do we have in this story? Villains? Heroes? Antiheroes? Comedic characters?

**Description of setting:** How is the setting described? Why is this important? Is the setting as important as character?

## PACE AND TONE – HOW SENTENCES HAVE AN IMPACT ON THE READER...

- Sometimes students can feel a little confused when asked to consider 'sentence forms', but there is an easier way to look at them. Every writer wants to establish a <u>pace</u> and a <u>tone</u> to their writing. Pace is how fast or slow a text is meant to be read.  Tone is the kind of sound or mood you want to give to a piece of writing.
- If you use lots of short sentences together it can build tension, but it can also speed up a text as a reader becomes more desperate to find out what happens as tension builds. Alternatively short sentences can make a reader stop and reflect on specific ideas.
- Longer, more complex sentence forms can be used to aid description or to help a reader build up an understanding of setting or character.
- So whenever you read a text,  think about what kind of tone and pace is created and how the writer uses sentences to achieve that effect on the reader.

### LANGUAGE FEATURES

| |
|---|
| Pronouns |
| Direct speech |
| Noun phrase |
| Subordinate/ main cause |
| Narrative voice |
| Simple/compound/ complex  sentences |
| Accent /Dialect |
| Utterances |
| Ellipsis |
| 1st/3rd person |
| Hyperbole |
| Imperatives |
| Exclamations |

Make sure you learn these key terms and understand what they mean

**KNOW YOUR BASICS!**  Noun/verb/adverb/adjective/simile/metaphor/question /alliteration/ onomatopoeia/5 senses/listing/repetition/personification

**STRETCH YOURSELF!** Look at the bigger picture – not just individual quotes/ Consider genre and form/narrative voice/use terms: connotes/ illustrates

# READING LITERARY TEXTS

How does the writer use **LANGUAGE** to…..?

**To answer: Read and highlight key words in the question**

Pick your quotations **first** then consider devices

- ❑ **CONTRAST** is the number 1/most important language technique – it is <u>always</u> in all good writing/extracts – so always look for & comment on it – *e.g. Light/dark; small/big; 1 person/crowds of people; day/night; etc…*
- ❑ **There are key terms to learn for writing about language:**
- ❑ **Imagery =** Simile, metaphor, personification, & alliteration
- ❑ And use the phrase **'*perhaps…*'** (allows you to speculate & offer alternative ideas)
- ❑ And also the phrases: **'*the effect of this is…*'** & **'*the effect of the motif is*…**' (don't be afraid of sounding repetitive, the marks here are for your comments on the 'effect' of language…not for style!)
- ❑ Point, Evidence, Explain will certainly help you to score well when writing about a text.

## LANGUAGE FEATURES … YOU SIMPLY NEED TO LEARN THESE!

| | |
|---|---|
| **IMAGERY** | **Imagery** is language used by writers to create images in the mind of the reader. **Imagery** includes figurative and metaphorical language to improve the reader's experience & understanding through their senses. E.g. simile, metaphor, personification & alliteration |
| **SIMILE** | Similes help readers to picture a particular object, person or place by **comparing something they don't know to something they do**. They can also be used for **exaggeration.** |
| **METAPHOR** | Metaphors help readers to picture a particular object or place by **transforming them into something they understand better**. They can also be used for **exaggeration.** |
| **PERSONIFICATION** | Personification gives inanimate objects a sense of life or human characteristics |
| **ALLITERATION** | Alliteration creates a memorable sound in the readers' head that means they notice that particular line more or they can remember it quite well. **This means it can be used to emphasise a particular point, idea or feeling**. |

**TECHNIQUE: personification**

**EVIDENCE: quotation shows use of personification– Death is standing**

**EFFECT: explain why the writer uses this technique + how it works – Be specific…DON'T just generally say what the technique means**

Example:
"The writer uses <u>personification</u> in the phrase, 'Death stood at my bedside,' to create an intense feeling of fear for the reader, suggesting the writer felt death was imminent; it was a threatening being, about to take his life."



**MAKE SURE YOU HAVE SOME HIGHLIGHTERS!**

**USE A DIFFERENT COLOUR TO HIGHLIGHT THE INFORMATION FOR DIFFERENT QUESTIONS**

# READING LITERARY FICTION/NON-FICTION TEXTS

| | |
|---|---|
| How far do you <u>agree</u> with a statement about the text?<br><br>**To answer: Read and highlight key words in the question**<br><br>Two stages: recognising **how** the writer tries to achieve effects and deciding **how effectively** this has been done. | ❑ The best answers *mostly* agree with the statement<br>❑ "I agree with … except when …"<br>❑ **CONTRAST** – does the writer use this?<br>❑ Narrative voice – Who is talking? 1st 2nd/3rd person - Why this person/viewpoint?<br>❑ Use this phrase to frame your answer: ***The writer uses …***<br>❑ Then add: ***… the word/phrase/personification/metaphor/simile/alliteration…***<br>❑ Then add: ***… a quotation***<br>❑ Then add: … t*his method shows that/suggests/implies …*<br>❑ End by evaluating: *although/however/but …*<br>❑ Then: **repeat** until you run out of time (literally repeat the above frame) |
| **STRUCTURE** will be referred to in one of the questions.  What could you include? | **[HOW & WHY]**<br>❑ **Construction** – how has the writer 'built' the text? Is it simply *chronological* or more *complex* – flashbacks, single/multiple narratives, repetition…<br>❑ **Contrast** = again, no.1 structural technique…it will always be there so learn what to say about it! Light/dark; small/big; one person/crowds of people; day/night; etc…<br>❑ **Circular** = means we start & end in a similar place but something has changed – what?<br>❑ **Changes** = paragraphs! Look at each paragraph – **how** has it changed? **Why** has it changed? [TiPToP]<br>❑ Summary statement = one sentence overview of how the structure changes across the text<br>❑ Always write about the ending<br>❑ If you struggle with writing about structure, you can still gain marks by using phrases such as: 'At the start of the text…/Then…./In the middle of the text…/At the end of the text…'  This shows that you are tracking the text and you are making a comment about how something has changed. |

*Top Tip: Remember when you are writing about ANY text, PEE (Point, Evidence, Explain) will demonstrate that you have understood what you have read and you have understood that the choices the writer has made, have an impact on the reader.*

# Command Words in Maths questions

These words are the clue to what the examiner expects you to do. Remember to always show your workings. You can get marks for it, even if you get the final answer wrong.

**Simplify** — Simplify the given expression.

**Simplify fully** — Simplify the given expression. Answer must be given in its simplest form.

**Factorise** — Insert brackets by taking out common factors.

**Factorise fully** — Insert brackets by taking out all the common factors.

**Expand** — Remove brackets.

**Expand and simplify** — Remove brackets and then collect like terms.

**Solve** — Find the solution of an equation or inequality.

**Solve algebraically** — Find the solution of an equation or inequality; algebraic manipulation **must** be shown.

**Prove** — More formal than 'show', all steps must be present. In the case of a geometrical proof, reasons must be given.

**Prove algebraically** — Use algebra in the proof.

**Draw** — Produce an accurate drawing (unless a sketch is being drawn).

**Sketch** — Produce a drawing that does not have to be drawn to scale or a graph that is drawn without working out each coordinate.

**Change** — Usually convert from one unit to another; either using known metric unit conversions or the use of a conversion graph.

**Show** — All working needed to get to a given answer **or** complete a diagram to show given information.

**Calculate** — A calculator and some working will be needed.

**Find** — Some working will be needed to get to the final answer.

**Work out** — Some working will be needed in order to get the answer.

**Explain** — Write a sentence or a mathematical statement to show how you got to your answer or reached your conclusion.

**Describe** — Write a sentence that gives the features of the situation.

**Complete** — Fill in missing values.

| x | y |
|---|---|
|  | -3 |
| -1 |  |
| 0 | 1 |
|  | 3 |
| 2 | 5 |

**Give a reason** — Must be clear and accurate reasons. If the reasons are geometrical then make sure you:
- ✔ provide a reason for each stage of working (if required)
- ✔ use correct geometric terminology.

**Express** — Re-write in another form, some working may be needed.

**Justify** — Show all working and/or give a written explanation.

## TECHNICAL VOCABULARY

| | |
|---|---|
| Factor | A number which divides exactly into another. |
| Multiple | A multiple is a number made by multiplying two other numbers. |
| Prime | A prime number has exactly two factors. |
| Integer | The positive and negative whole numbers. |
| Estimate | Usually a calculation where the numbers have been rounded before the operation is performed. |
| Index (indices plural) | An index is a power or exponent. |
| Square root | Is the number that was multiplied by itself to get the square number. |
| Square number | Is a number that has been multiplied by itself. |
| Cube number | Is a number that is multiplied by itself then again by the original number. |
| Cube root | Is the number that was multiplied by itself and itself again to get the cube number |
| Numerator | The number on the top of the fraction. Shows how many part there are. |
| Denominator | The number on the bottom of the fraction. Shows how many equal parts the item is divided into. |
| Common denominator | When two or more fractions have the same denominator. |
| Equivalent | Having the same value |
| Inverse | The opposite mathematical operation. |
| Reciprocal | The number produced by dividing 1 by a given number |
| Odd | An integer that cannot be divided exactly by two. |
| Even | An integer that can be divided exactly by two. |

## Websites to help you with understanding and revision

Sparxmaths.com
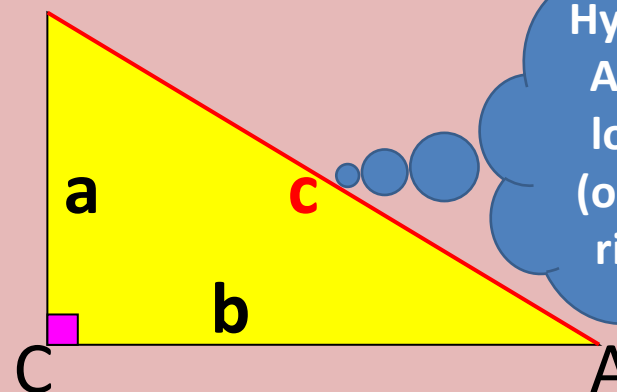
CorbettMaths.com

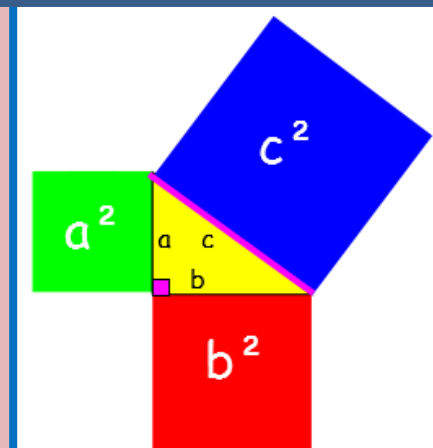Trafalgar Maths Site

Maths Genie

OnMaths

## Pythagoras' Theorem

Pythagoras' Theorum states that
for right angled triangles,
the sum of the squares of the
two shorter sides is equal to
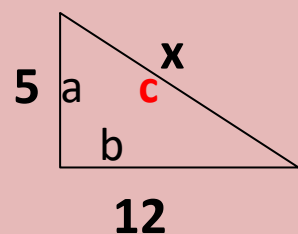the square of the hypotenuse

$$a^2 + b^2 = c^2$$

B

a     c

b

C          A

Hypotenuse is ALWAYS the longest side (opposite the right angle)

$c^2$

$a^2$     $a$  $c$
          $b$

$b^2$

Sparx : M147

---

### Finding the hypotenuse

Sparx : M677

5  a     **x**
      **c**
   b

**12**

$c^2 = a^2 + b^2$
$x^2 = 5^2 + 12^2$
$x^2 = 25 + 144$
$x^2 = 169$
$x = \sqrt{169}$
$x = 13$

**Pythagorean Triples** are 3 integers that follow the Pythagorean rule e.g.

**3, 4, 5        5, 12, 13        7, 24, 25**

and any multiples of these triples e.g.

6, 8, 10        15, 36, 39        14, 120, 125

---

### Finding a shorter side

Sparx : M677

9  a    **14**
      **c**
   b

**x**
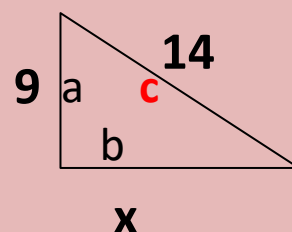
Find x
All lengths in cm
$c^2 = a^2 + b^2$

**Rearrange for shorter side**
$b^2 = c^2 - a^2$

$x^2 = 14^2 - 9^2$
$x^2 = 196 - 81$
$x^2 = 115$
$x = \sqrt{115}$
$x = 10.72380....$
$x = 10.7$ cm (3 sf)

Remember to give degree of accuracy of rounding and **UNITS** of measure when needed.

---

### Problems Solving:  Pythagoras in 3D

4 cm

6 cm     x

y

13 cm

4cm

x

y     6cm

13cm
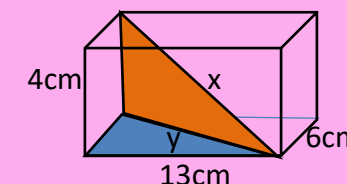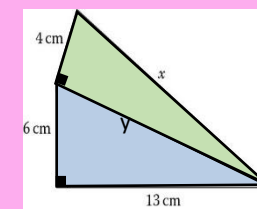
Find the interim hypotenuse:

$c^2 = a^2 + b^2 \rightarrow$    $y^2 = 13^2 + 6^2$
                    $y^2 = 169 + 36 =$ **205**

No need to find value of y as it is $y^2$ that will be used in next calculation!

Find the wanted hypotenuse:

$c^2 = a^2 + b^2 \rightarrow$    $x^2 = y^2 + 4^2$
                    $x^2 =$ **205** $+ 16 = 221$
                    $x = \sqrt{221} = 14.866....$
                    $x = 14.9$ cm (3sig fig)

Summary 3D Formula:  $d^2 = a^2 + b^2 + c^2$

Understanding Trigonometry

Trigonometry enables us to find **missing angles and sides in right angled triangles** because the ratios between different sides of a right angled triangle will be the same for all similar triangles (with the same angles).

Trigonometry Notation

For any right angled triangle ABC:
The **HYPOTENUSE** is ALWAYS the LONGEST SIDE
The **other sides are named according to where they are in relation to the angle**
The **OPPOSITE** side is OPPOSITE the ANGLE known/wanted
The **ADJACENT** side is NEXT TO the ANGLE known/wanted
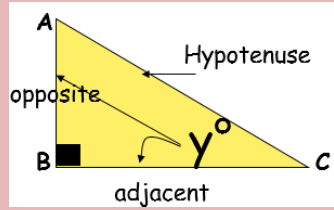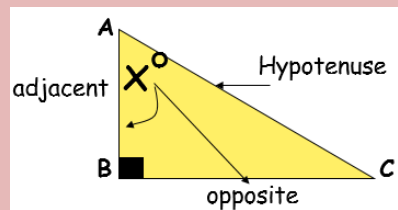
**Pythagoras or Trigonometry?:  Pythagoras only deals with sides;  Trigonometry MUST INVOLVE AN ANGLE**

A common way to remember the ratios is:  "**SOH CAH TOA**".... but make up your own mnemonic to remember the order of letters e.g. from one former pupil: "**s**unny **o**n **h**oliday, **c**loudy **a**t **h**ome, **t**oday **o**nly **a**verage!"

Sine Ratio

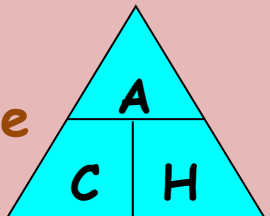$$\text{Sin } \delta = \frac{\text{Opposite}}{\text{Hypotenuse}}$$

Finding angle ⇨ $\sin^{-1}\left(\frac{o}{h}\right)$
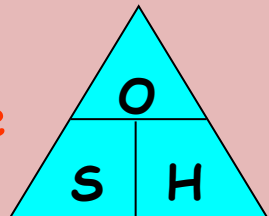
Cosine Ratio

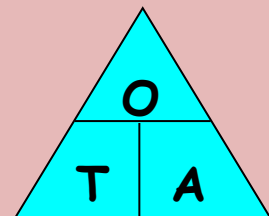$$\text{Cos } \delta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$$

Finding angle ⇨ $\cos^{-1}\left(\frac{a}{h}\right)$

Tangent Ratio

$$\text{Tan } \delta = \frac{\text{Opposite}}{\text{Adjacent}}$$

Finding angle ⇨ $\tan^{-1}\left(\frac{o}{a}\right)$

**METHOD**

STEP 1:     **Label the sides you need or know (only 2 out of the 3!)**
**Remember to label according to the known/wanted angle**

STEP 2:     **Identify the trig ratio needed from the sides involved**

STEP 3:     **Draw out the required calculation triangle**
**Cross out the item you need to find**

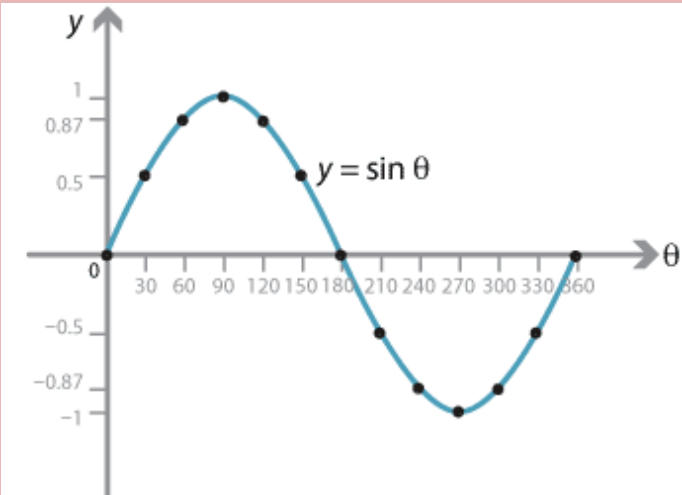STEP 4:     **Write down the required calculation – times or divide?**

In triangle ABC find side CB.

2 cm   56°
Adj.
Opp

CB   = tan(56) x 2
       = 2.965...
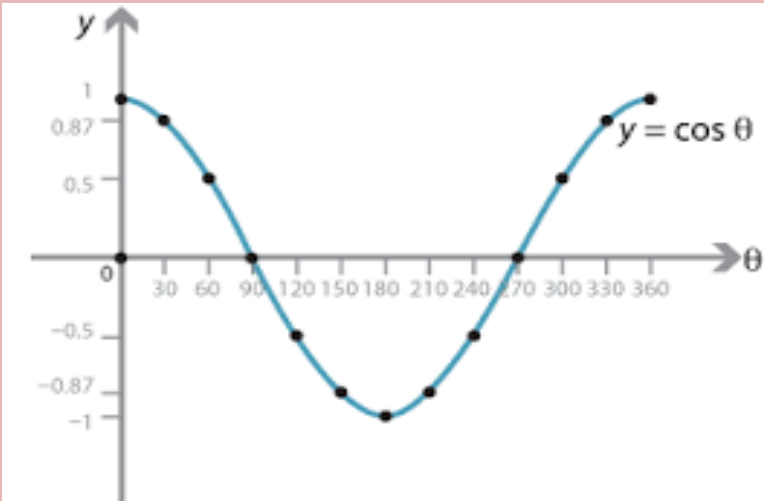       = 2.97cm s(3sf)

In triangle ABC find angle n

n°   10 cm
7 cm

Angle n   = $\sin^{-1}\left(\frac{7}{10}\right)$
            = 44.427....
            = 44° (nr°)

## Sine Graph



$y = \sin \theta$

**Minimum value -1  Maximum value +1**
**Lines of symmetry at 90⁰ and 270⁰**
**Pattern repeats every 360⁰** so within every 360⁰ there are 2 angles with same sine ratio e.g. $\sin^{-1}(\frac{1}{2}) = 30^{\circ}$ AND $150^{\circ}$

## Cosine Graph



$y = \cos \theta$

**Minimum value -1  Maximum value +1**
**Lines of symmetry at 180⁰**
**Pattern repeats every 360⁰** so within every 360⁰ there are 2 angles with same cos ratio e.g. $\cos^{-1}(-\frac{1}{2}) = 120^{\circ}$ AND $150^{\circ}$

## Tangent Graph
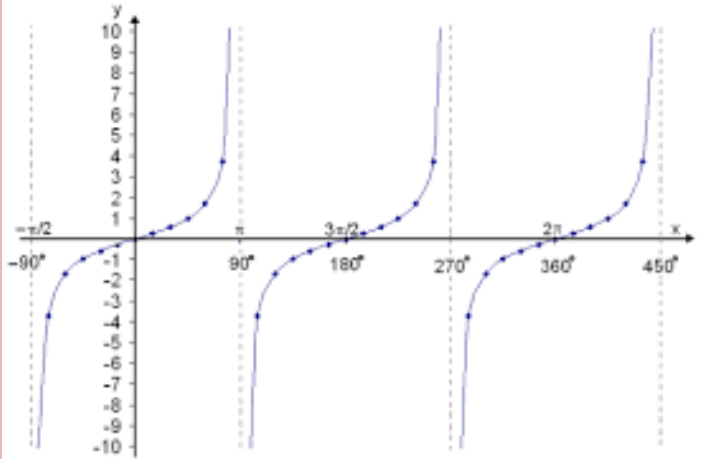


**Minimum value -∞  Maximum value +∞**
**Asymptotes at 90⁰ and 270⁰ - no tan value for these angles**.
**Pattern repeats every 180⁰** so within every 360⁰ there are 2 angles with same tan ratio e.g. $\tan^{-1}(1) = 45^{\circ}$ AND $(45+180=)$ $225^{\circ}$

## Exact Values:

Some trigonometric values need to be learnt BY HEART

### Exact Values of Trigonometric Functions

| Angle (θ) Degrees | 0° | 30° | 45° | 60° | 90° |
|---|---|---|---|---|---|
| $\sin(\theta)$ | 0 | $\frac{1}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{\sqrt{3}}{2}$ | 1 |
| $\cos(\theta)$ | 1 | $\frac{\sqrt{3}}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{1}{2}$ | 0 |
| $\tan(\theta)$ | 0 | $\frac{1}{\sqrt{3}}$ | 1 | $\sqrt{3}$ | Not Defined |

**Exact trig values can be calculated using properties and known angles in a "unit" equilateral triangle (60⁰ and 30⁰) and a right angled isosceles triangle (45⁰) - Pythagoras is applied to find the 3rd side....**

### two famous triangles



an equilateral triangle
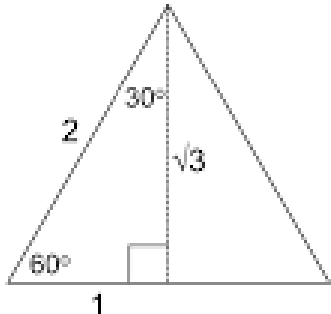
an isosceles, right-angled triangle

# Year 9 Maths Term 5/6 -Trigonometry in non-right angled triangles ("wonky trig")
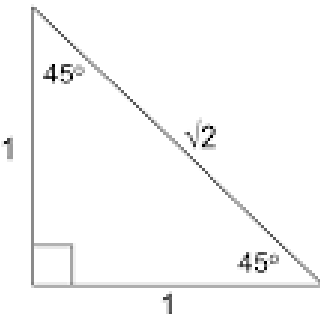
### Knowing this basic fact is key as correct use of formula requires knowing which sides and angles are involved
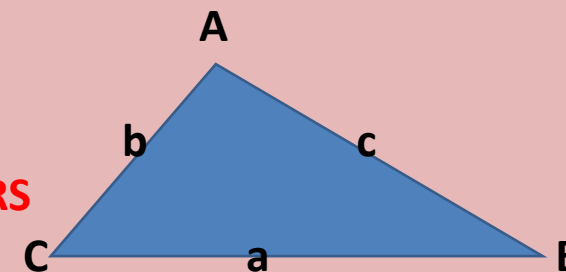
**KEY LABELLING Notation**

For any triangle ABC:

**Angles** are labelled with **CAPITAL LETTERS**

**Sides** are labelled with **LOWERCASE LETTERS**

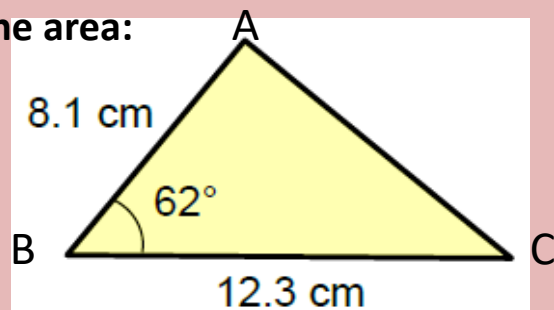**Side a** will be opposite **Angle A** etc.

---

## Sine Rule for AREA OF TRIANGLES

$$Area = \frac{1}{2}abSin(C)$$

Requires: 2 sides and INCLUDED angle

**Find the area:**

8.1 cm
62°
B
C
A
12.3 cm

Area  = ½ x 8.1 x 12.3 x Sin(62)

= 43.984….

= 44.0 cm² (3sig fig)

> Remember to show answer to 3 or 4 decimal places before rounding.
> Always state degree of accuracy and **units**

---

## Sine Rule for LENGTHS and ANGLES

Finding sides:

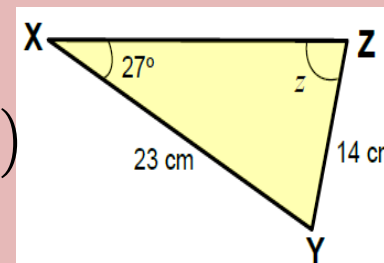$$\frac{a}{Sin\,(A)} = \frac{b}{Sin\,(B)} \left(= \frac{c}{Sin(C)}\right)$$

Finding angles:

$$\frac{Sin\,(A)}{a} = \frac{Sin\,(B)}{b} \left(= \frac{Sin\,(C)}{c}\right)$$

Requires: a known SIDE & ANGLE pair
the opposite side/Angle of the wanted Angle/side

**Find the angle Z**

$$\frac{Sin\,(Z)}{23} = \frac{Sin\,(27)}{14}$$

$$Z = sin^{-1}\left(\frac{Sin\,(27)\times23}{14}\right)$$

= 48.234….

= 48° (nr degree)

X 27°
Z
z
23 cm
14 cm
Y

---

## Cosine Rule for LENGTHS and ANGLES

Finding sides:

$$a^2 = b^2 + c^2 - 2bcCos(A)$$

Requires: 2 sides and INCLUDED angle being the angle opposite wanted side.

Finding angles:
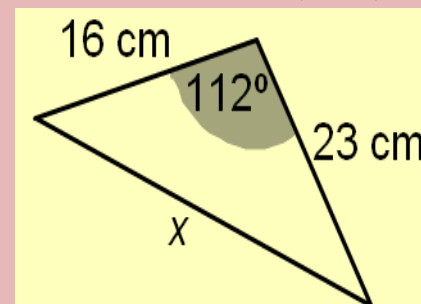
$$Cos(A) = \frac{b^2 + c^2 - a^2}{2bc}$$

Requires: all 3 sides

**Find the side x**

$$x^2 = 16^2 + 23^2 - 2 \times 16 \times 23 \times Cos(112)$$

$$x^2 = 1060.710\,…$$

$$x = 32.568\,…$$

$$x = 32.6\,cm\,(3\,sf)$$

16 cm
112°
23 cm
x

## The left hand trick for Sine and Cosine

$$\cos(30°) = \frac{\sqrt{3}}{2}$$

$$\sin(30°) = \frac{\sqrt{1}}{2} = \frac{1}{2}$$

$$\sin(330°) = -\frac{\sqrt{1}}{2} = -\frac{1}{2}$$

(−) Q4

- Your pinky is the x-axis, your thumb is the y-axis
- Each finger represents an angle
- Find Cosine coordinate of an angle by counting fingers to the left
- Find Sine coordinate of an angle by counting fingers to the right
- Switch the charge to represent the coordinates
- Fill in your circle using your hand trick

Tables for sine, cosine and tangent between 0 and 90 degrees (to 3dp)

| Angle | Sine | Cosine | Tangent |
|---|---|---|---|
| 0 | 0.000 | 1.000 | 0.000 |
| 1 | 0.017 | 1.000 | 0.017 |
| 2 | 0.035 | 0.999 | 0.035 |
| 3 | 0.052 | 0.999 | 0.052 |
| 4 | 0.070 | 0.998 | 0.070 |
| 5 | 0.087 | 0.996 | 0.087 |
| 6 | 0.105 | 0.995 | 0.105 |
| 7 | 0.122 | 0.993 | 0.123 |
| 8 | 0.139 | 0.990 | 0.141 |
| 9 | 0.156 | 0.988 | 0.158 |
| 10 | 0.174 | 0.985 | 0.176 |
| 11 | 0.191 | 0.982 | 0.194 |
| 12 | 0.208 | 0.978 | 0.213 |
| 13 | 0.225 | 0.974 | 0.231 |
| 14 | 0.242 | 0.970 | 0.249 |
| 15 | 0.259 | 0.966 | 0.268 |
| 16 | 0.276 | 0.961 | 0.287 |
| 17 | 0.292 | 0.956 | 0.306 |
| 18 | 0.309 | 0.951 | 0.325 |
| 19 | 0.326 | 0.946 | 0.344 |
| 20 | 0.342 | 0.940 | 0.364 |
| 21 | 0.358 | 0.934 | 0.384 |
| 22 | 0.375 | 0.927 | 0.404 |
| 23 | 0.391 | 0.921 | 0.424 |
| 24 | 0.407 | 0.914 | 0.445 |
| 25 | 0.423 | 0.906 | 0.466 |
| 26 | 0.438 | 0.899 | 0.488 |
| 27 | 0.454 | 0.891 | 0.510 |
| 28 | 0.469 | 0.883 | 0.532 |
| 29 | 0.485 | 0.875 | 0.554 |

| Angle | Sine | Cosine | Tangent |
|---|---|---|---|
| 30 | 0.500 | 0.866 | 0.577 |
| 31 | 0.515 | 0.857 | 0.601 |
| 32 | 0.530 | 0.848 | 0.625 |
| 33 | 0.545 | 0.839 | 0.649 |
| 34 | 0.559 | 0.829 | 0.675 |
| 35 | 0.574 | 0.819 | 0.700 |
| 36 | 0.588 | 0.809 | 0.727 |
| 37 | 0.602 | 0.799 | 0.754 |
| 38 | 0.616 | 0.788 | 0.781 |
| 39 | 0.629 | 0.777 | 0.810 |
| 40 | 0.643 | 0.766 | 0.839 |
| 41 | 0.656 | 0.755 | 0.869 |
| 42 | 0.669 | 0.743 | 0.900 |
| 43 | 0.682 | 0.731 | 0.933 |
| 44 | 0.695 | 0.719 | 0.966 |
| 45 | 0.707 | 0.707 | 1.000 |
| 46 | 0.719 | 0.695 | 1.036 |
| 47 | 0.731 | 0.682 | 1.072 |
| 48 | 0.743 | 0.669 | 1.111 |
| 49 | 0.755 | 0.656 | 1.150 |
| 50 | 0.766 | 0.643 | 1.192 |
| 51 | 0.777 | 0.629 | 1.235 |
| 52 | 0.788 | 0.616 | 1.280 |
| 53 | 0.799 | 0.602 | 1.327 |
| 54 | 0.809 | 0.588 | 1.376 |
| 55 | 0.819 | 0.574 | 1.428 |
| 56 | 0.829 | 0.559 | 1.483 |
| 57 | 0.839 | 0.545 | 1.540 |
| 58 | 0.848 | 0.530 | 1.600 |
| 59 | 0.857 | 0.515 | 1.664 |

| Angle | Sine | Cosine | Tangent |
|---|---|---|---|
| 60 | 0.866 | 0.500 | 1.732 |
| 61 | 0.875 | 0.485 | 1.804 |
| 62 | 0.883 | 0.469 | 1.881 |
| 63 | 0.891 | 0.454 | 1.963 |
| 64 | 0.899 | 0.438 | 2.050 |
| 65 | 0.906 | 0.423 | 2.145 |
| 66 | 0.914 | 0.407 | 2.246 |
| 67 | 0.921 | 0.391 | 2.356 |
| 68 | 0.927 | 0.375 | 2.475 |
| 69 | 0.934 | 0.358 | 2.605 |
| 70 | 0.940 | 0.342 | 2.747 |
| 71 | 0.946 | 0.326 | 2.904 |
| 72 | 0.951 | 0.309 | 3.078 |
| 73 | 0.956 | 0.292 | 3.271 |
| 74 | 0.961 | 0.276 | 3.487 |
| 75 | 0.966 | 0.259 | 3.732 |
| 76 | 0.970 | 0.242 | 4.011 |
| 77 | 0.974 | 0.225 | 4.331 |
| 78 | 0.978 | 0.208 | 4.705 |
| 79 | 0.982 | 0.191 | 5.145 |
| 80 | 0.985 | 0.174 | 5.671 |
| 81 | 0.988 | 0.156 | 6.314 |
| 82 | 0.990 | 0.139 | 7.115 |
| 83 | 0.993 | 0.122 | 8.144 |
| 84 | 0.995 | 0.105 | 9.514 |
| 85 | 0.996 | 0.087 | 11.430 |
| 86 | 0.998 | 0.070 | 14.301 |
| 87 | 0.999 | 0.052 | 19.081 |
| 88 | 0.999 | 0.035 | 28.636 |
| 89 | 1.000 | 0.017 | 57.290 |
| 90 | 1.000 | 0.000 | Undef. |

| Example: | Glossary :  Key terms and concepts explained |
|---|---|
| $a, b, x, y$ | **VARIABLES** – are letters or symbols used to represent numbers. |
| **4a + 2b** $xy$ $5(x + 3)$ $x^2 - 4$ | **EXPRESSIONS** – are formed from variables and numbers combined with operation signs and brackets. Each part of an expression is called a **TERM**, terms are separated by operators. Eg.  $3n$ + 5 has two terms $3n$ and 5 separated by the operation + **An expression does NOT have an equals sign.** |
| $A = \frac{1}{2}xy$ $5(x + 3) = 8$ $x^2 - 4 = 0$ | **EQUATIONS** – are mathematical statements showing two expressions have equal value, indicated by the equals symbol =. Eg. $5x + 4 = 29$, the = symbol shows that $5x$ + 4 has the same value as 29. **An equation MUST have an equals sign.** |
| **a < 2** $5(x + 3) > 8$ $x^2 - 4 \le 0$ | **INEQUALITIES** – are mathematical statements showing the comparative value of one expression to the other. Instead of = the two sides might be Greater than (>); Greater than or equal to (≥ ); Less than (<); Less than or equal to (≤) the other. Like equations, inequalities may be "solved" but unlike equations, **solutions of an inequality will be a range of possible values**.  For example, the inequality **a<2**  indicates that the variable a may take any value as long as it is less than 2. |
| $d = 2r$ $A = \frac{1}{2}xy$ $v = u + at$ | **FORMULA (pl. formulae or formulas)** – are equations linking at least two variables and explains the relationship between them. Eg. $d = 2r$ has two variables ( d and r) and explains that the diameter of a circle (d)  is equal to twice the length of the radius ($r$). **Formulae cannot be solved without substituting in known values**. For instance, the formula $v = u + at$, has 4 linked variables ($v, u, a, t$). Only if the values of three variables are known, can the fourth value be calculated. |
| $ab \equiv ba$ $x + 2 \equiv 2 + x$ | **Identities** – are expressions which are *identically equal* (in other words the same just written in a different way).  Such expressions are linked with the symbol ≡.  **Identities cannot be solved** as both expressions will be equal in value. |

## Substitution into Expressions and Formula  Sparx : U585

**Substitution** is when an unknown (variable) is replaced with a known value (number).
For example, you are asked to find the area of this rectangle….

5cm

$$A = L \times W$$

3cm

You know the formula for area:      Area = Length x Width
You now know actual values:       (L) = 5cm  (W) = 3cm
So you can substitute these in...    A = 5 x 3
… and calculate the Area:         A = 15cm$^2$

Things to note when substituting:
- **Be careful of algebraic notation** – remember number problems need multiplication signs!
- Be careful when substituting **negative numbers** – it is best to write them in a bracket particularly if you are going to use a calculator
- **Write out the new calculation in full** replacing the variables with their new known value
- When calculating the final answer, **follow BIDMAS rules** for order of operations
  Examples:  if **a = 2,   b = 3** and **c = -5**, find the value of the following expressions:

| **abc** ⇨ 2 x 3 x (-5) = -15 | **a - b - c** ⇨ 2 - 3 - (-5) = 2-3+5 = 4 | **ab + c** / **2** ⇨ $\frac{2x3+(-5)}{2} = \frac{1}{2}$ | **ac²** ⇨ 2x(-5)x(-5) = 2 x 25 = 50 | **(ac)²** ⇨ 2x(-5)x2x(-5) = -10 x -10 = 100 |
|---|---|---|---|---|

## Real life formulae and substitution examples  Sparx : U144

Example 1: Using given formula
$$F = \frac{9C}{5} + 32$$
This is the formula to change degrees Celsius (℃) to degrees Fahrenheit (℉).
Use the formula to convert 21℃ to ℉

Substitute in **C =21**:     $F = \frac{9 \times 21}{5} + 32$

$$F = \frac{189}{5} + 32$$

$$F = 37.8 + 32$$

Temperature of 21℃ is equal to **69.8** ℉

Example 2: Writing formula
The cooking time for a turkey is 35 minutes per Kilogram plus an extra 20 minutes.
a)  Write a formula for this problem
b)  Use your formula to calculate the cooking time for a turkey weighing 5kg in hours and minutes

Define variables: Cooking Time (C); Weight (W = 5)
Write formula:    Cooking Time = 35 x Weight + 20
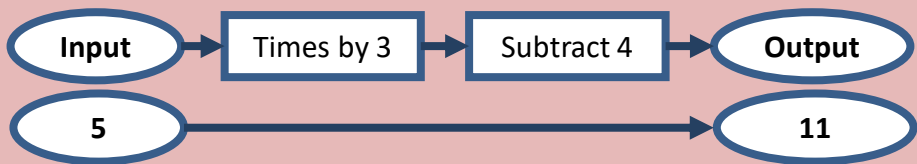a) Formula:        **C = 35W + 20**
b) Substitute:     C = 35 x 5 + 20
                   C = 195 minutes
                   **C =3hours and 15 minutes**

# Functions

**A function links two variables. When you know one, you can work out the other.**

There are three elements to a function: the input, the relationship and the output.

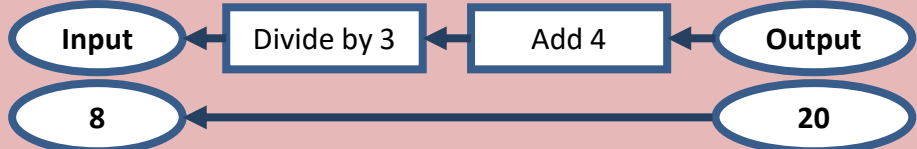These elements can be represented by a **function machine:**

Input → Times by 3 → Subtract 4 → Output

5 → 11

A true function must produce only one output for each input.

Once a function has been understood it can be "undone" by working backwards and applying **inverse operations**.

Input ← Divide by 3 ← Add 4 ← Output

8 ← 20

**Inverse operations**

$+ \Leftrightarrow -$

$\times \Leftrightarrow \div$

$\square^2 \Leftrightarrow \sqrt{\square}$

(Powers)    (Roots)

… so an **output** of 20 from this function could only have resulted from an input of (20+4)÷3 = 8.

## Functions, Equations and Formula

Many equations and formula can be represented using a function machine:

**Example:   (i) Create a function machine for the equation y = 2x³ − 5**

Y is the **Subject** of this formula - it is the variable on its own on one side of the equals sign. The subject is the **Output** of the function machine. "y" is the output, which means "x" will be the **Input**. The process that turns the input value "x" into output "y" is the 'story of "x" into "y"'.

Eg. What is happening to "x" to turn it into "y" – remembering to follow BIDMAS, "x" is being cubed first, then multiplied by 2 then 5 is subtracted from the value.

Input → Cube → Times by 2 → Subtract 5 → Output
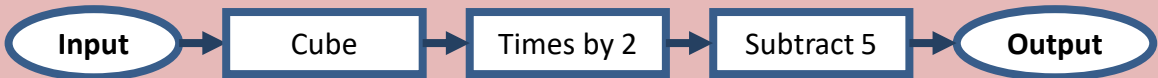
**(ii) Use your function machine to find the value of x when y = 11**

y is the output so x is the input. To the calculate x you need to work back through the function machine with inverse operations.

Input ← Cube Root ← Divide by 2 ← Add 5 ← Output

2 ← 11

$\sqrt[3]{8} = 2$     (16÷2=8)     (11+5=16)

Input must be 2 for output of 11 **so if y=11 then x = 2**

---

# Changing the subject of a formula or equation
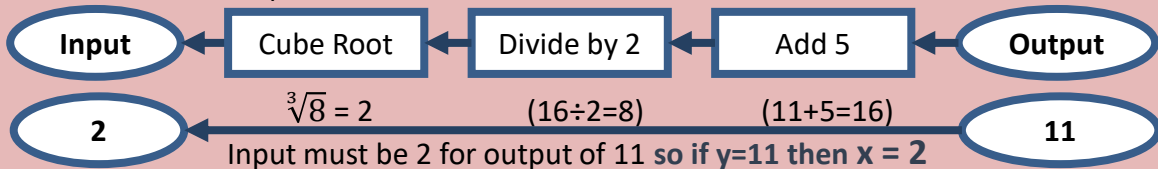
This method - creating functions machines and their inverses - can help in rearranging (or changing the subject of) a formula.

**Examples:   (1) Rearrange the equation** $y = 5x + 6$ **to make** $x$ **the subject**

**Step 1: create the Function machine. Remember start with** $x$ **and build to** $y$

$x$ → x5 → +6 → $y$ **(old subject)**

**Step 2: reverse the Function machine applying inverse operations**

$x$ ← ÷5 ← -6 ← $y$

**( new subject)**    **(relationship around y)**

**Step 3: follow the reversed function to write the new relationship around** $y$ **which is equal to the new subject x**

$x = \dfrac{y-6}{5}$

**(2) Rearrange the equation** $y = \frac{1}{2}x^2 - 5$ **to make** $x$ **the subject**

**Step 1:**   $x$ → Square → ÷2 → - 5 → $y$

**Step 2:**   $x$ ← Square root ← x2 ← +5 ← $y$

**Step 3:**   **(new subject)**    **(relationship around y)**

$x = \sqrt{2(y+5)}$

$= \sqrt{2y + 10}$   **(Simplify if necessary)**

Once you are confident that you know how to "unpick" a function accurately , an alternative way to set out your workings is similar to that for solving equations:

**(3) Rearrange these formula to make x the subject**

(i) $y = mx + c$                    (ii) $y = \dfrac{x}{2} - b$

(-c) | $y - c = mx$ | (-c)          (+b) | $y + b = \dfrac{x}{2}$ | (+b)

(÷m) | $\dfrac{y-c}{m} = x$ | (÷m)          (x2) | $2(y + b) = x$ | (x2)

Finally remember to write your final answer with $x$ as the subject at the start.

$x = \dfrac{y-c}{m}$                    $x = 2(y + b)$

# Function Notation

More mathematically, a function is a relation between a set of **INPUTS** (the "**DOMAIN**") and a set of **OUTPUTS** (the "**RANGE**") such that each input is related to an output.

Functions can be named. The most common name is "f", but others, "g", "h" etc can be used to distinguish between different functions in a problem.

Inputs **DOMAIN** $x$ → FUNCTION → Outputs **RANGE** $f(x)$
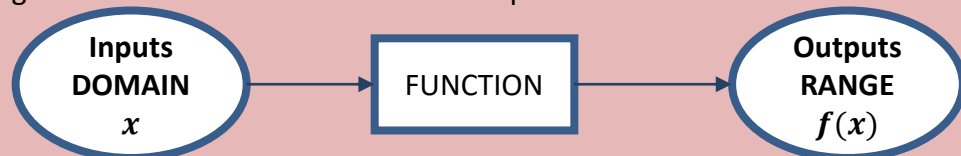
Here the function "f" has been applied to the input $x$ producing the result $f(x)$ which can be said "f of x". As you can see, we are using $f(x)$ where previously we have used $y$ to represent the output … the two are EXACTLY THE SAME – it's just using different notation!

More commonly , function are written:

$f(x) = x^2$

function name — input — what to output

..and just like functions machines, we may be given different parts (input or output) of the problem and asked to find the other – the trick is to work out which you have been given…

Example 1: Given that the function $f(x) = x^2 + 1$
(i) Find $f(3)$ and (ii) $f(-2)$

The values given are **INSIDE** the bracket. They are the **INPUTS** into the function. **SUBSITUTE** to find the output

(i) $f(3) = 3^2 + 1$
$f(3) = 10$

(ii) $f(-2) = (-2)^2 + 1$
$f(-2) = 5$

Example 2: Given that the function $f(x) = 2x + 7$
(i) Find $f(x) = 3$ and (ii) $f(x) = (-2)$

The values given are **OUTSIDE** the bracket. They are the **OUTPUTS of** the function. **SOLVE** the equation to find the input

(i) $f(x) = 3 \Rightarrow 2x + 7 = 3$
$2x = -4$
$\underline{x = -2}$

(i) $f(x) = (-2) \Rightarrow 2x + 7 = -2$
$2x = -9$
$\underline{x = -4.5}$

Get into the habit: Remember negatives in brackets may be a MUST if you are SQUARING using your calculator!

# Inverse Functions

The inverse of a function $f(x)$ is written $f^{-1}(x)$

$x$ —$f(x)$→ $y$ ←$f^{-1}(x)$—
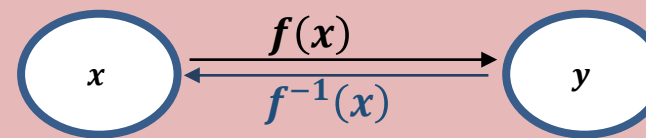
If a function maps the input $x$ to an output $y$ then the inverse function will map the output $y$ to the input $x$

Given the function $g(x) = 4x - 3$
Find $g^{-1}(x)$

$g(x) = 4x - 3 \Rightarrow y = 4x - 3$
$y + 3 = 4x$
$\frac{y+3}{4} = x$

$\Rightarrow g^{-1}(x) = \frac{(x+3)}{4}$

**Rewrite your answer using $x$ as the input for the new function**

To calculate the inverse function of $f(x)$, remember "$f(x)$" **is the same as "$y$"**, so simply rewrite the function as an equation and rearrange to **make $x$ the subject** of the formula. However, using function notation, the inverse function $f^{-1}(x)$ will still need $x$ as the named input variable so rewrite your answer simplify **replacing "$y$" with "$x$"**

**Note :** Most be not all functions will produce different inverse functions. Exceptions:
(i) A function can be its own **self inverse** for example if $f(x) = \frac{1}{x}$ then $f^{-1}(x) = \frac{1}{x}$
(ii) A function may not have a inverse <u>function</u> without further definition. For example, if $f(x) = x^2$ then the inverse would $\pm\sqrt{x}$ but a function is such that each input must map to a single output… with two possible outputs from square rooting this would not be the case. Therefore, it is sometimes important to "restrict the domain" for inverse function i.e. here for $f(x) = x^2$ then $f^{-1}(x) = \sqrt{x}$ where $x \geq 0$

Given the function $h(x) = \frac{1}{x}$
Find $h^{-1}(x)$

$h(x) = \frac{1}{x} \Rightarrow y = \frac{1}{x}$
$xy = 1$
$x = \frac{1}{y}$

$\Rightarrow h^{-1}(x) = \frac{1}{x}$

**Rewrite using $x$ as the input**

## Identifying inverse functions graphically
For any given function $f(x)$ and its inverse $f^{-1}(x)$, the graph of
$f^{-1}(x)$ **is a reflection of $f(x)$ in the line $y = x$**

$f(x) = 2x$
$y = x$
$f^{-1}(x) = \frac{x}{2}$
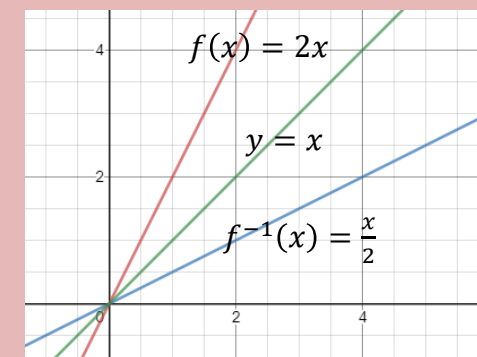
# Composite Functions

Composite functions are a combination of functions where the output of the first function applied becomes the input to the second; the relationship between original input and final output can then be simplified into a single composite function. The order in which the functions need to be applied are shown in the composite function notation – simply put, work back way from the input $(x)$…
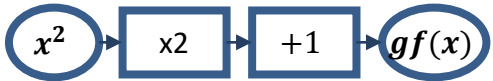
**Examples:** Given that $f(x) = x^2$ and $g(x) = 2x + 1$, ….

**a) Find $gf(x)$**

($\Rightarrow$ apply "f" first then "g" to its output)

$$x \rightarrow f(x) \rightarrow g(x) \rightarrow gf(x)$$
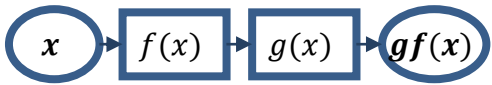
The output of $f(x)$ is $x^2$. This becomes the input for $g(x)$ so…

$$x^2 \rightarrow \times 2 \rightarrow +1 \rightarrow gf(x)$$

$$\Rightarrow gf(x) = 2x^2 + 1$$

*Number in bracket $\Rightarrow$ input*

**b) Find $gf(5)$**

If $gf(x) = 2x^2 + 1$, then

$gf(5) = 2 \times 5^2 + 1$

$= 51$

Check:
$f(5) = 5 \times 5 = 25$
$g(25) = 2 \times 25 + 1$
$= 51$

*Number outside bracket $\Rightarrow$ output*

**c) Find $gf(x) = 19$ where $x \geq 0$**

If $gf(x) = 2x^2 + 1$, then

$2x^2 + 1 = 19$

$2x^2 = 18$

$x^2 = 9$

$x = 3$

Check:
Substitute answer into functions…
$f(3) = 3 \times 3 = 9$
$g(9) = 2 \times 9 + 1$
$= 19$

**(1) Find $fg(x)$**

($\Rightarrow$ apply "g" first then "f" to its output)

$$x \rightarrow g(x) \rightarrow f(x) \rightarrow gf(x)$$

The output of $g(x)$ is $2x + 1$. This becomes the input for $f(x)$ so…

$$2x + 1 \rightarrow square \rightarrow fg(x)$$

$$\Rightarrow gf(x) = (2x + 1)^2$$

$$\Rightarrow gf(x) = (2x + 1)(2x + 1)$$

$$\Rightarrow gf(x) = 4x^2 + 4x + 1$$

**(2) Find $fg(-2)$**

If $gf(x) = 4x^2 + 4x + 1$, then

$gf(2) = 4 \times (-2)^2 + 4 \times (-2) + 1$

$= 9$

**(3) Find $gf(x) = 36$ where $x \geq 0$**

If $fg(x) = 4x^2 + 4x + 1$, then

$4x^2 + 4x + 1 = 19$

$(2x + 1)^2 = 36$

$2x + 1 = 6$

$2x = 5$

$x = 2.5$

---

**Example: Given that $f(x) = 2x - 3$ and $g(x) = x^2 + 1$**

**Solve $gf(x) = 2fg(x)$**

**Step 1: Find $gf(x)$** $\Rightarrow gf(x) = (2x - 3)^2 + 1$

$\Rightarrow gf(x) = (2x - 3)(2x - 3) + 1$

$\Rightarrow gf(x) = 4x^2 - 12x + 10$

*$gf(x) \Rightarrow$ apply "f" first then "g" to its output. The output of $f(x)$ is $2x - 3$. This becomes input for g(x) so $(2x - 3)$ needs to be squared then 1 add*

**Step 2: Find $2fg(x)$** $\Rightarrow fg(x) = 2(x^2 + 1) - 3$

$\Rightarrow gf(x) = 2x^2 + 2 - 3$

$\Rightarrow gf(x) = 2x^2 - 1$

$\Rightarrow 2gf(x) = 4x^2 - 2$

*$fg(x) \Rightarrow$ apply "g" first then "f" to its output then times 2. The output of $g(x)$ is $x^2 + 1$. This becomes input for $f(x)$ so needs to be x2 then subtract 3. Finally $2fg(x)$ means $2 \times fg(x)$…*

**Step 3: Form and solve equation** $\Rightarrow 4x^2 - 12x + 10 = 4x^2 - 2$

$(-4x^2) \Rightarrow -12x + 10 = -2$

$(-10) \Rightarrow -12x = -12$

$(\div -12) \Rightarrow x = 1$

---

## Functions and Graphs

All straight line graphs with Linear equations in the form

$$y = mx + c$$

are functions as they represent the relation between a single $x$ –coordinate and a single $y$-coordinate

To plot functions, substitute your inputs into the function to generate linked coordinate pairs Record your pairs in a table of values : **example:** for $f(x) = 2x + 1$

Every straight line has an equation in the form of:

**y = mx + c**

the steepness of the line
The **GRADIENT**
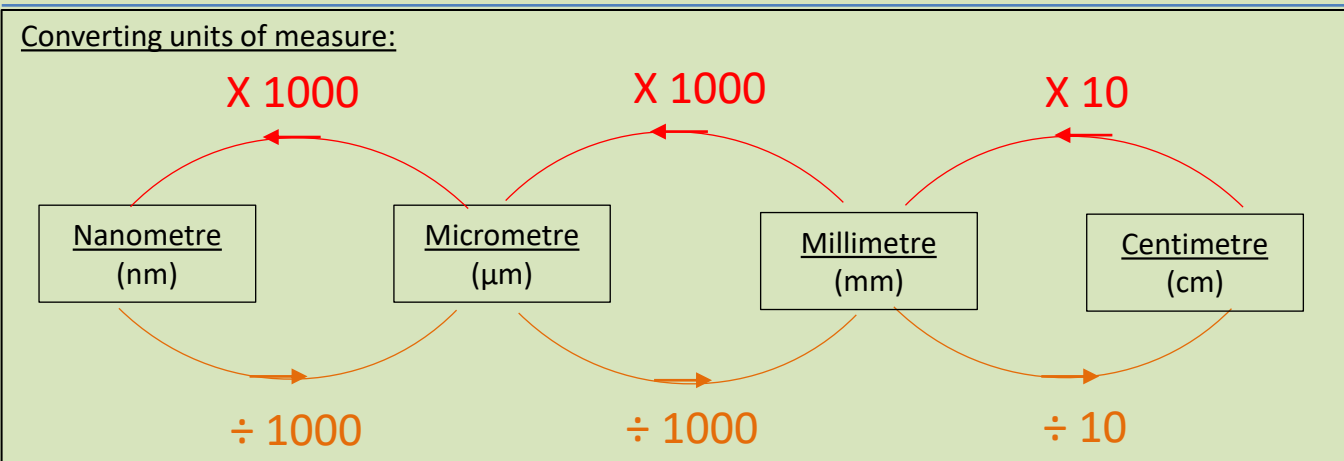
where the line cuts the y axis
The **y-INTERCEPT**

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| $y = x + 3$ | 1 | 3 | 5 | 7 | 9 | 11 | 13 |

$(0, 1)$ $(1, 3)$ $(2, 5)$ $(3, 7)$ $(4, 9)$ $(5, 11)$ $(6, 13)$
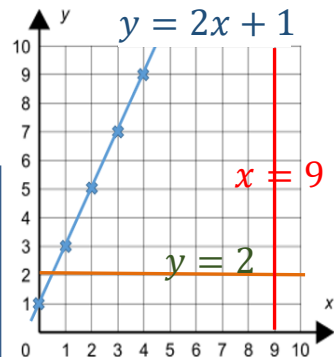
*Remember $f(x)$ and $y$ mean same thing – the final output value*

$y = 2x + 1$

$x = 9$

$y = 2$

The **Vertical line test**: If an equation (relationship) produces a **vertical line for any part of the line – it is NOT a function** as it has produced MORE THAN ONE output value for an input so $y = 2$ **IS a function** but $x = 9$ **IS NOT a function**

## Science: Useful Information

| Key Word / Term | Definition |
|---|---|
| Accuracy | Results are close to the true value |
| Precision | Results are similar to each other but not necessarily close to the true value |
| Repeatable | Similar results are obtained if the investigation is done again by the same person |
| Reproducible | Similar results are obtained if it is repeated by a different person |
| Resolution | Is the smallest change a measuring instrument can detect |
| Validity | A measure of how correct the results of an experiment are |

| Prefix | Number | Standard Form | e.g. metres |
|---|---|---|---|
| Giga | 1,000,000,000 | $1 \times 10^9$ | Gm |
| Mega | 1,000,000 | $1 \times 10^6$ | Mm |
| kilo | 1,000 | $1 \times 10^3$ | km |
| ---------- | 1 | 1 | m |
| milli | 0.001 | $1 \times 10^{-3}$ | mm |
| micro | 0.000001 | $1 \times 10^{-6}$ | µm |
| nano | 0.000000001 | $1 \times 10^{-9}$ | nm |

### Converting units of measure:

X 1000　　　X 1000　　　X 10

Nanometre (nm)　　Micrometre (µm)　　Millimetre (mm)　　Centimetre (cm)

÷ 1000　　　÷ 1000　　　÷ 10

### Variables:

**Independent**: the variable that is being changed during the experiment

**Dependent**: the variable being tested or measured during the experiment

The independent variable affects the dependent variable, the others must be controlled

**Control**: Keep the same (there can be more than one control variable) so that they do not affect the independent variable

### Units of measure:



10µm - 100µm
Eukaryotic cells

100nm
Viruses

1cm
Wasp

1m
Human

1nm
A small molecule

1µm
Prokaryotic cells

1mm
Ant

10cm
Apple

100m
Tree

nm　　　µm　　　mm　　　cm　　　m
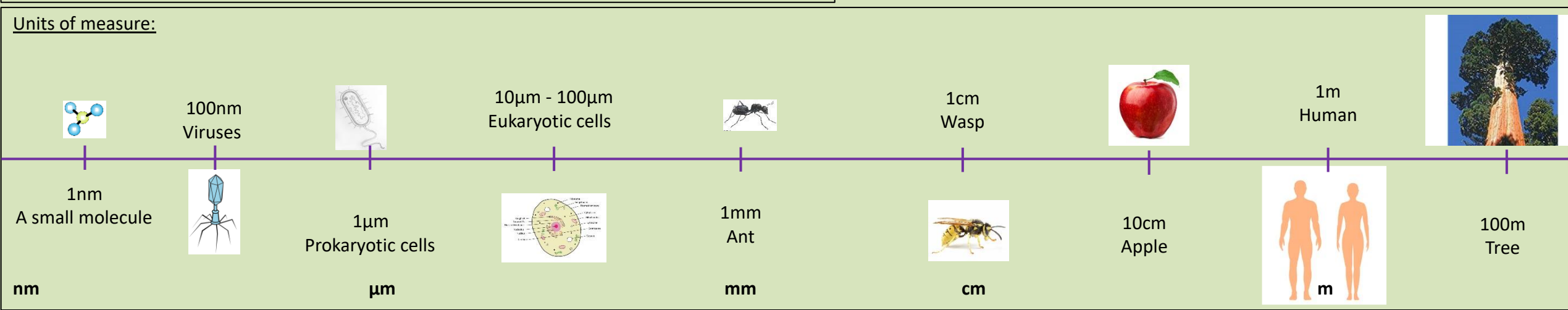
# The Periodic Table of Elements

**Key**

| relative atomic mass |
| **atomic symbol** |
| name |
| atomic (proton) number |

| 1 | 2 | | | | | | | | | | | 3 | 4 | 5 | 6 | 7 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1<br>**H**<br>hydrogen<br>1 | | | | | | | | | | | 4<br>**He**<br>helium<br>2 |
| 7<br>**Li**<br>lithium<br>3 | 9<br>**Be**<br>beryllium<br>4 | | | | | | | | | | | 11<br>**B**<br>boron<br>5 | 12<br>**C**<br>carbon<br>6 | 14<br>**N**<br>nitrogen<br>7 | 16<br>**O**<br>oxygen<br>8 | 19<br>**F**<br>fluorine<br>9 | 20<br>**Ne**<br>neon<br>10 |
| 23<br>**Na**<br>sodium<br>11 | 24<br>**Mg**<br>magnesium<br>12 | | | | | | | | | | | 27<br>**Al**<br>aluminium<br>13 | 28<br>**Si**<br>silicon<br>14 | 31<br>**P**<br>phosphorus<br>15 | 32<br>**S**<br>sulfur<br>16 | 35.5<br>**Cl**<br>chlorine<br>17 | 40<br>**Ar**<br>argon<br>18 |
| 39<br>**K**<br>potassium<br>19 | 40<br>**Ca**<br>calcium<br>20 | 45<br>**Sc**<br>scandium<br>21 | 48<br>**Ti**<br>titanium<br>22 | 51<br>**V**<br>vanadium<br>23 | 52<br>**Cr**<br>chromium<br>24 | 55<br>**Mn**<br>manganese<br>25 | 56<br>**Fe**<br>iron<br>26 | 59<br>**Co**<br>cobalt<br>27 | 59<br>**Ni**<br>nickel<br>28 | 63.5<br>**Cu**<br>copper<br>29 | 65<br>**Zn**<br>zinc<br>30 | 70<br>**Ga**<br>gallium<br>31 | 73<br>**Ge**<br>germanium<br>32 | 75<br>**As**<br>arsenic<br>33 | 79<br>**Se**<br>selenium<br>34 | 80<br>**Br**<br>bromine<br>35 | 84<br>**Kr**<br>krypton<br>36 |
| 85<br>**Rb**<br>rubidium<br>37 | 88<br>**Sr**<br>strontium<br>38 | 89<br>**Y**<br>yttrium<br>39 | 91<br>**Zr**<br>zirconium<br>40 | 93<br>**Nb**<br>niobium<br>41 | 96<br>**Mo**<br>molybdenum<br>42 | [98]<br>**Tc**<br>technetium<br>43 | 101<br>**Ru**<br>ruthenium<br>44 | 103<br>**Rh**<br>rhodium<br>45 | 106<br>**Pd**<br>palladium<br>46 | 108<br>**Ag**<br>silver<br>47 | 112<br>**Cd**<br>cadmium<br>48 | 115<br>**In**<br>indium<br>49 | 119<br>**Sn**<br>tin<br>50 | 122<br>**Sb**<br>antimony<br>51 | 128<br>**Te**<br>tellurium<br>52 | 127<br>**I**<br>iodine<br>53 | 131<br>**Xe**<br>xenon<br>54 |
| 133<br>**Cs**<br>caesium<br>55 | 137<br>**Ba**<br>barium<br>56 | 139<br>**La***<br>lanthanum<br>57 | 178<br>**Hf**<br>hafnium<br>72 | 181<br>**Ta**<br>tantalum<br>73 | 184<br>**W**<br>tungsten<br>74 | 186<br>**Re**<br>rhenium<br>75 | 190<br>**Os**<br>osmium<br>76 | 192<br>**Ir**<br>iridium<br>77 | 195<br>**Pt**<br>platinum<br>78 | 197<br>**Au**<br>gold<br>79 | 201<br>**Hg**<br>mercury<br>80 | 204<br>**Tl**<br>thallium<br>81 | 207<br>**Pb**<br>lead<br>82 | 209<br>**Bi**<br>bismuth<br>83 | [209]<br>**Po**<br>polonium<br>84 | [210]<br>**At**<br>astatine<br>85 | [222]<br>**Rn**<br>radon<br>86 |
| [223]<br>**Fr**<br>francium<br>87 | [226]<br>**Ra**<br>radium<br>88 | [227]<br>**Ac***<br>actinium<br>89 | [261]<br>**Rf**<br>rutherfordium<br>104 | [262]<br>**Db**<br>dubnium<br>105 | [266]<br>**Sg**<br>seaborgium<br>106 | [264]<br>**Bh**<br>bohrium<br>107 | [277]<br>**Hs**<br>hassium<br>108 | [268]<br>**Mt**<br>meitnerium<br>109 | [271]<br>**Ds**<br>darmstadtium<br>110 | [272]<br>**Rg**<br>roentgenium<br>111 | [285]<br>**Cn**<br>copernicium<br>112 | [286]<br>**Nh**<br>nihonium<br>113 | [289]<br>**Fl**<br>flerovium<br>114 | [289]<br>**Mc**<br>moscovium<br>115 | [293]<br>**Lv**<br>livermorium<br>116 | [294]<br>**Ts**<br>tennessine<br>117 | [294]<br>**Og**<br>oganesson<br>118 |

* The Lanthanides (atomic numbers 58 − 71) and the Actinides (atomic numbers 90 − 103) have been omitted.

Relative atomic masses for **Cu** and **Cl** have not been rounded to the nearest whole number.

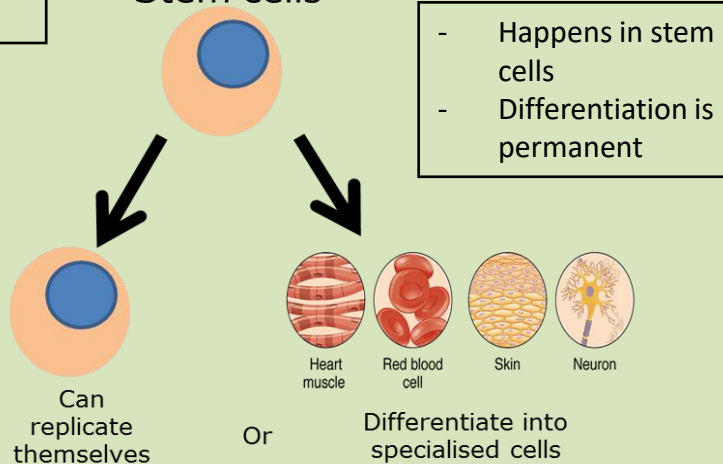## KS4 Biology: B2
## Cell division

| 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

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

## Differentiation

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

### Animal

Stem cells



- Happens in stem cells
- Differentiation is permanent

Can replicate themselves

Or

Differentiate into specialised cells

Heart muscle    Red blood cell    Skin    Neuron

### Plant



Shoot tip

Meristem cells are dividing

Cells are becoming differentiated

From the divisions:
- one cell remains meristematic
- the other contributes to growth
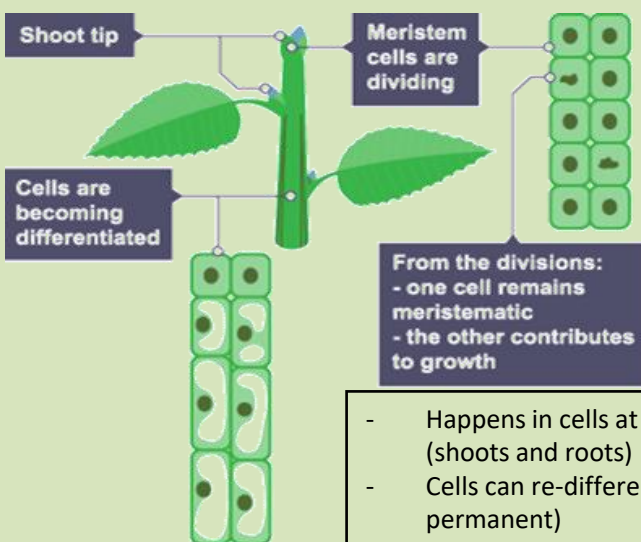
- Happens in cells at the meristems (shoots and roots)
- Cells can re-differentiate (not permanent)

| 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 |



stem cells cultured

stem cells made to differentiate into different tissues

spinal cord    heart    kidney    insulin-producing cells

organs or tissues transplanted into a patient to cure them
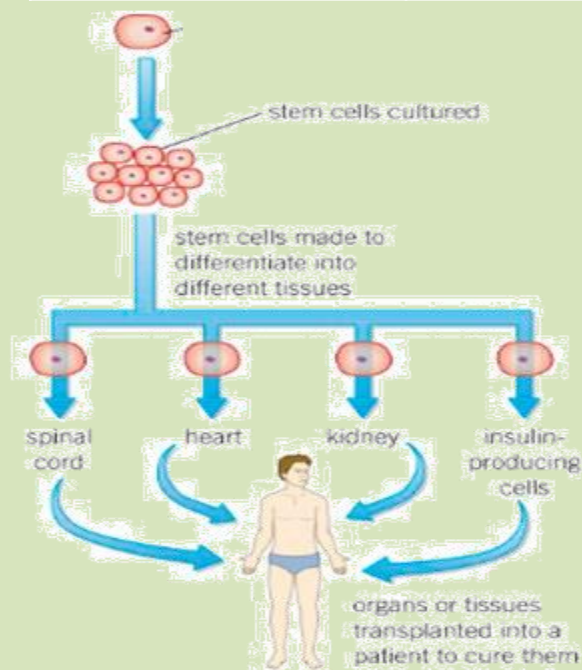
### Pros of stem cells
- Can be cloned to treat diseases such as diabetes and use same DNA to avoid rejection
- Potential in the future to be used to grow whole organs to transplant

### 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

## KS4 Chemistry – C5 Chemical Changes

### Reactivity Series
A *list* of metals in order of how reactive they are:
Some metals are *very reactive* (at the top) and react easily in chemical reactions. E.g.
Sodium
Some metals are u*nreactive* (at the bottom) and do not react easily or at all in reaction e.g.
gold



**How to remember the Reactivity Series?**

| Please | Potassium | Most reactive |
| Stop | Sodium | |
| Calling | Calcium | |
| Me | Magnesium | |
| A | Aluminium | |
| Careless | (Carbon) | |
| Zebra | Zinc | |
| Instead | Iron | |
| Try | Tin | |
| Learning | Lead | |
| How | (Hydrogen) | |
| Copper | Copper | |
| Saves | Silver | |
| Gold | Gold | Least reactive |

### Displacement Reactions
Displacement reactions involve a metal and a compound of a different metal; the more reactive metal *displaces* (pushes out) the less reactive metal from its compound:

Magnesium + copper sulfate → magnesium sulfate + copper
$Mg (s) + CuSO_4 (aq) → Mg SO_4 (aq) + Cu (s)$

### Ionic Equations (H tier only)
$Mg (s) + Cu^{2+} (aq) \longrightarrow Mg^{2+} (aq) + Cu (s)$

### Half Equations (H tier only)
At the anode: $Mg (s) - 2 e^- \longrightarrow Mg^{2+} (aq)$
At the cathode: $Cu^{2+} (aq) + 2 e^- \longrightarrow Cu (s)$

| Keyword | Definition |
| --- | --- |
| Acid | An acid has a pH value of less than 7. |
| Alkali | Its solution has a pH value more than 7. |
| Base | A soluble alkali that forms a salt when it reacts with an acid. |
| Displacement reaction | When a more reactive metal replaces a less reactive metal in a compound. |
| Electrolysis | The breakdown of a substance containing ions by using electricity. |
| Indicator | A substance that changes colour when added to acids or alkalis. |
| Insoluble | Does not dissolve in water. |
| Neutralisation | The reaction of an acid with a base producing salt and water. |
| Ore | Rock which contains enough metal to make it economically worth extracting. |
| Oxidation | The reaction when oxygen is added to a substance or electrons are lost. |
| pH Scale | A scale to tell us how acidic or alkaline an aqueous solution is. |
| Reduction | A reaction in which oxygen is removed or electrons are gained. |
| Salts | A compound formed when some of the $H^+$ in an acid is replaced by a metal. |
| Soluble | Dissolves in water. |
| Reactivity Series | A list of metals showing how reactive they are. |
| Half Equation | An equation that describes the gain or loss of electrons. |
| Ionic Equation | An equations that shows only those ions that change in a chemical reaction. |
| Strong Acid | An acid that completely dissociated into ions in solution, e.g. nitric acid |
| Weak Acid | An acid that is only partly dissociated in solution, e.g. ethanoic acid |

## Reduction of metals by carbon and hydrogen

The oxides of metals below carbon in the series can be reduced by carbon

Metal oxide + carbon $\longrightarrow$ metal + carbon dioxide

e.g. lead oxide + carbon $\longrightarrow$ lead + carbon dioxide

$2PbO$ (s) + C (s) $\longrightarrow$ $2Pb$ (l) + $CO_2$ (g)
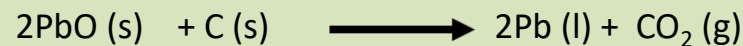
## Making Salts

There are various ways salts can be made. You need to know the products.

Acid + metal $\longrightarrow$ salt + hydrogen

Acid + base $\longrightarrow$ salt + water

Acid + alkali $\longrightarrow$ salt + water

Acid + metal carbonate $\longrightarrow$ salt + water + carbon dioxide

## Making a copper salt – this is a required practical.

Sulphuric acid + copper oxide $\longrightarrow$ copper sulfate + water

$H_2SO_4$ (l) + CuO (s) $\longrightarrow$ $CuSO_4$ (aq) + $H_2O$ (l)
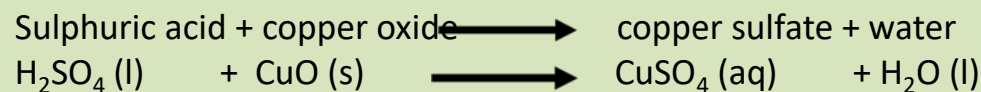
Method:
Add EXCESS insoluble copper oxide to sulphuric acid and stir.
Warm gently on a tripod – the solution will turn blue.
Filter off excess copper oxide.
Evaporate the water so that crystals of copper sulfate start to form.
Stop heating when you have evaporated about half the water and allow the rest of the water to evaporate off naturally.

## Names of Salts

The acid used provides the negative ions present in all salts.

**Hydrochloric acid** make salts called *chlorides* containing $Cl^-$ ions.

**Sulphuric acid** $H_2SO_4$ makes *sulphates* containing $SO_4^{2-}$ ions

**Nitric acid** $HNO_3$ makes *nitrates* called $NO_3^-$ ions.

**OILRIG** is a useful way of remembering:
Oxidation Is Loss (of electrons)
Reduction Is Gain (of electrons)



pH scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 — acidic, neutral, alkaline
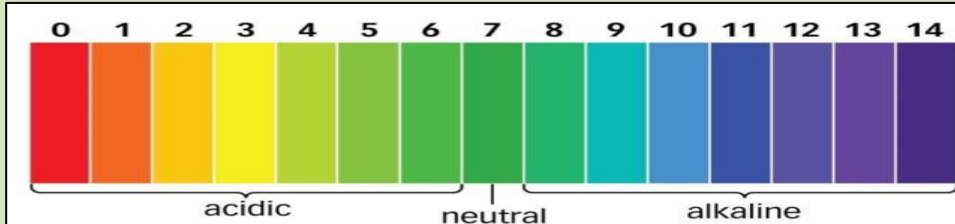
### pH Scale

Universal Indicator changes colour depending on the pH of a solution.
Acids can be dilute (lots of water) or concentrated (less water)
Weak Acids e.g. citric acid are not harmful even when in concentrated solutions
Strong acids e.g. hydrochloric acid can be harmful even when diluted

**Making a salt from a metal carbonate is also a required practical.**



warmed mixture of excess base and acid

mixture of excess base and salt solution

filter paper to remove excess insoluble base

filter funnel

aqueous salt solution ready for evaporation

Stage 1          Stage 2
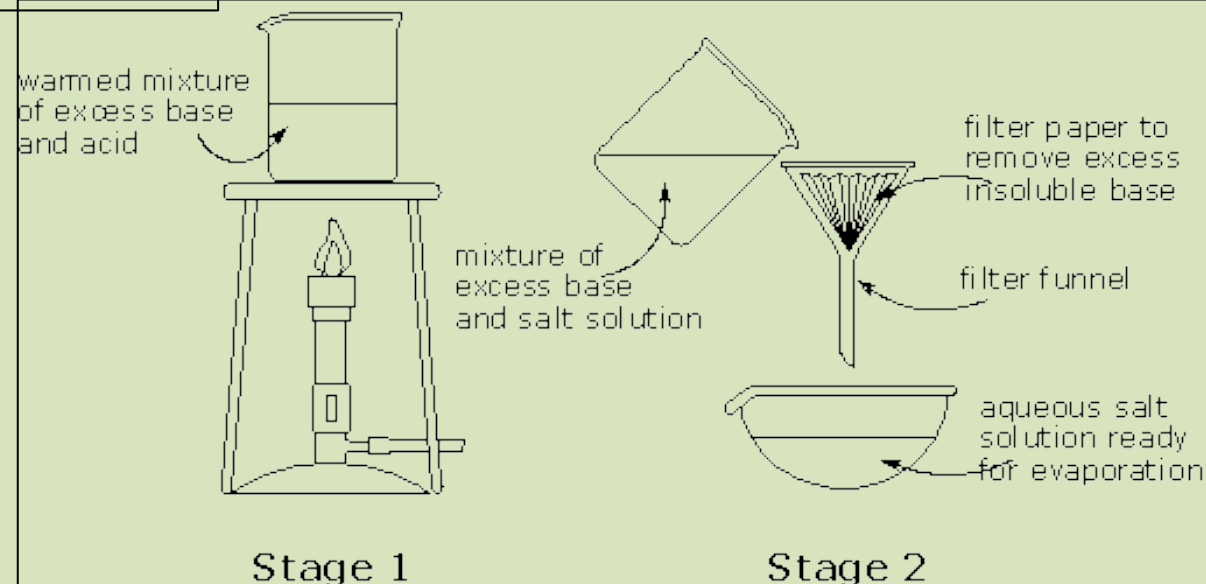
**Background**: It is hard to imagine a World without electricity. It reaches into every aspect of our lives. But where do we get the energy to make it from? Will they run out? Have we got a backup plan?

| Keyword/term | Definition |
|---|---|
| Carbon neutral | Balancing carbon emissions with carbon removal e.g. by photosynthesis OR simply eliminating carbon emissions altogether. |
| Dissipate | To scatter in all directions or to use wastefully. When energy has been dissipated, it means we cannot get it back. The energy has spread out and heats up the surroundings. |
| Non-renewable energy resources | Energy resources which will run out, because they are finite reserves, and which cannot be replenished. |
| Renewable energy resources | Energy resources which will never run out and (or can be) replenished as they are used. |
| Alternative energy resource | Resources other than fossil fuels. The resources may or may not be renewable. Nuclear power is not a renewable energy resource, but tidal power is. Alternative energy resources do not contribute to global warming. |
| Biofuel | Fuel produced from biological material. Biofuels are provided by trees such as willow that can be grown specifically as energy resources. |
| National grid | The network of cables and transformers used to transfer electricity from power stations to consumers (i.e. homes, shops, offices, factories etc.) |
| Geothermal energy | Energy released by radioactive substances deep within the Earth |
| Nuclear fuel | Substance used in nuclear reactors that releases energy due to nuclear fission |

**World energy demands and sources (2015)**



oil 31%
coal 31%
gas 24%
nuclear 4%
hydroelectricity 7%
other renewables 3%
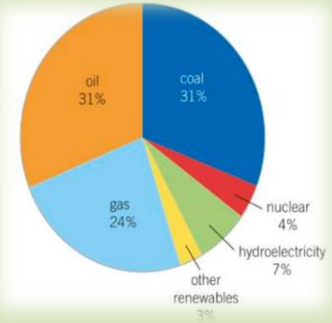
**Hydroelectric power:**

Hydroelectricity can be generated when rainwater that is collected in a Reservoir

(or water in a pumped storage scheme) flows downhill.

The flowing water drives turbines that turn electricity generators at the bottom of the hill.



A coal-fired power station

Water is turned to steam in the boiler
Steam is cooled in cooling towers
Generator makes electricity
Coal arrives by train or truck
Coal is burned in the furnace
Steam turns the turbines
Transformer changes the voltage
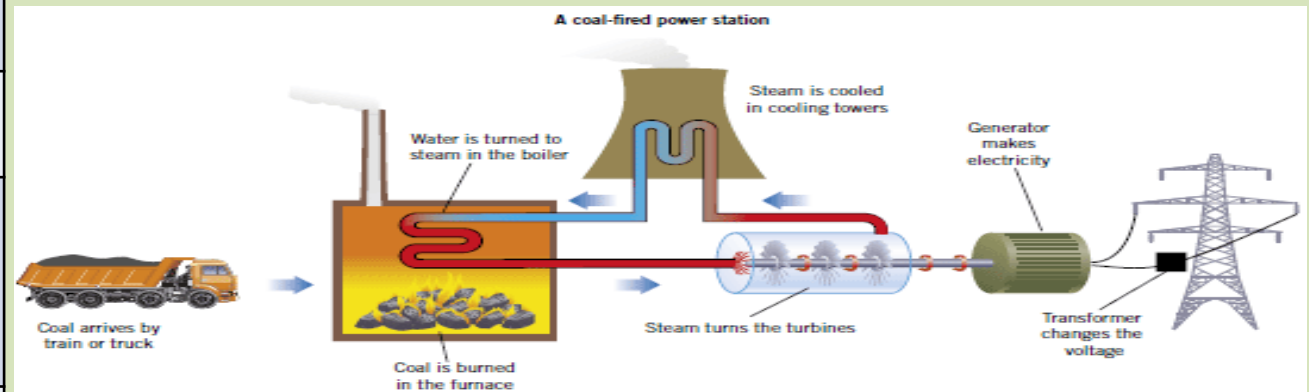
**Wave power:** A wave generator is used to make a floating generator move up and down, turning a generator to create electricity.

rocking motion
wave
buoyancy chamber
balancing float
axle connected to generator
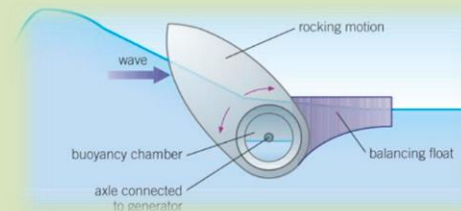
**Tidal power:** Tidal power stations trap water from each high tide behind a barrage. The high tide can then be released into the sea through turbines.

These turbines drive generators.

In some coastal areas, electricity generated by tidal flow passing through undersea turbines, placed on the sea bed.

| Resource | Renewable? | Uses | Advantages | Disadvantages |
|---|---|---|---|---|
| Fossil Fuels | Non-Renewable | Electricity, transport, heating | Reliable – electricity can be generated all of the time. Relatively cheap way of generating electricity. | Produces carbon dioxide, a greenhouse gas that causes global warming. Can produce sulphur dioxide, a gas that causes acid rain. |
| Nuclear Fuel | Non-Renewable | Electricity | Produces no carbon dioxide when generating electricity. Reliable – electricity can be generated all of the time. | Produces nuclear waste that remains radioactive for thousands of years. Expensive to build and decommission power stations. |
| Bio Fuel | Renewable | Heating, electricity | Carbon neutral. Reliable – electricity can be generated all of the time. | Production of fuel may damage ecosystems and create a monoculture. |
| Wind | Renewable | Electricity | No $CO_2$ produced while generating electricity. | Unreliable – may not produce electricity during low wind. Expensive to construct. |
| Hydroelectricity | Renewable | Electricity | No $CO_2$ produced while generating electricity. | Blocks rivers stopping fish migration. Unreliable – may not produce electricity during droughts. |
| Geothermal | Renewable | Electricity, heating | Does not damage ecosystems. Reliable source of electricity generation. | Fluids drawn from ground may contain greenhouse gases such as $CO_2$ and methane. These contribute to global warming. |
| Tidal | Renewable | Electricity | No $CO_2$ produced while generating electricity. | Unreliable – tides vary. May damage tidal ecosystem e.g. mudflats. |
| Waves | Renewable | Electricity | No $CO_2$ produced while generating electricity. | Unreliable – may not produce electricity during calm seas. |
| Solar | Renewable | Electricity, heating | No $CO_2$ produced while generating electricity. | Unreliable – does not produce electricity at night. Limited production on cloudy days. Expensive to construct. |

**Geothermal energy:**
This comes from the energy released by radioactive sources deep in the Earth.
- The energy transferred from these substances heats the surrounding rock
- The hot rocks are used to turn water into steam
**Geothermal power station**
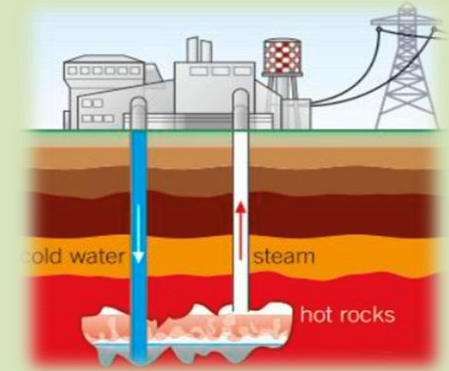


**Solar water heating**



Solar heating panels use solar energy to heat water that flows through the panel. You can use the equation $\Delta E = m\,c\,\Delta\theta$ from Topic P2.4 to estimate the temperature increase of mass $m$ of water that flows through the panel, where $c$ is the specific heat capacity of water and $E$ is the solar energy absorbed by the panel.

Further reading

https://www.bbc.co.uk/bitesize/guides/zchgdxs/revision/1

## BRONZE AWARD BADGES

## SILVER AWARD BADGES

IDEA PROGRESS RECORD: TICK WHEN COMPLETED

**CITIZEN**

| | | | | | |
|---|---|---|---|---|---|
| GLOBAL GOALS | BRAIN HACK | WHAT IS THE CLOUD? | CYBER SPIES | DATA PLAY | DIGITAL ETHICS |
| eCOMMERCE | E-SAFETY | SOCIAL MEDIA ETHICS | FAKE NEWS | FARM TECH | GDPR |
| INTERNET & WEB | PERSONAL STATEMENT | SAFE ONLINE | SOCIAL MEDIA SET-UP | CYBER SECURITY | |

**MAKER**

| | | | | | |
|---|---|---|---|---|---|
| AI PROJECT CYCLE | ANIMATION | AUTOMATION | CODING SOLUTIONS | COLOURS | GIF MAKING |
| GRAPHIC DESIGN | JQUERY CODING | MAKING WEBSITES | VIDEO EDITING | VIRTUAL REALITY | JUNIOR WEB DESIGNER |

**GAMER**

| | | | | |
|---|---|---|---|---|
| BAFTA GAME CONCEPT | GAME DESIGNER | INTRO TO GAMING | PYTHON QUIZ | MAKE A GAME |

**WORKER**

| | | | | | |
|---|---|---|---|---|---|
| COLLABORATION | CRISIS MANAGEMENT | DIGITAL CAREERS | DIGITAL PATHWAYS | DIGITAL PORTFOLIOS | IMAGE SPECIALIST |
| INTERVIEWS | MATHS TOOLS FOR AI | PROBLEM SOLVING WITH AI | PROJECTS | DESIGN PSYCHOLOGY | RANDOM CODING |
| DIGITAL RESEARCH | SYSADMIN | USER INTERFACES | USER EXPERIENCE | WHAT IS AI? | WORKING FROM HOME |

**ENTREPRENEUR**

| | | | | | |
|---|---|---|---|---|---|
| ADVERTISING | BIG DATA | BLOCKCHAIN | CRM | GROWTH HACKING | GROWTH MINDSET |
| INFLUENCER | INNOVATION | JARGON BUSTER | MONEY MANAGEMENT | PROBLEM SOLVING | RESEARCHER |
| SOCIAL MEDIA IN BUSINESS | SOCIAL SELLING | THE ART OF SELLING | VIDEO TESTIMONIALS | | |

### SILVER AWARD BADGES

**MAKER** — FOUNDATION, ACTIVATION, RESOLUTION

**GAMER** — FOUNDATION, ACTIVATION, RESOLUTION

**ENTREPRENEUR** — FOUNDATION, ACTIVATION, RESOLUTION

**CITIZEN** — FOUNDATION, ACTIVATION, RESOLUTION

**WORKER** — FOUNDATION, ACTIVATION, RESOLUTION

### GOLD AWARD BADGES

**CITIZEN** — DIGITAL ETHICS, FAKE NEWS DETECTOR

**WORKER** — AI INFERENCE, FIRST AID

**MAKER** — CHATBOTS, COMPUTER VISION, ROBOTICS

To achieve the **Bronze** Award, you need to have a minimum of **250 points** and these points must be made up of at least **50** from each core category (**Citizen**, **Worker**, **Maker**, **Entrepreneur**). To achieve the **Silver Award**, you need to have completed at least 4 categories and the **Citizen** category is mandatory. **Gold** award is in development but you can assume that the current badges would need to be collected.

# World War Two

## Key Events
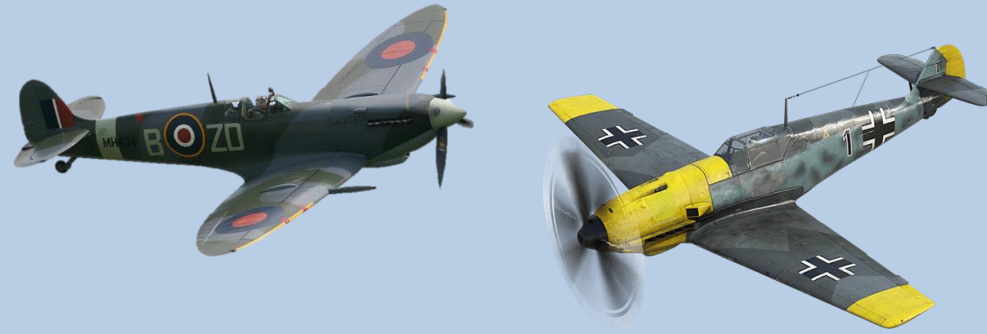
### The Phoney War (September 1939–April 1940)
Hitler conquered Poland. There was no other major activity on land, although there were actions at sea. Historians believe that this period saw very little action as all countries involved were biding their time and waiting for the other to make the first move. The governments of Germany, Britain and France began to issue propaganda. The British government even flew over Germany but, rather than dropping bombs, they dropped **propaganda** leaflets. Very little of military significance happened that was noticeable. However, all countries were developing their military bases and new technologies. People began to get frustrated and some evacuated children were sent home because people felt there was no point staying in the countryside when there were no bombs to worry about.

### Blitzkreig (April 1940–June 1940)
The Nazis conquered Denmark, Norway, Holland, Belgium and France. The British Expeditionary Force was trapped at Dunkirk, but managed to withdraw by sea back to Britain. On 4th June, 1940, Winston Churchill delivered one of the most famous speeches of all time to the House of Commons in Westminster. In it, he warned about the possibility of a German invasion of Britain and said to the inspiration of many: "We shall defend our island, whatever the cost may be. We shall fight on the beaches, we shall fight on the landing grounds, we shall fight on the fields and in the streets, we shall fight in the hills; we shall never surrender."

### Britain and the empire stands alone (July 1940–June 1941)
•Britain withstood the German Airforce, called the Luftwaffe, in the Battle of Britain (July–September 1940).
•But Britain was alone, and in great danger of losing the war.
•The Luftwaffe bombed London for 76 nights running (the Blitz), then other cities such as Coventry. People took cover in air raid shelters; some were made of corrugated iron in gardens; others were located inside train stations and tunnels.
•The British were driven out of Greece and most of North Africa.
•The British ran out of money, and had to sign the Lend-Lease Agreement with America (America sold arms to Britain, to be paid back after the war).

Here is a link to an overview of WW2:
https://www.youtube.com/watch?v=HUqy-OQvVtI

A BRIEF OVERVIEW OF WORLD WAR II

**The tide turns (1941–1943)**
•In June 1941, Hitler invaded Russia, known as Operation Barbarossa. This brought Russia back into the war, this time against Germany. The failure of Operation Barbarossa was the first major German defeat.
•In December 1941, the Japanese bombed Pearl Harbour. This brought America into the war.
•As a result the Allies gradually began to win the war:
•In June 1942 the Americans defeated the Japanese at the Battle of Midway.
•In November 1942 the British won the Battle of El-Alamein in Egypt.
•In January 1943 the Russians defeated the Nazis at the Battle of Stalingrad.

Victory (1943–1945)
•In 1944, the Nazis launched V-1 rockets, known as doodlebugs, which fell randomly in southern Britain.
But:
•After D-Day on 6 June 1944, Germany was gradually driven back in Western Europe by the British, Americans and their allies.
•The Americans and British continued the strategic bombing campaign on German cities.
•The Russians advanced in Eastern Europe and in April they reached Berlin. Hitler committed suicide.
•Germany surrendered and war came to an end in Europe shortly afterwards and VE Day was announced on 8 May 1945. Winston Churchill announced this with caution: "We may allow ourselves a brief period of rejoicing; but let us not forget for a moment the toil and efforts that lie ahead". He was speaking of Japan, where the war would continue for three months more.
•On 6 August 1945, the Americans dropped the atomic bomb on Hiroshima, and again on Nagasaki on 9 August. Within weeks Japan surrendered, and VJ Day was announced 15 August 1945. By this stage, Winston Churchill was no longer Prime Minister. Clement Attlee had taken over following a general election in which the majority of people voted for a Labour government believing that they would help them more in recovering from the destruction of war. Attlee said, at midnight, "The last of our enemies is laid low".

Should the bomb have been dropped?

**World War Two created a new world:**
It has been estimated that 50 million people died in World War Two.
The old empires of France and Britain were ruined. A 'wind of change' meant that by the end of the 1960s almost all the old colonies of the British Empire had gained their independence.
America and Russia were the new 'superpowers', and immediately started on a **Cold War**.
The dropping of the atomic bomb on Hiroshima and Nagasaki created a world which was terrified by the threat of atomic war.
Germany was divided, and remained so until 1990.
The League of Nations was disbanded. Instead, a new United Nations was declared.

A good analysis of WW2:
https://www.youtube.com/watch?v=Q78COTwT7nE

WORLD WAR II

# The Holocaust

After 1919, Jewish people in Germany were free and legally equal and often felt more German than Jewish. Many were wealthy and successful.

But there was an undercurrent of anti-Jewish racism, called '**anti-Semitism**', in Germany. Hitler appealed to this anti-Semitism by blaming the Jewish people for Germany's defeat in the First World War. Nazi race-scientists incorrectly claimed that the Jewish people were sub-human.

As soon as Hitler came to power he introduced a programme of **persecution**. The Nuremberg Laws (1935) deprived Jewish people of many of their civil rights. On 9 November 1938, Kristallnacht or the 'Night of Broken Glass' took place. Jewish businesses, synagogues and homes were attacked and destroyed. This was a response to the assassination of a German diplomat by a Polish Jewish man in Paris.

After the outbreak of World War Two in 1939, the Nazis stepped up the persecution of the Jewish people:

•They were herded into over-crowded '**ghettos**'.
•After 1941, following the invasion of the Soviet Union, Nazi death-squads, called 'einsatzgruppen', murdered more than a million Jewish people in eastern Europe.
•In 1942, a Nazi conference at Wannsee decided on the 'Final Solution' – the Jewish people were to be systematically taken to camps such as Auschwitz and gassed.

Nobody knows how many Jewish people died during the Holocaust, but the usual figure given is 6 million.

| | |
|---|---|
| **1933** | Hitler's 'brownshirts' stood outside Jewish shops and persuaded Germans to boycott them. |
| **Summer 1935** | 'Jews not wanted here' posters began to go up around Germany. |
| **September 1935** | The Nuremberg Laws deprived Jewish people of their civil rights. They were forbidden to vote and they were not allowed to marry Germans. Other laws were passed forbidding them to go out at night or own a bicycle, among other things. |
| **9 November 1938** | Kristallnacht was when Jewish businesses, synagogues and homes were destroyed. Many Jewish men were killed or put in concentration camps. |
| **January 1939** | Hitler accused the Jewish people of stirring up other countries against Germany. He threatened them with annihilation if a war broke out. |
| **1940** | In many towns, Jewish people were forced to leave their homes and go to live in Jewish areas, or 'ghettos', where they were forbidden to earn a wage. Many starved to death. |
| **1941** | All Jewish people were forced to wear a yellow Star of David. |
| **1941** | In eastern Europe, Nazi Einsatzgruppen rounded up and murdered over a million Jewish people. |
| **1942** | Wannsee Conference: In January, the decision was taken for a 'Final Solution to the Jewish Problem' – to exterminate all the Jewish people in Europe. Camps were built at places such as Auschwitz and Jewish people were rounded up and sent there to be gassed. Jewish prisoners were organised into Sonderkommando units to burn the bodies in the crematoria. Others were worked to death in labour camps to help the war effort. |
| **Winter 1944–1945** | The 'Death Marches'. As the Russians advanced, the SS guards marched the Jewish people to concentration camps in the west. Many Jewish people died on the marches. Many were killed because they could not keep up. When they reached camps such as Bergen-Belsen in West Germany, they were crammed in in such numbers that they died of starvation or disease. |

# The Cold War

## Background Context

At the end of World War II, the world was split into two factions; The **Western Bloc** a group of countries under capitalist rule, comprised of the United States and its allies, some of whom would later become **NATO,** and the **Eastern Bloc** - led by the USSR (known as the Soviet Union) and communist countries, some of whom would later sign the **Warsaw Pact.** An imaginary **Iron Curtain** divided east and west.

These two factions would spend the next 40+ years engaged in a stand-off - both the United States and the USSR had developed nuclear weapons - and knew that attacking the other would lead to **M.A.D. (mutually assured destruction).** There were incidents of **brinkmanship** and **proxy wars** fought in Korea and Vietnam, as the USA became increasingly concerned about a **domino** effect as neighbouring countries would fall to **communist** rule.

With the fall of the **Berlin Wall** in 1989, and the collapse of the USSR in 1991, the Cold War came to an end, as the world sought a more harmonious approach to co-existence.
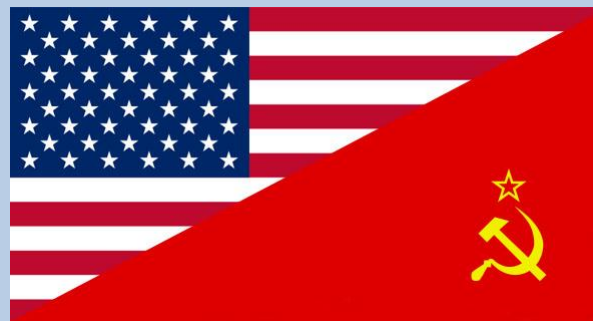


**USA, NATO & Its Allies          USSR & Its Allies**

Neutral/Non-aligned



| Cold War Video Library |
| :---: |
| https://tinyurl.com/ColdWarVids |

Iron Curtain divides East and West
1945

Truman Doctrine
1947

USSR tests nuclear bomb
1949

Vietnam War begins
1955

U-2 Plane Incident
1960

Bay of Pigs botched invasion
1961

Strategic Arms Limitation Talks
1969

Fall of the Berlin Wall
1989

STOP

Potsdam Conference
1945

Containment leads to Domino Theory
1945

Berlin Blockade
1948
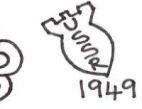
Korean War
1950-53

Space Race
1955-75

Berlin Wall erected
1961

Cuban Missile Crisis - brink of WW3
1961

Soviets invade Afghanistan
1979

Fall of the USSR End of Cold War
1991

# Superpower Relations & Cold War

Scale 1:50000

## How do waves form?

Waves are created by wind blowing over the surface of the sea. As the wind blows over the sea, friction is created - producing a swell in the water.

The size of the wave is determined by:
1. **Fetch** – how far the wave has travelled
2. Strength of the wind
3. How long it has been windy

## Why do waves break?

| | |
|---|---|
| 1 | Waves start out at sea. |
| 2 | As waves approaches the shore, friction slows the base. |
| 3 | This causes the orbit to become elliptical. |
| 4 | Until the top of the wave breaks over. |
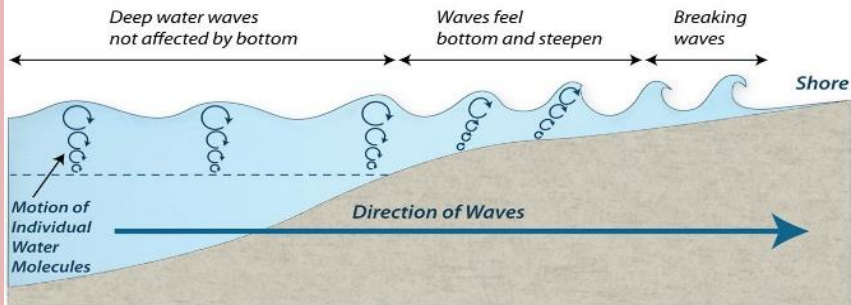
### Constructive waves
- Low and long waves.
- Low frequency of waves (6-8 waves a minute).
- The swash is more powerful than the backwash, so sediment is deposited on the beach.
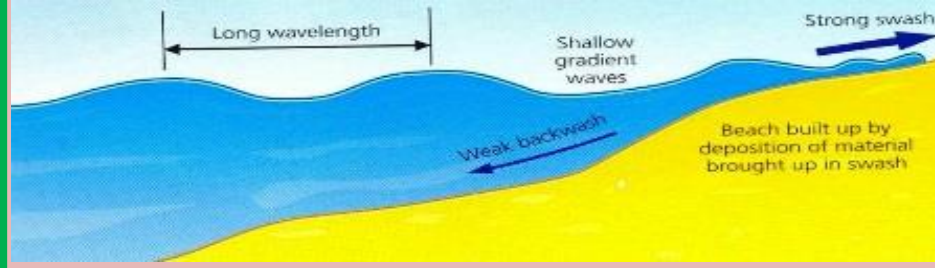
### Destructive waves
- Steep and high waves.
- High frequency of waves (10-15 waves a minute).
- The backwash is more powerful than the swash, so sediment is eroded away from the beach (destroying the beach).

## Types of erosion

| | | | |
|---|---|---|---|
| **Hydraulic power** – As the powerful waves smash into the cliff face, air is compressed in the small cracks of the rock and breaks fragments off. | **Attrition** – eroded material in the sea bumps into other and eventually wears down – materials becomes smaller and more rounded. | **Abrasion/corrasion** – strong waves picks up rocks and pebbles. These are then smashed into the cliff face which breaks new rock fragments off. | **Solution** - when certain types of cliff dissolve as a result of weak acids in the sea. |

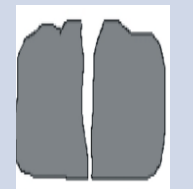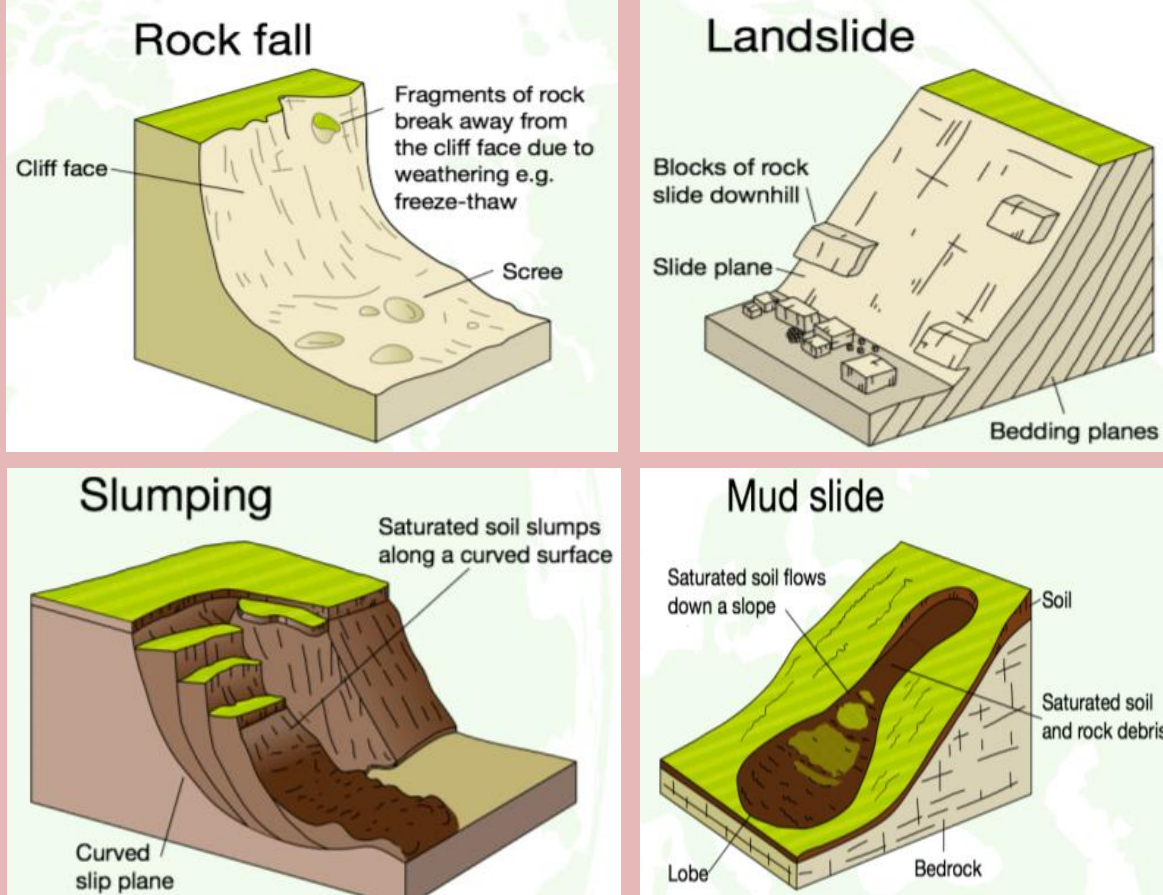## Mechanical Weathering Example: Freeze-thaw weathering

**Stage One** - Water seeps into cracks and fractures in the rock.

**Stage Two** - When the water freezes, it expands about 9%. This wedges apart the rock. Water can travel deeper into crack

**Stage Three** - It thaws and the water seeps further into the cracks. With repeated freeze-thaw cycles, the rock breaks off.

**Chemical weathering** is the breakdown of rock through changing its chemical composition. When rainwater hits rock it decomposes it or eats it away. This is known as **carbonation**. This occurs when slightly **acidic (carbonic) rain** or sea water comes into contact with sedimentary rock, such as **limestone or chalk**, it causes it to **dissolve**.

A chemical reaction occurs between the acidic water and the calcium carbonate and forms calcium bicarbonate. This is soluble and is carried away in solution.

## Mass Movement

Mass Movement is the downhill movement of cliff material under the influence of gravity and extreme weather changes.

### Rock fall
Cliff face

Fragments of rock break away from the cliff face due to weathering e.g. freeze-thaw

Scree

### Landslide
Blocks of rock slide downhill

Slide plane

Bedding planes

### Slumping
Saturated soil slumps along a curved surface

Curved slip plane

### Mud slide
Saturated soil flows down a slope

Soil

Saturated soil and rock debris

Lobe

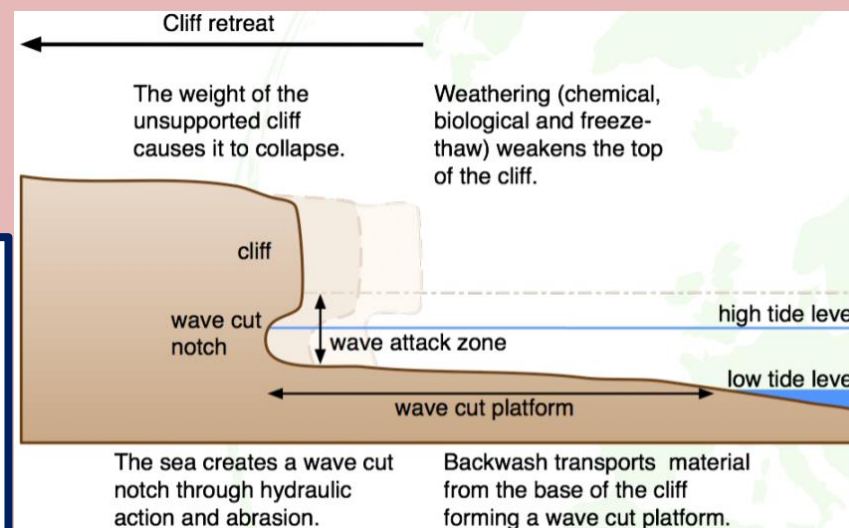Bedrock

## Bays and Headlands

Headlands form along discordant coastlines where bands of soft and hard rock outcrop at right angles to the coastline (see image below). Due to the different nature of the rock erosion occurs at different rates. Less resistant rock (e.g. boulder clay) erodes more rapidly than more resistant rock (e.g. chalk).

The bands of soft rock, such as sand and clay, erode more quickly than those of more resistant rock, such as chalk. This leaves a section of land jutting out into the sea called a headland. The areas where the soft rock has eroded away, next to the headland, are called bays. Sandy beaches are often found the sheltered bays where waves lose energy, and their capacity to transport material decreases resulting in material being deposited.

Concordant coast

headland

bay

discordant coastline
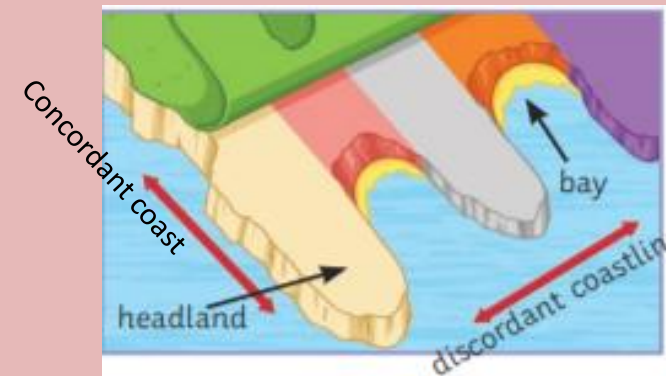
## Discordant and Concordant Coastlines

Where coastlines vary in bands of soft and hard rock are called discordant coastlines. A concordant coastline is where the same rock runs along the length of the coast and normally has fewer bays and headlands. Along the coastline of Dorset, there are both – the concordant coastline runs from west to east along the south coast, but the discordant coastline runs from Studland Bay to Durlston Head as the geology changes from clay and sands, to chalk and limestone.

## Wave-cut platform

A wave-cut platform is formed when (1) The sea attacks a weakness in the base of the cliff. For example, this could be a joint in chalk. (2) A wave-cut notch is created by erosional processes such as hydraulic power and abrasion. (3) As the notch becomes larger the cliff becomes unstable and collapses as the result of gravity. (4) The cliff retreats inland. (5) The material from the collapsed cliff face is eroded and transported away. This leaves a wave-cut platform. (6) The process repeats over time as the cliff collapses and retreats repeatedly.

Cliff retreat

The weight of the unsupported cliff causes it to collapse.

Weathering (chemical, biological and freeze-thaw) weakens the top of the cliff.

cliff

wave cut notch

wave attack zone

high tide level

low tide level

wave cut platform

The sea creates a wave cut notch through hydraulic action and abrasion.

Backwash transports material from the base of the cliff forming a wave cut platform.

## Erosion of Headlands

Headlands are normally made of resistant rock, so do not erode easily. However, when they do erode, they form these landforms as shown in the diagram below:

**1. Cracks in the base of the headland are enlarged through hydraulic action. Air becomes compressed and widens the crack as it escapes.**

**4. The cave increases in size as refracted waves concentrate their energy on the sides further enlarging the cave.**

**5. Where two caves are aligned the waves may cut through to form an arch. Wave cut notches widen the arch.**

**7. The base of the stack will be eroded through abrasion and hydraulic action. Sub-aerial processes will weaken the stack.**



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**2. Cracks enlarge by weathering processes such as salt crystalisation.**

**3. Cracks widen and a cave is formed through abrasion and hydraulic action.**

**6. Over time the roof can be weakened by weathering such as freeze-thaw. The arch will collapse under its own weight forming a stack.**

**8. Eventually, wave cut notches will form and the stack will collapse forming a stump.**
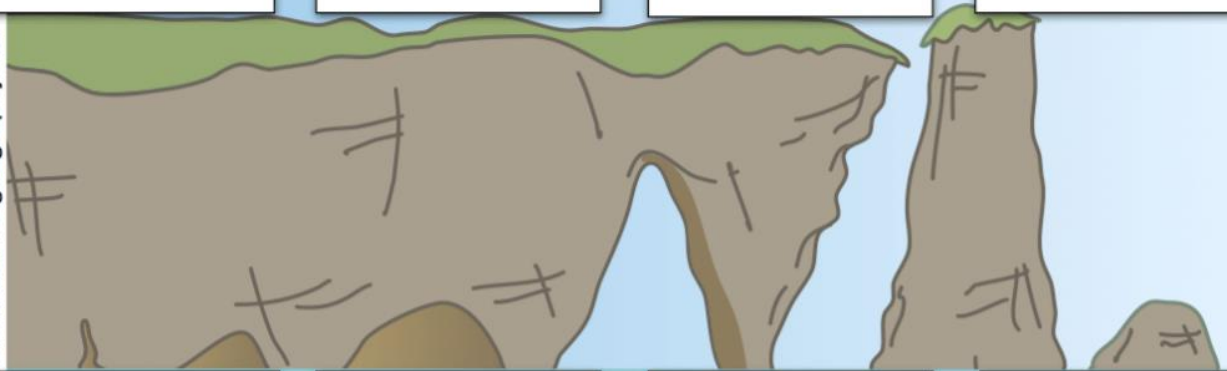
## Process of transportation

Once sediment has been eroded from the cliff face, it will then be transported. There are 4 different ways which sediment can be transported.
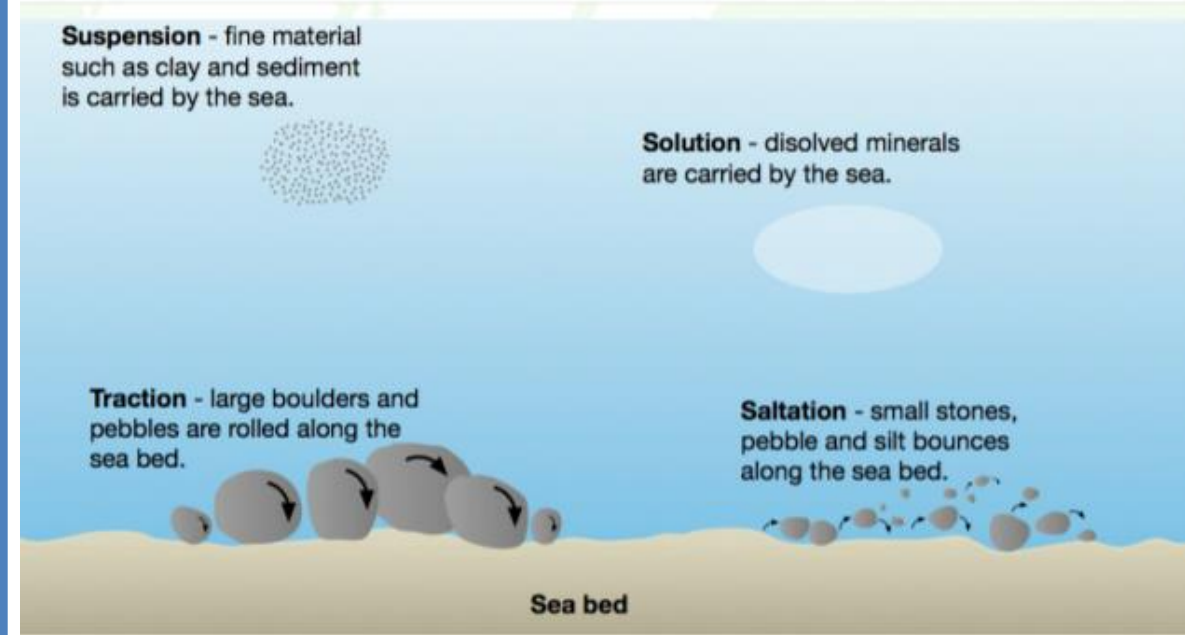


**Suspension** - fine material such as clay and sediment is carried by the sea.

**Solution** - disolved minerals are carried by the sea.

**Traction** - large boulders and pebbles are rolled along the sea bed.

**Saltation** - small stones, pebble and silt bounces along the sea bed.

Sea bed

## Key Words

Fetch, constructive, destructive, freeze-thaw weathering, chemical weathering, carbonic acid, hydraulic power, abrasion, attrition, solution, mass movement, rock fall, landslide, slumping, mud slide, bay, headland, concordant coast, discordant coast, wave-cut platform, wave-cut notch, erosion, deposition, transportation, cave, arch, stack, stump, suspension, traction, solution, saltation, longshore drift, swash, backwash

## Longshore Drift

Longshore drift is the movement of material along the shore by wave action. It happens when: (1) waves approach the beach at an angle, (2) the swash (waves moving up the beach) carries material up and along the beach. (3) the backwash (waves moving back down the beach) carries material back down the beach at right angles. This is the result of gravity. (4) This process slowly moves material along the beach and provides a link between erosion and deposition. Material is transported through suspension, traction, solution and saltation. Longshore drift provides a link between erosion, transportation and deposition.



Direction of longshore drift

swash  backwash

prevailing wind
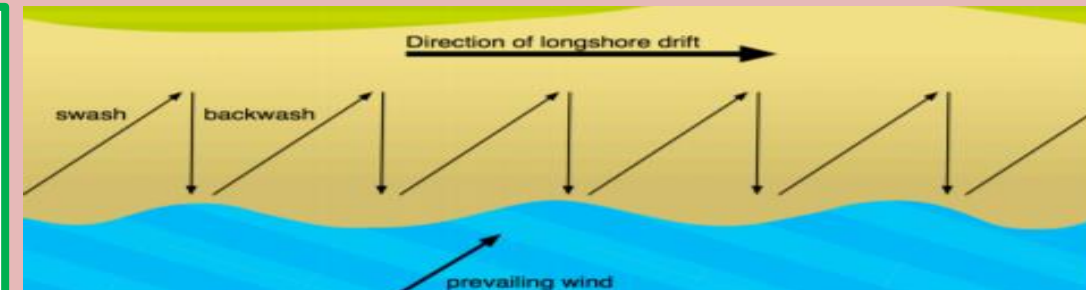
## Coastal Deposition

Deposition is when material that is being transported is dropped by constructive waves, as the waves lose their energy.
Deposition happens when the swash is stronger than the backwash and is associated with constructive waves.

Deposition is likely to occur whenever wave energy is reduced, such as where:
• waves enter an area of shallow water;
• waves enter a sheltered area, e.g. a bay;
• there is little wind;
• a river or estuary flows into the sea;
• or, where there is a good supply of material and the amount of material being transported is greater than the wave energy can transport.

## Depositional Landform - Beaches

The beach is the area between the lowest spring tide level and the point reached by the storm waves in the highest tides. Every beach is different but they are usually made up of material deposited on top of a wave-cut platform and are formed from sand, shingle or pebbles, or mud and silt.

A sandy beach is usually formed in sheltered bays, where constructive waves with low energy transport material onto the shore: The swash is stronger than the backwash so the material is moved up the beach.

However, a pebble beach is usually found where there are waves of high energy (destructive waves) and this causes a steeper gradient as the strong backwash erode away the beach, leaving only the largest material (pebbles).
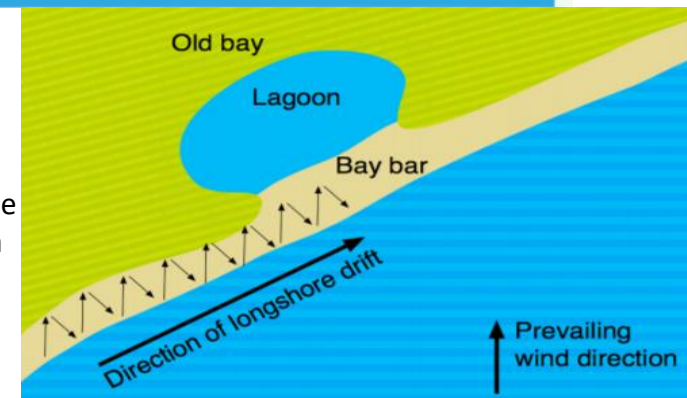


## Depositional Landforms – Spits and Bars

A spit is a landform of coastal deposition and is formed when longshore drift moves material along a coastline. Where the coastline changes direction, or the power of the waves is reduced because it meets a river or estuary, material being transported by the sea is deposited. The sediment which is deposited usually builds up over the years to form a long ridge of material (usually sand or shingle) called a spit. An example of this is Hurst Castle Spit in Hampshire, or Mudeford Spit in Dorset. Over time, the shape of the spit can change, often due to changes in wind directions or river discharge during storms. This can cause it to become hook shaped, trapping sediment to form a salt marsh habitat.



Longshore drift transports material along the coast.

A spit forms when material is deposited due to a reduction in energy where the sea meets a river.

Estuary

Sea

Salt marsh forms as silt and mud is deposited in the sheltered estuary.

Spit develops a hook due to changes in wind direction.

Sand dunes form along the spit, vegetation colonises the dunes stabilising them.

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Similarly, longshore drift will continue transporting and depositing sediment and if this continues in the same direction long enough, it will connect up with another headland creating a bar. The water behind the bar is cut off and becomes a lagoon. As it is a low energy zone, over time, deposition may fill in the lagoon to create a saltmarsh.



Old bay

Lagoon

Bay bar

Direction of longshore drift

Prevailing wind direction

## Depositional Landform – Sand Dune

For a sand dune to form there needs to be 3 main ingredients:
1. A large amount of loose, dry sand
2. Wind to move the grains of sand
3. An obstacle that causes the sand to lose momentum and settle, e.g. plant or driftwood

## Sand Dune Supply of Sediment

Generally, 20% of the sand is blown up the beach from the foreshore (between the high and low tide mark), when it is exposed at low tide. 80% is blown onto the dunes from the backshore (the area between the high tide line and the dunes). This is because the sand is drier and thus lighter.
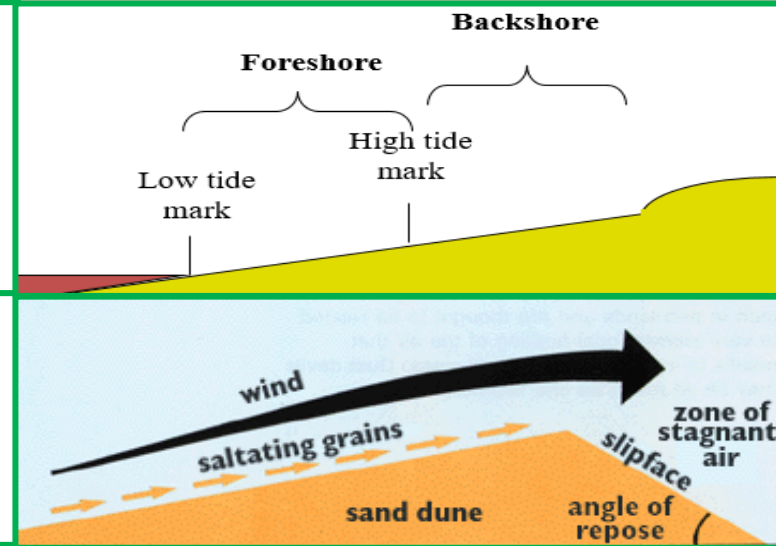


## Sand Dune - Wind Force
In the UK, most dunes are located on the south west and the north east coasts. This is because of prevailing winds coming across the Atlantic and the North Sea. If there was no wind, there would be no sand dunes!

## The beginnings of a dune…

Wind-blown sand is generally moved up the beach through creep (rolling) or saltation (bouncing). It builds up against the obstacle, then as the dune grows, moves over the top, slipping down the slipface into the dune slack between dunes.



For a sand dune system to develop, it follows a progression from the harsh environment of an embryo dune to the intricate ecosystem of a mature dune. Grains of sand gradually move from the embryo dune towards the mature dunes. The diagram below which shows how each stage differs.



Youngest dunes where sand has just started to accumulate – very little vegetation

Larger than embryo dunes, formed as more sand accumulates and embryo dunes begin to join together.

These dunes reach up to 5 metres – yellow colour

Dunes 8-10m high which are grey in colour due to the presence of humus in the soil.

Depressions between the dunes where the water table is near to the surface.

The oldest dunes (no longer fed by supply of fresh sand dune to distance from beach).

Embryo dunes
↓
Fore dunes
↓
Yellow dunes
↓
Grey dunes
↓
**Dune slack**
↓
Mature dunes

## Protecting our coastline

Our coastlines need to be protected for many economic, social and environmental reasons, though it is important to remember we cannot protect everything.

In order to protect coastlines from constant erosion and weathering, people have used 2 different groups of engineering methods to minimise change. These are:

1. Hard Engineering methods - involves building and using structures made of solid materials such as steal concrete or rocks. The main idea is to stop the waves eroding the coast. However, they can be very costly and could cause visual pollution

2. Soft engineering methods – these work with the physical and natural processes within an area rather than building large man made structures to protect the land from wave attack. These methods are usually based on preserving and managing the beach or dunes.

Take a look at the table to find out different examples of each type…

| Type of engineering method | | Advantages | Disadvantages |
|---|---|---|---|
| Hard engineering | Sea wall | Have a recurved shape to minimise wave energy and reduce erosion. Stops erosion in a small area. | Very expensive to build and maintain. Look quite ugly and might destroy habitats. Stops people accessing the beach. |
| | Groynes | Groynes are fences which stick out perpendicular to the sea. They stop the movement of sediment through longshore drift and help build beaches. This is particularly good if you rely on a beach for tourism or protecting habitats. | As they stop the movement of sediment from one area, this could cause more erosion down the coast. Older looking groynes might not look as attractive and could also be hazardous. |
| | Rock armour | These are large rocks dumped in certain positions on a beach to absorb and reflect wave energy. As they absorb a lot of the waves energy, this stops erosion from taking place, but also causes sediment to be deposited so helping to build the beach. | These are very expensive, especially as the rocks need to be transported from very far away. Many of the rock armour we have in the UK has rocks from Norway. They might not fit in with the local scenery and look ugly. |
| | Gabions | Gabions are wire cages filled with smaller rocks that form a wall to reduce power of waves. They are significantly cheaper than a sea wall and easy to build. They can also last for a long time in the right conditions | As the wire corrode, they can become quite dangerous to people and animals as well as looking unappealing. |
| Soft engineering | Beach Nourishment | This is where sediments is taken from offshore or from a different area and dumped onto the beach making it wider. The wider beaches reduce erosion and flooding. | Can be very expensive as special equipment is needed to dredge sediment from offshore. They might not last for a very long time as the sediment is eroded after extreme weather. |
| | Dune Stabilising | This involves creating/restoring sand dunes through beach nourishment or planting vegetation to stabilise sand. This provides a barrier between land and sea, prolonging the effects of erosion. Looks more natural and provides habitats for plants and animals | Although they look more natural, they require a lot of maintenance to keep the dunes from eroding |
| | Managed retreat | This involved removing all defences from an area and giving up the land to the sea. This could allow for salt marshes to form and prevent flooding happening in another area. This is a very cheap method as you do nothing. | Normally means that buildings, houses and habitats will be lost, so you might have to give out compensation. |

Bournemouth Beach Management Scheme is a programme of work, planned from 2015 to 2032 to:

• Replace Bournemouth's existing 53 groynes
• Construct an additional three new groynes
• Replace the groyne at Hengistbury Head known as 'Long Groyne'
• Replenish the beach every five years

### What work is taking place at Bournemouth Beach?

A phased programme of work is planned over 17 years. This is to replace the existing 53 groynes and install an additional three, as well as replacing the groyne at Hengistbury Head known as the Long Groyne.

The first phase involved the replacement of 30 groynes. These are along the coast from Southbourne to Hengistbury Head. Beach replenishment has taken place between Bournemouth and Boscombe Piers and to the east of Boscombe Pier. 320,000 $m^3$ of sand was replaced during autumn/winter 2015/16. There will be beach replenishment taking place once every five years. The first phase ran from autumn 2015 until 2020. The second and third phases (up to year 2032) will replace the remaining 29 groynes. These are along the seafront from Southbourne to Alum Chine. There will also be a further two beach replenishment operations. The locations of the future beach replenishments will be determined nearer the time, by continually monitor beach levels and assessing which areas need attention.

### How is the beach replenished of sand?

Sand is dredged from a licensed area of seabed, for example, to the South East of the Isle of Wight. It is brought by dredger close to the section of beach where it will be deposited. The sand is then pumped through a long pipe on to the beach. The sand is mixed with water to assist it being pumped. As the mixture exits the pipe the water flows back in to the sea leaving the new sand behind. The beach is then levelled using bulldozers.

### How much will it cost?

**The total cost of the entire project (phases 1 – 3) is £50m approximately.** The majority is funded by the Environment Agency and a small proportion by Council funding and local levy.

### Why is the work necessary?

The work is required to ensure that Bournemouth's coastline continues to be protected from coastal erosion in the future.

Groynes were originally installed along the coastline in 1915. Groynes control beach material and prevent undermining of the promenade seawall. Groynes interrupt wave action and protect the beach from being washed away by longshore drift. Longshore drift is the wave action that slowly erodes the beach.

The sea wall and groynes alone will not protect the coastline. The beach is eroded over time by wave action and the longshore drift. The sand must be dredged and pumped back on to the beach to maintain it.

It is important that the beach is maintained as it is one of the UK's biggest attractions: There is an estimated 4.5 million visitors per year as well as being enjoyed by thousands of residents.

### What would happen if we did not do the work?

The life span of a groyne is around 25 years. They must be replaced periodically to ensure the coastline continues to be protected. The process for removing and replacing each groyne can take up to two months. The groynes would eventually deteriorate and no longer be effective, if not replaced. The beach would eventually be washed away. The sea wall would become exposed and disintegrate, exposing the cliffs to further erosion.

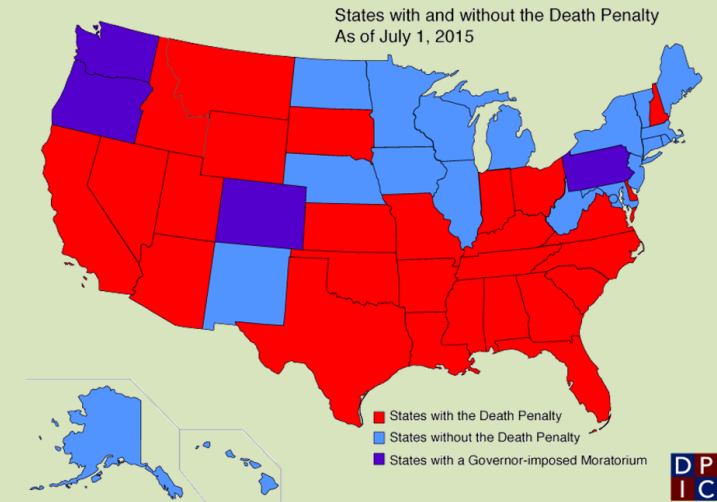## Derek Bentley case:

On 2 November 1952, Derek Bentley and a sixteen year old companion, Christopher Craig, attempted to burgle a warehouse.

Craig armed himself with a revolver and carried a number of rounds for the revolver. Bentley carried a sheath knife and a spiked knuckle-duster, both of which Craig had given to Bentley.

When the police arrived, one of the police officers, Detective Sergeant Frederick Fairfax, climbed the drainpipe onto the roof and grabbed hold of Bentley. Bentley broke free of Fairfax's grasp. Bentley then called across to Craig "Let him have it Chris!" The police officer was shot.

States with and without the Death Penalty
As of July 1, 2015

States with the Death Penalty
States without the Death Penalty
States with a Governor-imposed Moratorium

DPIC

## The Death penalty in the USA

### Top ten countries by number of executions
Numbers with '+' indicate the figure calculated is a minimum

| Country | Executions |
| --- | --- |
| China | 1,000+ |
| Iran | 251+ |
| Saudi Arabia | 184 |
| Iraq | 100+ |
| Egypt | 32+ |
| US | 22 |
| Pakistan | 14+ |
| Somalia | 12+ |
| South Sudan | 11+ |
| Yemen | 7 |
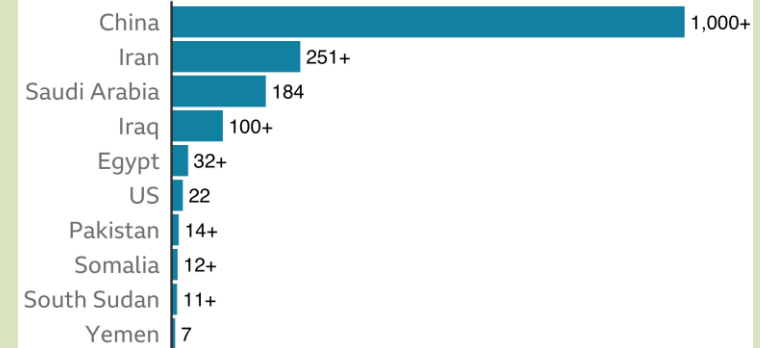
Note: Data for China is unavailable but Amnesty estimates thousands are executed

Source: Amnesty International 2019 report

BBC

| Religions that agree with the Death penalty | Religions that disagree with taking life | Religions that say prison would be better |
| --- | --- | --- |
| **Christianity:** The Bible teachers **God is Just** – the story of Original Sin - Adam and Eve show God's punishment. Also parables such as Lazarus and the Rich man. *Death penalty bring justice: "An eye for an eye"* – old testament<br><br>**Islam:** "Stand up firmly for justice" Qur'an in Islam. Islam believe in the law of **retribution**. There is capital punishment for murder, adultery and homosexuality under Shari'ah Law in some Islamic Countries. The Qur'an says *"Life for life".* | **Christianity:** God teaches the **Sanctity of Life** – all life is sacred and only God has the right to take a life *"I your God, give life and take it away"* Bible. "Thou shall not kill" 10 Commandments<br><br>**Islam:** Qur'an teaches *"The greatest sin is to take another mans life"*<br><br>**Buddhism:** Also Buddhists 1st of the 5 Precept is not to harm living things. Eightfold path teaches Right Action | **Christianity:** Christians teach to forgiveness and second chances *"We may forgive those who trespass against us".* Teaching of the parable the Prodigal Son also shows forgiveness.<br><br>**Islam:** In the Qur'an it says *"Those that pardon (forgive) are rewarded by God"*<br><br>**Buddhism:** The Dali Lama says *"Hatred will not cease by hared but by love alone",* showing forgives and love. |

## Theories on the existence of God

| Theory of Gods existence | Philosopher associated with this theory | Details of the theory |
|---|---|---|
| By Design | Paley | It seems extremely unlikely that such a complex, life-supporting universe happened by chance. It must have been designed, and there must be a designer. William Paley said that the intricate detail of the world pointed to the existence of an intelligent designer. |
| First Cause | Aquinas | Aquinas argued that some things are caused and that anything that's caused, must have been caused by something else (cause & effect). Nothing can cause itself - there must be a first causer, itself uncaused. This causer was GOD. |
| By Morality | Kant | As morals seem to be so well established, it seems like they might even be hardwired into the human mind. They are more than in-built beliefs – they are rules. And if there are rules, there must be a rule maker. The argument from morality argues that this rule maker is God. |

Philosophy – The study of general and fundamental questions about existence, knowledge, values, reason, mind, and language.

Philosopher – Someone engaged in, or studying philosophy.
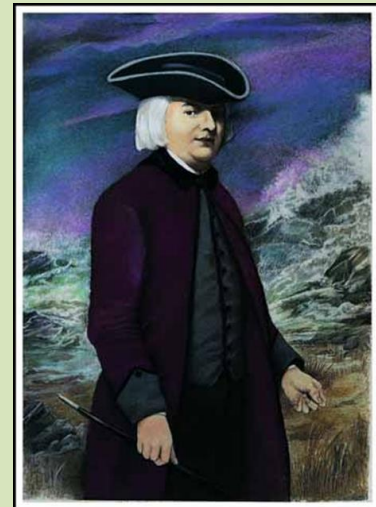
Kant (left) and Paley (right)

## God of the Gaps Theory

The idea that God resides in the unknown is what philosophers call the God of the gaps. And we have this thing called science, which marches on and makes discoveries in those gaps, ultimately closing gaps.

Science has a better understanding of our origins and our world. With more evidence for different worldly occurrences and changes, there is no need for belief in God, where science can fill in the gaps of our knowledge.

**Theologian Irenaeus said:**
Humans although created by God, were not created perfectly. We are still to learn about how to be good by witnessing evil and experiencing suffering. God allows us to experience suffering so we can learn and improve ourselves.

**Theologian Saint Augustine said:**
That suffering comes from evil that is within us all. This evil we are born with because it has been passed down through the generations by Eve, from her sin of eating the fruit from the forbidden tree, going against God's will.
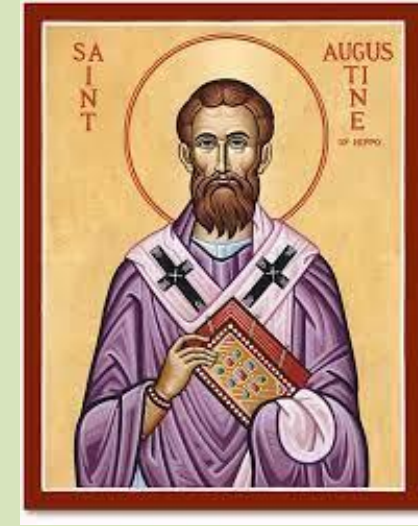
**Philosopher Epicurus** questioned the intention and ability of God to stop evil. He questioned whether God had any control over evil and our suffering.

"Is God willing to prevent evil, but not able?
Then he is not omnipotent.
Is he able, but not willing?
Then he is malevolent.
Is he both able and willing?
Then whence cometh evil?
Is he neither able nor willing?
Then why call him God?"
-Epicurus, Ancient Greek Philosopher
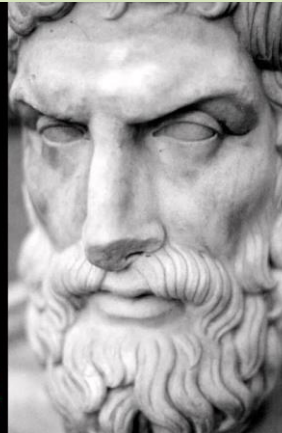
Pope John Paul said that humans are tempted by evil because humans by nature are sinful and weak

| Key term | Definition |
|---|---|
| Conscience and morality | Human sense and understanding to tell us right and wrong |
| Design argument | The argument that our existence was designed as it is so complex to be by chance. |
| Epicurus | Greek Philosopher to challenge the nature of God |
| First Cause | The argument that our existence must have been caused as nothing happens without a cause. Therefore something or someone must have caused our existence. |
| God of the Gaps | The idea that science, knowledge and exploration has developed our understanding of the world. What we didn't know previously was very large and often put down to God. As we learn more, the gap of what we account to God is shrinking. |
| Immortality | Living forever, never dying. |
| Natural Law | The belief that humans are easily tempted and cannot reason because by nature they are weak and sinful (Pope John Paul's theory) |
| Natural Evil | Acts of evil and suffering which are not caused by humans e.g. volcanoes, hurricanes |
| Moral Evil | Acts of evil and suffering caused by humans e.g. murder, war |
| Philosophy | The study of questions about existence, knowledge, values, reason, mind, and language. |
| Resurrection | Rebirth into the afterlife. |
| Thomas Aquinas | Christian theologian who came up with Natural Theory and First Cause argument. |
| William Paley | Christian philosopher who argued "existence by design." |

**Pourquoi visiter Salisbury / Downton?**

Elle est située / il est situé dans le sud / sud-ouest *(it is in the south / south west)*

La ville / elle est petite / grande / calme / intéressante / plein de choses à faire *(the town / it is small / big / quiet / interesting / full of things to do)*

Elle est située à la campagne / près d'une forêt / au bord de la mer *(it is situated in the countryside / near a forest / by the sea)*

à ... km de *(... kilometers from)*

Il y a / nous avons *(there is, are / we have)*

Il n'y a pas de / nous n'avons pas de *(there isn't, aren't / we don't have)*

La ville / le village est... *(the town / village is...)*

Beaucoup de / plein de / assez de *(lots of / full of / enough)*

Les magasins / les espaces verts / les arbres / les plantes / les fleurs / les champs *(shops / green spaces / trees / plants/ fields)*

**See opposite for a full list of places in a town**

Dans le passé / il y a trente ans / avant *(in the past / 30 years ago / previously, before)*
C'était *(it was)*
Il y avait / il n'y avait pas de *(there was / were, there wasn't / weren't)*
On pouvait / on ne pouvait pas *(you could / you couldn't)*

En été / en automne / en hiver / au printemps *(in summer / autumn / winter / spring)*
S'il pleut / neige / fait froid / chaud *(if it rains / snows / is cold, hot)*
Quand il fait beau / mauvais *(when it's nice / horrible weather)*
On peut... *(you / one can)*
Faire des promenades / faire du sport / faire des randonnées / faire du vélo / faire du shopping / visiter des monuments / aller voir un match de foot *(go for walks / do sport / go on hikes / go cycling / go shopping / see the sights / go and see a football match)*
C'est plus .... que / moins ... que *(it's more... than / less ... than)*
C'est facile de *(it's easy to)*
Se déplacer / voyager *(get around / travel)*

l'agence de voyages (f) = travel agency
l'auberge de jeunesse (f) = youth hostel
la banque = bank
la bibliothèque = library
la bijouterie = jeweller's shop
la boucherie = butcher's shop
la boulangerie = bakery
le café = café
le centre commercial = shopping centre
le centre sportif = sports centre
le château = castle
le cinéma = cinema
le collège = school (11-15)
le commissariat = police station
l'école primaire (f) = primary school
l'église (f) = church
l'épicerie = grocer's shop
la ferme = farm
la gare = railway station
la gare routière = bus station

l'hôpital (m) = hospital
l'hôtel (m) = hotel
l'hôtel de ville (m) = town hall
le lycée = school (15-18)
le magasin = shop
la maison = house
le marché = market
le musée = museum
la poste = post office
le parc = park
la parfumerie = perfume shop
la pension = guest house
la pharmacie = chemist
la piscine = swimming pool
le restaurant = restaurant
le stade = stadium
la station-service = petrol station
le supermarché = supermarket
le théâtre = theatre
la zone piétonne = pedestrian area

**Venez chez nous!**

Venez à … ! *(come to)*
Visitez ! *( visit)*
Venez voir *(come and see)*
Profitez de… *(take advantage of)*

Si vous vous intéressez à *(if you're interested in...)*
Si vous aimez *(if you like)*
Si vous êtes fana de... *(if you're a fan of...)*
Si vous cherchez... *(if you're looking for)*
Si vous voulez … *(if you want)*

**Imperfect tense**
When we're talking about what things used to be like,
we are using the 'imperfect tense'.

La ville **était** petite = the town used to be (was) small
Il y **avait** beaucoup de polllution = there used to be
(was)  lots of pollution
Tout le monde **allait** à pied = everyone walked
Il n'y **avait** pas de voitures = there weren't any cars
C'**était** plus calme = it was more quiet / quieter

**Giving instructions ('imperative')**

In English, when you tell someone to do something,
you are using the 'imperative' form of a verb.
Come here!  Buy  this / that!  Enjoy yourself!
Eat food!  Drink lemonade!  Don't smoke!  Don't drink
and drive!

In French, you can use the 'tu' form (personal,
informal ) or (more commonly in adverts) the 'vous'
form of the verb.
Examples:
**viens / venez = come!**
**visite / visitez = visit**
**amuse-toi  / amusez –vous = enjoy youself**

**Modal verbs**
Modal verbs are verbs which require a second verb.
In English, can, must, should etc are all modals as they need a second verb to make sense.

**On peut = one can** is a modal verb.
It comes from the verb 'pouvoir', which means 'to be able to'.

| | |
|---|---|
| je peux | = I can |
| tu peux | = you can |
| il / elle / on peut | = he/she/one can |
| nous pouvons | = we can |
| vous pouvez | = you (pl) can |
| ils peuvent | = they can |

Examples:
on peut faire du shopping = one can (you can) do / go shopping
on ne peut pas nager dans la mer = one can't  (you can't) swim in the sea

**Pros and Cons**

A couple of ways you can talk about good / bad things:

**un avantage / un point positif, c'est que...**
*(an advantage is that...)*

**un désavantage / un inconvénient / un point négatif, c'est que...**
*( a disadvantage is that...)*

**ce qui est bien c'est....**
*(what's good is...)*

**Adjectival Agreement**
Adjectives change spellings, depending on the gender of the noun, and the quantity of the noun they are describing.

**Le** stade est petit *(the stadium is small)*
**La** ville est grand**e** *(the city is big)*

**Les magasins sont varies** *(the shops are varied)*
**Les piscines sont belles (***The swimming pools are beautiful)*
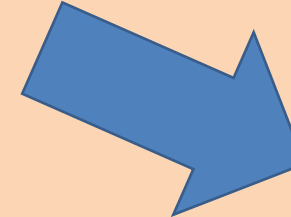


| Masculine singualar | Feminine singualar | Masculine plural | Feminine plural | English |
|---|---|---|---|---|
| beau | belle | beaux | belles | beautiful |
| sale | sale | sales | sales | Dirty |
| tranquille | tranquille | tranquilles | tranquilles | Peaceful |
| jolie | jolie | jolis | jolies | Pretty |
| laid | laide | laids | laides | Ugly |
| ancien | ancienne | anciens | anciennes | Old |
| moderne | moderne | modernes | modernes | modern |

**Comparatives (more than/less than)**

*PLUS* + adjective + *que*
Southampton est *plus* grande **que** Salisbury
*Southampton is **bigger** (more big) **than** Salisbury*

*moins* + adjective + *que*
Salisbury est **moins** grande **que** Southampton
*Salisbury is **smaller** (less big) **than** Southampton*

**Superlatives (the most/the least)**

To say the **most** you need to use **le, la, les**
 + **plus** + adjective
Salisbury est la plus jolie
(Salisbury is the prettiest)

To say the **least** you need to use **le, la , les** + **moins** + adjective
Salisbury est la moins jolie
Salisbury is the least pretty

- During **term 6**, your final term of KS3 French, you are being asked to write a story about YOU! You have the opportunity to pull together all your learning from Years 7, 8 and 9 to say as much as you can about yourself and present it in a story / book format.
- You could make this a multi-media project, where you include video / sound files too.
- Here is a reminder of what you have been learning to give you the opportunity to start drafting your story:

**Year 7**
- ❑ Describing what you can see
- ❑ Talking about people in your family
- ❑ Talking about yourself
- ❑ Describing what you do during a typical week
- ❑ Describing where you live
- ❑ Talking about holidays

**Year 8**
- ❑ Describing a holiday you've been on
- ❑ Talking about food
- ❑ Finding your way across town to a doctor
- ❑ Arranging a meeting with a friend
- ❑ Talking about life at school
- ❑ Describing another French-speaking country (Guadeloupe).

**Year 9**
- ❑ Describing your phone and other modern tech
- ❑ Talking about media (TV, films etc)
- ❑ Talking about your future plans
- ❑ Talking about money and jobs
- ❑ Advertising where you live

**¿Por qué visitar Salisbury / Downton?**

Mi ciudad / mi pueblo está en el sur / sur-oeste *(it is in the south / south west)*

está ubicado/a en el sur de Inglaterra *(is situated in the south of England)*

La ciudad / es pequeña/ grande / tranquila / interesante / llena de cosas que hacer *(the town / it is small / big / quiet / interesting / full of things to do)*

Está situado/a en el campo / cerca de un bosque / al lado del mar *(it is situated in the countryside / near a forest / by the sea)*

a ... km de *(... kilometers from)*

hay / tenemo *(there is, are / we have)*

no hay / no tenemos *(there isn't, aren't / we don't have)*

La ciudad / el pueblo es ... *(the town / village is...)*

mucho / lleno de / bastante *(lots of / full of / enough)*

las tiendas / los espacios verdes / los árboles/ las plantas/ las flores/ los campos *(shops / green spaces / trees / plants/ fields)*

**See opposite for a full list of places in a town**

En el pasado / hace xx años / antes *(in the past / xx years ago/ before)*

Mi barrio / pueblo / ciudad *(my neighbourhood / village / town)*

Era / no era *(was / wasn't)*

Más / meno *(more / less)*

Tenía / no tenía *(It had / didn't have)*

en el verano / en el otoño / en el invierno / en la primavera *(in summer / autumn / winter / spring)*
si llueve / nieva / hace frío/ calor *(if it rains / snows / is cold, hot)*
cuando hace buen tiempo / mal tiempo *(when it's nice / horrible weather)*
se puede... *(you / one can)*
visitar / hacer / ver / nadar / jugar / relajarse / ir *(visit / do / see / swim / play / relax / go)*
Es facíl *(it's easy to)*
desplazarse / viajar *(get around / travel)*

más *(more)*

menos *(less)*
tranquilo/a *(quiet)*
ruidoso/a *(noisy)*
sucio/a *(dirty)*
limpio/a *(clean)*

mucha gente *(lots of people)*
más basura *(more rubbbish)*
menos contaminación *(less pollution)*
un problema con la delincuencia *(crime)*
menos edificios *(fewer buildings)*

un aeropuerto *(an airport)*
un ayuntamiento = *(town hall)*
un castillo *(a castle)*
un centro commercial *(a shopping centre)*
un cine *(a cinema)*
un colegio *(a secondary school)*
un estación de trenes = *(train station)*
un estadio *(a stadium)*
una hamburguesería *(a fast-food restaurant)*
un hospital = *(hospital)*
una iglesia *(a church)*
un mercado *(a market)*
un museo *(a museum)*
un palacio *(a palace)*
un parque *(a park)*
un polideportivo = *(sports hall)*
un puerto *(a port)*
un supermercado *(a supermarket)*
una universidad *(a university)*

**¡Visita!!**

¡ Visite... ! *(visit)*
¡ Venga ! *( come)*
¡ Venga a ver! *(come and see)*
Aproveche... *(take advantage of)*

Si le interesa *(if you're interested in...)*
Si le gusta *(if you like)*
Si es un fan de... *(if you're a fan of...)*
Si busca... *(if you're looking for)*
Si quire... *(if you want)*

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**Comparatives (more than/less than)**

*más* + adjective + *que*
Southampton es *más* grande **que** Salisbury
*Southampton is **bigger** (more big) **than** Salisbury*

*menos* + adjective + *que*
Salisbury es **menos** grande **que** Southampton
*Salisbury is **smaller** (less big) **than** Southampton*

**Superlatives (the most/the least)**

To say the **most** you need to use **el, la, los, las**
+ **más** + adjective
Salisbury es **la más** bonita
(Salisbury is the prettiest)

To say the **least** you need to use **el, la, los, las**
+ **menos** + adjective
Salisbury es **la menos** bonita
Salisbury is the least pretty

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**The imperfect tense = was ….. / used to …..**
- When the verb has the –AR, -ER, -IR ending it is called the INFINITIVE.
- Remove the –AR, -ER, -IR
- Dd the correct ending for the person who is speaking

❖ Hablar = habl_ = habl**aba** = I used to speak
❖ Leer = le_ = Le**ía** = I used to read
❖ Vivir = viv_ = viv**ía** (I used to live)

|         |         | AR      | IR/ER  |
|---------|---------|---------|--------|
| yo      | (I)     | **aba**     | **ía**     |
| tú      | (you)   | **abas**    | **ías**    |
| él, ella | (he/she**)** | **aba**    | **ía**     |
| nosotros | (we**)** | **ábamos**  | **íamos**  |
| vosotros | (you)   | **ais**     | **íais**   |
| Ellos   | (they)  | **aban**    | **ían**    |

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**Modal verbs**
Modal verbs are verbs which require a second verb.
In English, can, must, should etc are all modals as they need a second verb to make sense.

**Se puede = one can** is a modal verb.
It comes from the verb 'poder', which means 'to be able to'.

| puedo | = I can |
|-------|---------|
| puedes | = you can |
| puede | = he/she/one can |
| podemos | = we can |
| podéis | = you (pl) can |
| pueden | = they can |

Examples:
se puede ir de compras= one can (you can) do / go shopping
no se puede nadar en el mar = one can't (you can't) swim in the sea

## Pros and Cons

*A nice way to describe the pros and cons of something is to use 'lo + adjective' to mean 'the...thing'*

*Lo bueno – the good thing*
*Lo malo – the bad thing*
*Lo interesante – the interesting thing*
*Lo gracioso – the funny thing*

*Lo bueno es que Salisbury es limpia**
*The good thing is that Salisbury is clean*

*Lo malo es que Salisbury es ruidosa**
*The bad thing is that Salisbury is noisy*

- *The word for town in Spanish is feminine so the adjective must end in 'a'*

## Adjectival Agreement

Adjectives change spellings, depending on the gender of the noun, and the quantity of the noun they are describing.

**El** estadio es modern**o** *(the stadium is modern)*
**La** ciudad es modern**a** *(the city is modern)*

**Los** muse**os** son modern**os** *(the museums are modern)*
**Las** tiend**as** son modern**as** *(The shops are modern)*
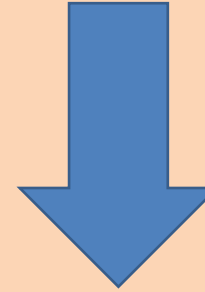
| Masculine singualar | Feminine singualar | Masculine plural | Feminine plural | English |
|---|---|---|---|---|
| buen**o** | buen**a** | buen**os** | buen**as** | Good |
| suci**o** | suci**a** | suci**os** | suci**as** | Dirty |
| tranquil**o** | tranquil**a** | tranquil**s** | tranquil**as** | Peaceful |
| bonit**o** | bonit**a** | bonit**os** | bonit**as** | Pretty |
| fe**o** | fe**a** | fe**os** | fe**as** | Ugly |
| antigu**o** | antigu**a** | antigu**os** | antigu**as** | Old |
| modern**o** | modern**a** | modern**os** | modern**as** | modern |

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# The Fundamentals of Art

## TERM 3 and 4

**A R T I S T**

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

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

Patterns can be manmade or natural.

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 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

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

There are 3 primary COLOURS: RED, YELLOW, BLUE

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

SENTENCE STARTERS

I can vary tone by…
- layering mark making
- using a range of pencils
- varying the pressure of my marks
- using an eraser to add highlights

My work is successful because…
I could develop my work further by…
My design was inspired by the work of…

ATTITUDE

Be positive and try your best!

RESPECT

Respect others, work and the room

THINK

Understand and demonstrate.

IMAGIINE

Be creative, use you imagination!

SPOTLESS

Tidy up after yourself.

TARGET

Follow directions.

| COLOUR | LINE | SHAPE/FORM/SPACE | PATTERN AND TEXTURE | TONE |
|---|---|---|---|---|
| BRIGHT | FLUENT | CLOSED | REPEATED | BRIGHT |
| BOLD | CONTINUOUS | OPEN | UNIFORM | DARK |
| VIBRANT | CONTROLLED | DISTORTED | GEOMETRIC | FADED |
| PRIMARY | LOOSE | FLAT | RANDOM | SMOOTH |
| SECONDARY | POWERFUL | ORGANIC | SYMMETRICAL | HARSH |
| TERTIARY | STRONG | POSITIVE | SOFT | CONTRASTING |
| RADIANT | ANGULAR | NEGATIVE | IRREGULAR | INTENSE |
| VIVID | FLOWING | FOREGROUND | UNEVEN | SOMBRE |
| DULL | LIGHT | BACKGROUND | ROUGH | STRONG |
| CONTRASTING | DELICATE | COMPOSITION | BROKEN | POWERFUL |
| COMPLIMENTARY | SIMPLE | ELONGATED | GRID | LIGHT |
| HARMONIOUS | THICK | LARGE | FLAT | MEDIUM |
| MONOCHROME | THIN | SMALL | WOVEN | DARK |
| NATUARL | BROKEN | 2D | ORGANIC | LAYERED |
| SATURATED | OVERLAPPING | 3D | SMOOTH | DEPTH |
| PASTEL | LAYERED | TWISTED | ABSTRACTED | DEVELOPED |
| COOL | MARK MAKING | JAGGED | | SOFT |
| WARM | | | | |

Lesson 1: Understanding the Value Scale

ESSENTIAL EQUIPMENT:
- PENCIL PACK (2B, 4B, 6B ETC)
- ERASER
- SHARPENER
- SKETCHBOOK

OPTIONAL EQUIPMENT:
- DRAWING PENS
- WATERCOLOUR SET
- WATERCOLOUR PENCILS
- PAINTBRUSHES

TAKING ABOUT ART:
- What are you looking at?
- How was it made?
- Who made it?
- How will it inspire your work?
- Do you like it/dislike it? Why?

# FOOD PROJECT

## TERM 5 and 6

Artists you could explore…


Andy Warhol


Sarah Graham


Wayne Thiebaud


Claes Oldenburg


Emma Dibben

### Food in Art

Food has always appeared in art, from the Romans to 1960s Pop Art, Cave Art to 21st century hyper realistic paintings.
Artists record the world around them, and this often includes food, whether it is in still life form and realistic or abstracted through simplification. We are going to explore the subject matter of food not only through observational studies but through the lens of graphic design and advertisement. Companies want us to buy their products so have to make them visually appealing.
Art is a powerful tool for companies!

Potential media you will explore within this project:
Observational drawing
Photography
Sculpture with Mod Roc
Various printing techniques




### WAYNE THIEBAUD

- Was an American Pop Artist.
- Pop art focused on things that were popular at the time (mostly in the late 50s and 60s), Wayne Thiebaud focused a lot of his work on popular fast food.
- Thiebaud used a strong light source within his paintings to create contrasting tones and strong shadows.

# FOOD PROJECT

**Drawing support:**

- Use a range of pencils (2B, 3B, 4B, 5B, 6B) to help to build tone.
- Use a rubber to add highlights.
- Vary the pressure of your pencil, the harder you press, the darker the mark, the lighter you press, the lighter the mark.
- Layer your mark making.
- When using colour, add brown, green, purple and blue to help build shadow and darker tones.

**Photography support:**

- Make sure your image is well framed, this means, check your background is clear from other subject matter.
- Your images should be in focus, the cameras should do this automatically for you but press the shutter button half way down to auto focus before pressing all the way down to take the image.
- Check your composition (where objects are placed in the frame), experiment with where you place your subject matter.
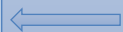
**Rule of thirds:**
The rule of thirds is a compositional guideline that places your subject in the left or right third of an image. This leaves the other two thirds more open and with more space.
Using the rule of thirds helps artists and photographers to compose their subject matter in the most visually interesting way they can.
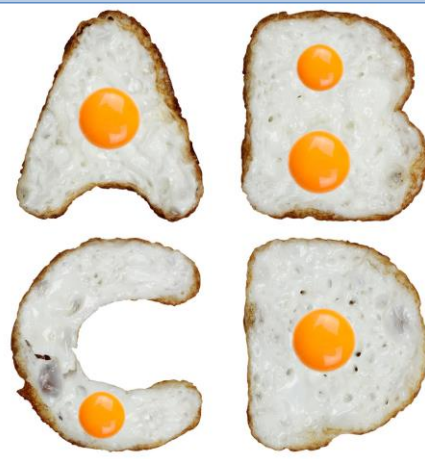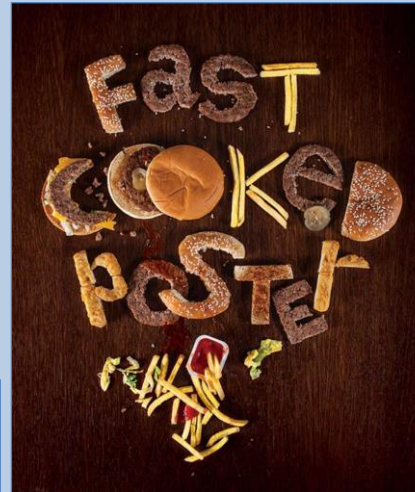
## Food Idioms
Don't cry over spilt milk
How do you like your eggs in the morning
It was a piece of cake
Taking home the bacon
Cheap as chips
Not my cup of tea
Flat as a pancake
Sweet as honey
Take with a pinch of salt
Variety is the spice of life
Apple of their eye
In a pickle
Egg on your face
Walking on eggshells
Couch potato
Bigger fish to fry
Full of beans
Cool as a cucumber

# SAMBA

## # Module Learning Objectives

This unit introduces the polyrhythmic style of Latin-American Samba and revises and revisits may key concepts concerning rhythm, beat and pulse from pupil's learning including features such as polyrhythms, cyclic rhythms, syncopation, ostinato and call and response.

# Understand how instruments, structures and textures are used in Samba

# Perform as part of a larger ensemble understanding key roles of performers and different instruments and the relationship between these and the effect this has on the music

# Use rhythmic features such as ostinato, cyclic rhythms, polyrhythms, call and response and syncopation when performing and improvising

AAINJAA is a Samba collective from Bogota, Colombia band. They organise drumming sessions for anyone so that they can; "create spaces in which everyone is accepted, regardless of the differences that make us unique." Here they are performing with 150 drummers!

A Surdo,
The Bass drum

## Language for Learning/Music Theory

**CALL AND RESPONSE** – one person plays or sings a musical phrase, then another others respond.

**CYCLIC RHYTHM** – a rhythm that is repeated over and over again.

**IMPROVISATION** – making up music as you go along, without preparation.

**OSTINATO** – a repeated pattern.  Can be rhythmic or melodic.

**PERCUSSION** – Instruments that are mostly hit, scraped or shaken to produce sound.

**POLYRHYTHM** – the use of several rhythms performed simultaneously, often overlapping each other to create a thick texture.

**PULSE** – a regular beat that is felt throughout music

**RHYTHM** – a series of notes of different lengths that create a pattern.

**SYNCOPATION** – accenting or emphasising the weaker beats of the bar (often a half beat (quaver) followed by a
    full beat (crotchet)) giving the rhythm an OFFBEAT feel.

**SAMBISTA** – the leader of a Samba band. **STRUCTURE** – the way in which a piece of music is put together.

**CODA** – section that brings a piece of music to an end (Italian for "tail".)

**INTRODUCTION** – the opening section of a piece of Music

Here is a street Samba group from Rio De Janiero. They are so full of life!!

# SAMBA
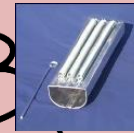
## A. Key Words and Terms in Samba Music

**CALL AND RESPONSE** – one person plays or sings a musical phrase, then another person/group responds with a different phrase or copies the first one.

**CYCLIC RHYTHM** – a rhythm that is repeated over and over again.

**IMPROVISATION** – making up music as you go along, without preparation.

**OSTINATO** – a repeated pattern.  Can be rhythmic or melodic; usually short.

**PERCUSSION** – Instruments that are mostly hit, scraped or shaken to produce sound.  Samba uses many percussion instruments which together are called a **BATERIA**.

**POLYRHYTHM** – the use of several rhythms performed simultaneously, often overlapping each other to create a thick texture.

**PULSE** – a regular beat that is felt throughout music

**RHYTHM** – a series of notes of different lengths that create a pattern.  Usually fits with a regular beat or pulse.

**SYNCOPATION** – accenting or emphasising the weaker beats of the bar (often a half beat (quaver) followed by a full beat (crotchet)) giving the rhythm an **OFFBEAT** feel.

**SAMBISTA** – the leader of a Samba band or ensemble, often signalling cues to the rest of the band of when to change sections within the music with an **APITO** (Samba whistle)

## B. Form and Structure of Samba

Samba music often starts with an **INTRODUCTION** often featuring **CALL AND RESPONSE RHYTHMS** between the Samba Leader and ensemble.  The main Ostinato rhythm of Samba is called the **GROOVE** when all the instruments of the Samba Band play their respective rhythms over and over again **(CYCLIC RHYTHMS)** forming the main body of the piece.  The **GROOVE** is broken up by **BREAKS** - 4 or 8 beat rhythms providing contrast and **MID SECTIONS** – one or two instruments change the rhythm of their ostinato and the others stay the same or stop.  Sometimes **BREAKS** and **MID SECTIONS** feature a **SOLOIST** who "shows off" their rhythms.  The **SAMBISTA** must signal to the group when to change to a different section which is normally done with an **APITO** (Samba Whistle – loud!).  A piece of Samba can end (this section is called the **CODA**) with either a **CALL AND RESPONSE** pattern or a pre-rehearsed ending phrase of rhythm.  The **FORM AND STRUCTURE** of a piece of Samba may look like the following:

| Intro | Groove | Break | Groove | Mid-Section | Groove | Mid-Section | Groove | Break | Groove | Coda |
|-------|--------|-------|--------|-------------|--------|-------------|--------|-------|--------|------|

## C. Texture of Samba Music

Texture varies in Samba music, often **MONOPHONIC** where a single rhythm is heard as in **CALL AND RESPONSE** sections, sometimes **POLYPHONIC** where sections of the Samba band play different rhythms **(OSTINATOS)** creating **CROSS-RHYTHMS** (when two rhythmic patterns that "conflict" with each other occur simultaneously) creating a thick texture of interweaving and interlocking rhythms – a **POLYRHYHM** or a **POLYRHYTHMIC TEXTURE**.

## D. Dynamics of Samba Music

The dynamics of Samba music are normally **VERY LOUD** – it is music designed to be performed outdoors at carnivals and is played by large numbers of instrumentalists and to accompany dancers and processions with large audiences watching and listening.  Sometimes, a **CRESCENDO** is used at the end of a piece of Samba music for dramatic effect.

## E. Tempo of Samba Music

Samba music is generally **FAST** at around 104 bpm and keeps a constant tempo to assist the dancers or processional nature of the music.  Sometimes the **SAMBISTA** (Samba leader) uses **(TEMPO) RUBATO** – tiny fluctuations in tempo for expressive effect.

## F. Instruments, Timbres and Sonorities of Samba

SURDO    REPINIQUE    TAMBORIM    CHOCOLO    RECO-RECO    APITO    AGOGO BELLS    CAIXA DE GUERRO

# What Makes a Good Song?

## # Module Learning Objectives

# Understand the different textural and structural elements of a song/popular song.

# Understand and use the different musical information given on a lead sheet in creating a Musical Arrangement of a Popular Song.

This is Emonik! We will be using Bandlab for this project. Here he takes you through a simple tutorial.

Here is Sink aka Rachel Lindsey who shows you in this video how to formulate a song. She uses loops here and concentrates on melody and from/structure!

## Language for Learning/Music Theory

**HOOK** – A 'musical hook' is usually the 'catchy bit' of the song that you will remember.

**RIFF** – A repeated musical pattern often used in the introduction and instrumental breaks in a song or piece of music.

**BASS LINE** – The lowest pitched part of the music often played on bass instruments such as the bass guitar.

**MELODY** – The main "tune" of a song or piece of music.

**CHORD** – A group of two or more notes played at the same time.

**ACCOMPANIMENT** – Music that accompanied either a lead singer or melody line.

**FORM AND STRUCTURE** – the different sections of a piece of music or song and how they are ordered.

**INTRO** – The introduction sets the mood of a song.

**VERSES** – Verses introduce the song theme.

**PRE-CHORUS** - A section of music that occurs before the Chorus which helps the music move forward.

**CHORUS** – All the choruses have the same lyrics. This section relays the main message of the song .

**MIDDLE 8/BRIDGE** – This section adds some contrast to the verses and choruses by using a different melody and chord progression.

**INSTRUMENTAL SOLO** – Solos are designed to show off an instrumentalists' skills.

**CODA/OUTRO** – The final section of a popular song which brings it to an end (Coda is Italian for "tail"!).

**CONJUNCT MELODIC MOTION** – Melodies which move mainly by step or use notes which are next to or close to one another.

**DISJUNCT MELODIC MOTION** – Melodies which move mainly by leap or use notes which are not next to or close to one another.

# What Makes a Good Song?



## A. Popular Song Structure

**SONG STRUCTURE** – How a song is made up of or divided into different sections (see below) and the order in which these sections occur. To work out the structure of a song, it's helpful to analyse the **LYRICS and** listen to a recording for the song (for instrumental sections).

**INTRO** – often shortened to 'intro', the first section of a song which sets the mood of the song and is sometimes, but not always, an instrumental section using the song's chord pattern.

**VERSES** – songs normally have several verses. Verses introduce the song's theme and have the same melody but different lyrics for each verse which helps develop the song's narrative and story. Songs made up entirely of verses are called **STROPHIC**.

**LINK** – a optional short section often used to join different parts of a song together, often instrumental, and sometimes joins verses together or appears at other points within a song.

**PRE-CHORUS** – an optional section of music that occurs before the **CHORUS** which helps the music move forward and "prepare" for what is to come.

**CHORUS** – occurs several times within a song and contains the most memorable **HOOK/RIFF**. The chorus relays the message of the song and is repeated with the same melody and lyrics each time it is heard. In popular songs, the chorus is often repeated several times towards the end of the song.

**MIDDLE 8/BRIDGE** – a section (often 8 bars in length) that provides contrasting musical material often featuring an instrumental or vocal solo using new musical material allowing the performer to display their technical skill on their instrument or voice.

**CODA/OUTRO** – The final section of a popular song which brings it to an end (Coda is Italian for "tail"!)

## B. Key Words

**LYRICS** – The words of a song, usually consisting of **VERSES** and a **CHORUS**.

**HOOK** – A 'musical hook' is usually the 'catchy bit' of the song that you will remember. It is often short and used and repeated in different places throughout the piece. Hooks can be either **MELODIC, RHYTHMIC** or **VERBAL/LYRICAL**.

**RIFF** – A repeated musical pattern often used in the introduction and instrumental breaks in a song or piece of music. Riffs can be rhythmic, melodic or lyrical, short and repeated.

**MELODY** – The main tune of the song often sung by the **LEAD SINGER**.

**COUNTER-MELODY** – An 'extra' melody often performed 'on top of' the main melody that 'fits' with it a **DESCANT** or **INSTRUMENTAL SOLO**.

**TEXTURE** – The layers that make up a song *e.g., Melody, Counter-Melody, Hooks/Riffs, Chords, Accompaniment, Bass Line*.

## C. Lead Sheet Notation and Arrangements

A **LEAD SHEET** is a form of musical **NOTATION** that contains only the essential elements of a popular song such as the **MELODY, LYRICS, RIFFS, CHORDS** (often as guitar chord symbols) and **BASS LINE**; it is not as developed as a *FULL SCORE ARRANGEMENT* and is open to interpretation by performers who need to use and adapt the given elements to create their own musical **ARRANGEMENT:** their "version" of an existing song.



**COVER (VERSION)** – A new performance, remake or recording by someone other than the original artist or composer of the song.

## D. Conjunct and Disjunct Melodic Motion

**CONJUNCT MELODIC MOTION** – Melodies which move mainly by step or use notes which are next to or close to one another.

**DISJUNCT MELODIC MOTION** – Melodies which move mainly by leap or use notes which are not next to or close to one another.

**MELODIC RANGE** – The distance between the lowest and highest pitched notes in a melody.



## E. Song Timbre and Sonority (Instruments that are used to Accompany Songs)



Pop Bands often feature a **DRUM KIT** and **PERCUSSION** to provide the rhythm along with **ELECTRIC GUITARS** (**LEAD GUITAR, RHYTHM GUITAR** and **BASS GUITAR**) and **KEYBOARDS**. Sometimes **ACOUSTIC INSTRUMENTS** are used such as the **PIANO** or **ACOUSTIC GUITAR**. **ORCHESTRAL INSTRUMENTS** are often found in pop songs such as the **STRINGS, SAXOPHONE, TROMBONE** and **TRUMPET.** Singers are essential to a pop song - **LEAD SINGER** – Often the "frontline" member of the band (most famous) who sings most of the melody line to the song. **BACKING SINGERS** support the lead singer providing **HARMONY** or a **COUNTER-MELODY** (a melody that is often higher in pitch and different, but still 'fits with' the main melody) and do not sing all the time but just at certain points within a pop song e.g. in the chorus.

# Interpretation, genre & performance

## Study Focus

We will look at a variety of texts and dramatic situations from a variety of genres with the intention of you appreciating how you might use the skills of the actor, director and to some degree, the stage designer. We will work practically, where possible, so that you get to work with the plays as they were intended to be used. We will look at the playwright's use of language and structure and the way that actors and directors can take the playwright's ideas, from page to stage, as the saying goes. You will explore how, subtext, pause, space and silence combine to communicate subtle and dramatic meaning. The intention is that You will gain some breadth of knowledge of how different playwrights from different era's and cultures have 'told their stories' and shared their ideas.

## Things that you will practise and learn

- Playwrights use the play format differently to communicate their ideas.

- You will investigate how playwright's use language to suggest subtext and hidden meaning.

- You will investigate how playwrights use language to suggest character, class and status as well as mood and personality.

- You will learn how different silence and pause create meaning and how to realise this meaning on stage as an actor / director.

- You will explore how to use a variety of vocal skills to interpret and communicate different characters in different situations and emotional states.

- You will discover how pace and tempo rhythm affect the meaning of a moment and a scene and the mood that is created.

- You will explore Shakespeare's particular use of language and how actors can use it

- You will explore ideas of context and how plays from the past can be to brought to life for a modern audience by situating them in modern settings and contemporary events and situations.

# Key Concepts and Ideas

- **Subtext** – The prefix, 'sub' means below or underneath, like a submarine goes under the sea (marine means sea). So <u>sub</u> – text  is the text, or meaning, beneath the actual words that are said or not said. In naturalistic theatre, the hidden meaning is brought out by the playwright's very specific use of language- words and phrases that have a double meaning. In performance, the subtext comes out through the actor's body language, intonation and tone of voice.
- **Intonation** – this is how the voice pitch rises and falls in a sentence. Characters sound excited and animated when there is a significant rise and fall. They sound dull and depressed when the voice stays flat in monotone.
- **Silence**-  is such a powerful option on the stage. Young actors rarely use this device, often falling into the trap that they have to be saying something, as well as doing something, all of the time, probably out of awkwardness and lack of confidence. Silence – not saying something can be especially potent when the audience knows that there is lots that could be said, or indeed, needs to be said.  As the playwright, Anton Chekhov wrote, "Characters often reveal more about themselves by what they do NOT say than by what they do say".  Lack of speech maintains the tension and builds the suspense.
- **Suspense** – This is the tension that puts us on the edge of our seats when we are watching something.  The dictionary describes it as the state or feeling of excited or anxious uncertainty about what may happen.  The more that we care about the characters on stage, the more anxious we get when it seems something bad may happen to them. The suspense increases in theatre because, as an audience, we can do nothing to save the situation - at least in naturalistic theatre.
- **Space** – We tend to put ourselves close to the people we like and apart from those that we do not like. Recent research has found this to be even more true than we previously assumed. Theatre people can use this basic information to communicate the state of character's relationships. We also look for opportunities and excuses to be near those we like and similarly will walk a mile around someone we're wanting to avoid. The study of spatial relationships is called. **Proxemics**. It is not an easy word to use and you can experiment. It is a favourite with the Examination boards.
- **Context** – It is important to remember that all scenes in a play and all events are partly the result of things that have previously happened. Past events inform and motivate character's words and actions- everything comes out of a context. Knowing this will help you as an actor know how to behave in a scene and why the character is feeling this way and acting this way. In your devised work, creating the context of a scene  will help you extend your scenes and make them clearer and richer, as you discovered in our last scheme of work.
- **Naturalism/ Realism** – Later on you will explore the difference between these two genres, for now, we can think of them as the style of theatre that tries to depict things as they are like in everyday life. Television like EastEnders and Coronation Street might be examples of these genres.
- **Melodrama** – This is a very exaggerated style of theatre. Key features include; a very clear strong plot line often with twists and turns. Very clear heroes and villains. Melodramas often have a clear moral message. It is quite a difficult style to perform in but a very enjoyable one for those who give it a good go.
- **Genre** – a timely reminder that this is the word we use for the category or style that a play is performed in. We will explore a variety of genres in both text and devised work. Some examples are;  Naturalism, Western and melodrama.

# Some example texts from different genres

**Texts by Philip Ridley**
*Fairytaleheart*

In Fairytaleheart, two fifteen-year olds confront their loneliness by exploring the language of theatre itself in a derelict community centre in the East end of London.
'This sixty-minute gem of a play- poetic perfection' Daily Mail.
First staged at The Hampstead Theatre 1998
*Sparkleshark*
There are nine wonderful characters in this modern example of storytelling in the theatre. Jake, a young East end boy uses his amazing powers of storytelling to avoid getting beaten up by the local bullies. His narrative interweaves real and challenging elements from all the characters lives and in so doing brings about some healing for the group.
Sparkleshark premiered at The Royal National Theatre London in 1997
*Romeo & Juliet* Shakespeare
Does true love conquer all or does unbridled passion destroy everything in its wake? Two contrasting themes that could be taken from this classic play. We look at key early scenes and explore how a modern setting can help communicate the characters and situation.
**Black-Eyed Susan** Douglas William Jerold
This most famous of 19th century melodrama a handsome heroic sailor returns from the Napoleonic wars to find his virtuous  wife has fallen on hard times and fallen play to the harassment of her crooked landlord uncle.

# Athletics
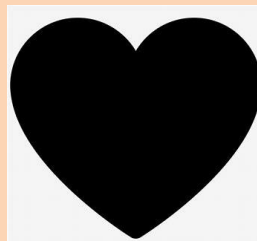
## Communication

### Triple Jump
Approach:
- Start approach by stepping onto your take off foot
- Mark out your approach distance (11-15 running strides form the take off board)
- Run fast at a speed you can take off from

Hop Phase:
- Use a low take off angle
- Use a single arm action
- Drive out and up with no take off leg
- Stay tall and look forward towards the end of the pit

Step Phase:
- Push of your back leg just like a bound
- Low take off angle
- Drive your thigh to parallel
- Maintain upright posture

Jump Phase:
- Single or double arm action
- Use the hang technique
- Keep head and chest up

Landing:
- Use a double leg shoot out in front
- Push your feet ahead of your body
- Don't fall backwards



### Implementation of the Academic Standards to the PE Environment:
- Arrive promptly and change within the allocated time.
- Always have the correct PE kit.
- Fully engaged throughout the lesson, striving to improve performance of skills and techniques at every opportunity.
- Motivated and contributes 100% effort.
- Can work independently to complete a warm-up, drills and competitive situations.
- Perseveres and doesn't give up, demonstrates resilience when practicing and applying skills to different situations/ game scenarios.

### Tactics of Performance:
- How can you use tactics in a track event?
- What stages of a middle distance race should you consider the implementation of tactics?

**Race tactics:**
Should you consider to sprint at these points at the race:
- Sprint start
- Start of the 2$^{nd}$ Lap
- Back straight
- Final Bend

**Finish Line Dip:**
As you approach the finish line, with a  stride left, lean forwards to push chest to cross the line first.

### Discus
Grip:
- Hold the discus by the pads of your finger tips, your thumb resting against the side of the discus
- The index finger can be placed (b) close together or apart (c)
- As you rotate to create momentum the discus will stay in your hand

Wind-up Phase:
- Rotate backwards and forwards
- Arm travels from your side, across your body,  to your hand being on top, non-throwing hand meets the discus to stop it dropping

Release:
- Spin the side of the discus
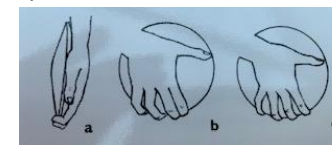
# Cricket

## Feedback

**Performance Analysis:**
- Using the success criteria for each of the skills of Cricket – Bowler, Batter, Fielder and Wicket Keeper.
- Identify the strengths and weaknesses in technique.
- Suggest what needs to improve and how it can be improved.

**Bowling Technique Checklist:**

**The Bound**
- Ball held at chin
- Arms thrown up
- Body leans backwards

**The Coil**
- Front arm pulled back
- Make a figure of six with bowling arm
- Back foot lands parallel to the crease

**The Release**
- Release ball at 1 o'clock
- Arm brushes ear
- Look over your shoulder

**Follow Through**
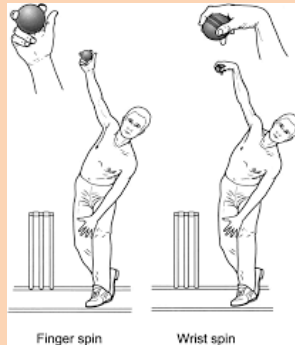
Finger spin    Wrist spin

**Wicket Keeper:**
Key Skills:
- Good Glove work – use two hands
- Watch the ball with a still head
- Catching with relaxed elbows, moving the gloves in the same direction as the path of the ball
- Soft hands

## Communication

**Implementation of the Academic Standards to the PE Environment:**
- Arrive promptly and change within the allocated time.
- Always have the correct PE kit.
- Fully engaged throughout the lesson, striving to improve performance of skills and techniques at every opportunity.
- Motivated and contributes 100% effort.
- Can work independently to complete a warm-up, drills and competitive situations.
- Perseveres and doesn't give up, demonstrates resilience when practicing and applying skills to different situations/ game scenarios.

## Tactics

**Key Skills: Forward defensive**

**Forward Defence**
The principle of a forward defensive stroke is to block the ball rather than to score runs.
1. Played to a straight full delivery.
2. Get your head in line with the ball.
3. Get your weight right into the ball.
4. Don't push at the ball, let the ball hit the bat not the bat hit the ball.
5. Angle the bat towards the ground

**The Cut Shot**
1. Played to a ball that is short and wide
2. The back foot goes back and across to get closer to the ball. Extend your arms through the shot.
3. Try to come from a high back lift down onto the ball. This will allow you to keep the ball on the floor so you don't get caught out.

**Key Skills: The Cut shot**
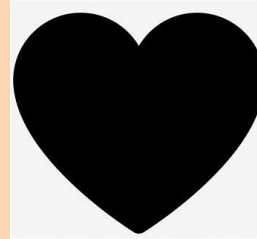
# Rounders

**Performance Analysis:**
- Using the success criteria for each role within Rounders – Fielder, Bowler and Batsperson.
- Identify the strengths and weaknesses in technique.
- Suggest what needs to improve and how it can be improved.

**Backhand shot**
- Start with original batting stance and change your stance as late as possible to disguise the shot.
- Like in tennis, begin your backswing by turning your hips and shoulders.
- Step out towards the line of the ball, shifting your weight to the outside foot.
- Hit through the ball as you bring most of your weight onto your front foot.
- Do not make your arm do all of the work, use your whole body to add extra power to your shot.

**Placing the ball**
There are different types of batting technique where you spin your body, so you bat to certain areas of the field. A good batter can select gaps and areas where there is no fielder or can bat towards weaker fielders, so they have more chance of scoring the rounder.

## Communication

**Implementation of the Academic Standards to the PE Environment:**
- Arrive promptly and change within the allocated time.
- Always have the correct PE kit.
- Fully engaged throughout the lesson, striving to improve performance of skills and techniques at every opportunity.
- Motivated and contributes 100% effort.
- Can work independently to complete a warm-up, drills and competitive situations.
- Perseveres and doesn't give up, demonstrates resilience when practicing and applying skills to different situations/ game scenarios.

**Tactic instructions**
1. Ask the bowler to change bowling technique for each batter (try a donkey drop, fast bowl, a slow bowl, a spin).
2. Move the fielders around, depending on the batters' strengths and weaknesses.
3. ask the batters to strike the ball into space (using a backhand hit if possible).
4. Give fielders space when the ball is thrown to them.
5. Ask batters to disguise their hits if they can, keeping their batting intentions a secret for as long as possible.
6. Ask the batters to 'chance' a run to 2$^{nd}$ or 4$^{th}$, even if they think they may be stumped out.
7. Tell batters standing on bases to set off running to the next base as soon as the ball leaves the bowlers hands.
8. Ask your bowler to cover 3$^{rd}$ base when fielding.
9. If there is a backwards hit, ask your backstop to walk up to the back line with the ball, before deciding where to throw it.

"Here's the plan…"
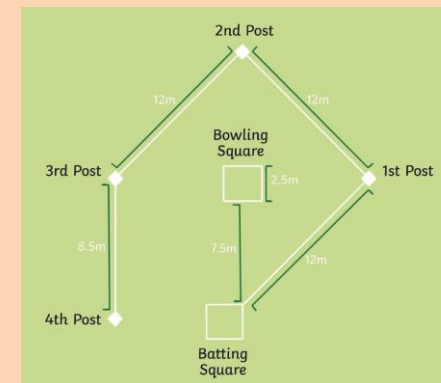
**Tactics Vocabulary**
- Batting order
- Bowling techniques
- Field placements

# Tennis

## Feedback

## Tactics

## Communication

**Performance Analysis:**
- Using the success criteria for each of the shots of Tennis – Ready Position, Serve, Forehand, Backhand Groundstrokes, Smash, Volley.
- Identify the strengths and weaknesses in technique.
- Suggest what needs to improve and how it can be improved.

**Volley**
- By coming forwards in the court you are putting huge pressure on your opponent and also opening up all the angles - making winners much easier.
- You have less time to cover the width of the court.
- So if your opponent gets in a good shot only exceptional movement and reactions will get you out of trouble.

**Step One**
- Ready position.
- Alter the ready position slightly from the way you would prepare for groundstrokes by bringing the racquet head slightly higher.
- Move the elbows forward so they're just in front of the body.

**Step Two**
- Bring the racquet head out into position in front of you.
- Your upper body goes to the ball and your feet following.

**Step Three**
- Do not swing the racquet at the ball.
- Shot should be short and punchy.
- Use your wrist and forearm to bring the racquet head down on the ball in a short, sharp action.

**Step Four**
- Follow through in the direction you want to send the ball.
- Then get back into the centre of the court as quick as you can ready for the next shot.

**Implementation of the Academic Standards to the PE Environment:**
- Arrive promptly and change within the allocated time.
- Always have the correct PE kit.
- Fully engaged throughout the lesson, striving to improve performance of skills and techniques at every opportunity.
- Motivated and contributes 100% effort.
- Can work independently to complete a warm-up, drills and competitive situations.
- Perseveres and doesn't give up, demonstrates resilience when practicing and applying skills to different situations/ game scenarios.

**Smash**
- The smash is the shot that the professional players hardly ever miss and that club players rarely get right.
- The main reason for that is practice!

**Step One**
- The moment you see the lob go up in the air you need to turn sideways - as if you were getting ready to serve.
- Your hands and racquet head up to around chest level with the same grip that you serve with.

**Step Two**
- Keep your eye firmly on the ball and start to adjust position so that the flight of the ball is in line with your body.
- You want the ball to come down just in front of you.
- As you start to move you must stay sideways on, so use side steps and cross over steps to adjust your position.

**Step Three**
- Try to feel both hands going up together - your non racquet hand should stretch up towards the ball, use your hand as an aid to track the incoming ball.
- Your racquet hand should bring your racquet back behind you - into the same throwing position that you use half way through your service action.

**Step Four**
- Keep your head still and your eyes firmly focussed on the ball.
- As the ball arrives throw the racquet head up to meet the ball as you would in a serve.
- Don't try to hit too hard though - timing is the key.

# Design and Technology

## 1. INSERT COMPONENT

Place the component into the board, making sure that it goes in the correct way around, and the part sits closely against the board.
Bend the legs slightly to secure the part. Place the board so you can access the pads with a soldering iron.
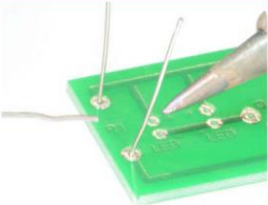
## 2. CLEAN SOLDERING IRON

Make sure the soldering iron has warmed up. If necessary use a brass soldering iron cleaner or damp sponge to clean the tip.
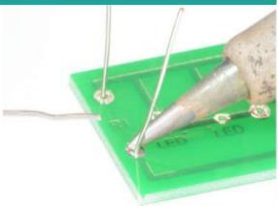
## 3. PICKUP IRON AND SOLDER

Pick up the Soldering Iron in one hand, and the solder in the other hand.

## 4. HEAT PAD
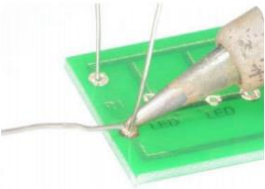
Place soldering iron tip on the pad.

## 5. APPLY SOLDER
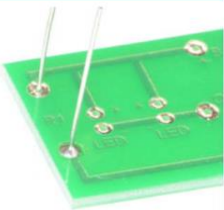
Feed a small amount of solder into the joint. The solder should melt on the pad and flow around the component leg.

## 6. STOP SOLDERING
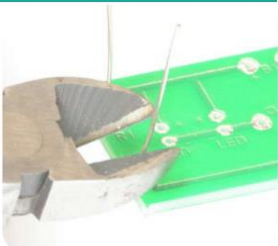
Remove the solder, and then remove the soldering iron.

## 7. TRIM EXCESS
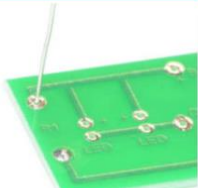
Leave the joint to cool for a few seconds, then using a pair of cutters trim the excess component lead.
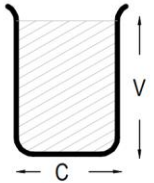
## 8. REPEAT

Repeat this process for each solder joint required.

### What is a capacitor?

A capacitor is a component that can store electrical charge (electricity). In many ways, it is like a rechargeable battery.

A good way to imagine a capacitor is as a bucket, where the size of the base of the bucket is equivalent to the capacitance (C) of the capacitor and the height of the bucket is equal to its voltage rating (V).

The amount that the bucket can hold is equal to the size of its base multiplied by its height, as shown by the shaded area.

### Filling a capacitor with charge

BATTERY          CAPACITOR

BATTERY
V

## Resistor Values

A resistor is a device that opposes the flow of electrical current. The bigger the value of a resistor, the more it opposes the current flow. The value of a resistor is given in Ω (ohms) and is often referred to as its 'resistance'.

| 1st digit | 2nd digit | Multiplier | Tolerance |
|---|---|---|---|
| 0 | 0 | x 1 | |
| 1 | 1 | x 10 | ±1% |
| 2 | 2 | x 100 | ±2% |
| 3 | 3 | x 1K | |
| 4 | 4 | X 10K | |
| 5 | 5 | x 100K | |
| 6 | 6 | x 1M | |
| 7 | 7 | | |
| 8 | 8 | x 0.1 | ±5% |
| 9 | 9 | x 0.01 | ±10% |

## Components

| | | |
|---|---|---|
| Electrolytic capacitor | Resistor | Speaker |
| Ceramic capacitor | Printed Circuit Board (PCB) | Battery holder |

Alternating current supplied to the loudspeaker creates sound waves in the following way:

1. a current in the coil creates a magnetic field
2. the magnetic field interacts with the permanent magnet generating a force, which pushes the cone outwards
3. the current is made to flow in the opposite direction
4. the direction of the magnetic field reverses
5. the force on the cone now pulls it back in
6. repeatedly alternating the current direction makes the cone vibrate in and out
7. the cone vibrations cause pressure variations in the air - which are sound waves

## Isometric

Isometric drawings look more realistic than oblique ones and are based on 30-degree lines. For support, use isometric grid paper to guide your angles:

1. Instead of drawing the 2D front view in oblique, you begin with an edge of the product – draw this as a vertical straight line.
2. From this line, create **construction lines** going off at 30 degrees.
3. Fill in the next vertical lines.
4. From these vertical lines, draw your next construction lines going off at 30 degrees (repeat steps 3 and 4 depending on the complexity of your drawing).
5. Within these construction lines, draw your product.

| | |
|---|---|
| | Capacitor circuit symbol |
| | Resistor circuit symbol |

The variety of methods used to join timbers
The advantages and disadvantages of a range of surface finishes that can be applied to timber



| Name | Appearance | Advantages | Disadvantages |
|---|---|---|---|
| Butt | | Easy to make, it is just square ends glued together | • Weak: there is no mechanical strength, just the glue<br>• Not aesthetically pleasing |
| Dowel | | Automated machines can drill the dowel holes quickly and accurately | Hard to line up the dowels accurately by hand |
| Lap | | Quite easy to cut | Not very strong |
| Housing | | • Holds a shelf or divider securely in the middle of a carcass (frame)<br>• Pairs well with corner lap joints | • Can be tricky to cut neatly on a wide board<br>• Very accurate marking out and cutting required to ensure a shelf is exactly level |
| Mitre | | • Looks good because no end grain shows<br>• Good for picture frames | Weak, it is only a butt joint at 45° |
| Mortise and tenon | Mortise<br>Tenon | • A strong joint<br>• Good for joining a table or chair frame to legs | Time consuming to cut by hand |
| Dovetail | | • A very strong joint – the dovetails lock together securely<br>• Good for a drawer front that will get pulled hard | Very tricky to cut accurately by hand |

| Type | Description | Advantages | Disadvantages |
|---|---|---|---|
| Paint | A coloured pigment in liquid that dries out | Available in a range of colours | Covers up the natural woodgrain |
| Stain | A coloured liquid that soaks into the wood surface | Makes a pale coloured wood like pine a darker colour to mimic more expensive woods like oak or mahogany | Does not look quite like another wood as the pine grain still shows |
| Varnish | A clear coating that dries to shine | Gives a hard wearing finish that shows the grain of the wood<br>Can be a high gloss or a matte finish | Can scratch or chip and expose the wood |
| Wax | A soft solid that is rubbed into the surface with a cloth | Easy to apply<br>Gives a plain natural look | Rubs away and needs reapplying<br>Not a glossy finish |
| Oil | Is rubbed onto the surface and soaks in | Good waterproofing for timber<br>Vegetable oil on kitchen ware is non toxic | Surface feels oily |
| Shellac | A cloudy liquid made from a resin secreted by a beetle<br>Lots of layers are rubbed on and polished to a finish called French polish | Traditionally used on expensive furniture for its glossy lustre | Easily damaged by water and heat |
| Veneer | A thin layer of wood glued onto the surface | An expensive decorative wood like mahogany can be put onto a cheaper wood like pine or chipboard | The veneer is natural wood so it still needs a finish applied |

The fashion and textiles industry today has been transformed by the advent of new technologies and the development of computers and processors has led to the automation of a lot of areas within manufacturing processes.

# CAD – Computer Aided Design

Computer Aided Design – allows designers to draw, design, plan and model on screen using a computer.

| Advantages of CAD | Disadvantages of CAD |
|---|---|
| Designs can be created, saved and edited easily, saving time. | CAD software is complex to learn. |
| Designs or parts of designs can be easily copied or repeated. | Software can be very expensive. Upgrades may be necessary. |
| Designs can be worked on by remote teams simultaneously. | Compatibility issues with software. |
| Designs can be rendered to look photo-realistic to gather public opinion in a range of finishes. | Security issues - Risk of data being corrupted or hacked or get a 'virus' |
| CAD is very accurate. | |
| CAD software can process complex stress testing and model materials and components. | CAD Software |
| Designs can be presented easily with the client or other members of the team. | |

# CAM – Computer Aided Manufacture

Computer Aided Manufacture is the manufacturing of products designed using CAD. CAM can create a faster production process.

| Advantages of CAM | Disadvantages of CAM |
|---|---|
| Quick – Speed of production can be increased. | Training is required to operate CAM. This can add to cost. |
| Consistency – All parts manufactures are all the same. | High initial outlay for the machines. |
| Accuracy – Accuracy can be greatly improved using CAM. | Production stoppage – If the machines break down or there's a power cut, the production would stop. |
| Fewer Mistakes – There is no human error unless pre programmed. | Social issues . Areas can decline as human jobs are taken. This will lead to unemployment. |
| Cost Savings – Workforce can be reduced. | |

If you are designing products and they are made in another country you need to talk to the factory ALL the time.
E-mail used to be THE THING but now that's moved on to virtual 'cloud based' sites where product information can be uploaded to and which can be accessed from anywhere on the globe. So it's quick and easy. Designs can be worked on by remote teams simultaneously

## 3D Modelling

With a good CAD program you don't need to be able draw at all – a CAD program will do it for you! You can also see what the fabric for the product looks like, how it drapes and whether it is the correct material for the product.
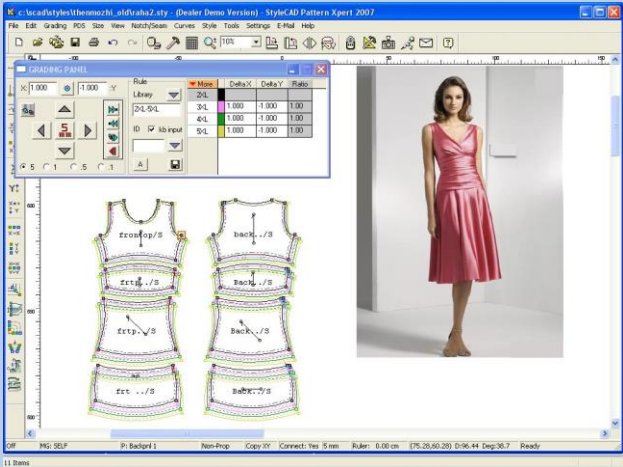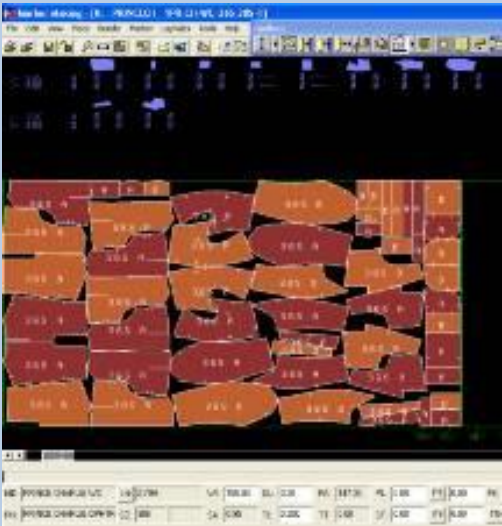


**Cutting out of materials**



Once you have created the layplan/layout you can use CAM to follow this and cut out the fabric. Many layers are usually cut out at the same time.

## Drawing patterns and layplans



CAD is also used in planning how to cut out the fabric pieces. This is called a **layplan** or **layout**. It makes sure you are using the fabric economically – so there's no wastage.

Below are some of the main types of machines used in the manufacture of textile products.



**Digital jet printer**



**Digital Knitting machine**



**Laser Cutter**



**Multi-head embroidery machine**

**Digital Printing** is the process uses a computer to print directly onto fabric that have been coated with a special chemical wash. The fabric is steamed to set the design on the fabric. This can be used on natural fabrics. **Transfer** or **Direct printing** is the process of applying designs directly to a paper. The designs are then transferred to fabric using heated rollers for mass-produced designs or a heat press for small scale designs. This works best on synthetic or synthetic blend fabrics.

# Scales of Production

<u>**One off/Bespoke:**</u> when you make a unique item.
<u>**Batch**</u>: when a limited number of the same product is made.

<u>**Mass**</u>: when a large quantity of the same product are made over a long period of time. This typically uses a production line.
<u>**Just-In-Time**</u>: a form of stock control when goods are delivered 'just in time' to use on the production line.

# Production Line

In Industry products are usually made by passing each stage of making down a line: this is known as a **production line**. At each stage of making, a specific operator carried out a required task then passes it on to the next machine or person to continue making the product.

# Planned Obsolescence

Sometimes manufacturing companies plan or design products to have a short useful life. They do this so the product will become obsolete or unfashionable or they will no longer function after a certain period of time and new products will have to be purchased. This is called **planned obsolescence**.

**The following table explains how these production methods are used in the textile industry:**

| System | Product market | Design and production | Skill Level and Cost |
|---|---|---|---|
| Bespoke | Made-to-measure, eg suit, wedding dress; | Made-to-measure garments are made to fit the measurements of an individual <u>client</u> [client: person or organisation that wants a product manufactured - eg a retailer. ]; the garment design is developed from a <u>basic block pattern</u> [basic block pattern: pattern made with standard-sized pattern pieces ] and a <u>toile</u> [toile: a prototype garment made from low-cost fabric. ] is made to test the fabric drape, <u>the fit</u> [the fit: how well the size and shape of a garment fits a human body. ] and order of assembly | Very high-level skills in design and manufacture; high-cost materials; high labour costs |
| One-off | Haute Couture, eg made by fashion houses | Fashion designers such as Vivienne Westwood design Haute Couture garments for individual clients. These designers have catwalk shows which set trends for high street shops. | Very high-level skills in design and manufacture; high-cost material and labour costs |
| Batch production | Ready-to-wear (RTW) designer label, eg Designers at Debenhams | Garments are designed to fit a range of standard sizes and shapes. Garment patterns are developed from a basic block using CAD: Computer Aided Design - a system which helps the user produce accurate drawings.. A sample garment is made up in a medium size, from the intended fabric. Once the design has been approved it is put into production in a range of standard sizes. They are sold through up-market retailers. | High-level design, pattern making and sampling skills; cost-effective materials and lower manufacturing costs |
| Mass production | Mass-market retailers, e.g. Top Shop | Similar production methods to batch production: garments produced in limited range of sizes; standardised production methods are used to produce a wide range of styles. Most fashion products are batch produced in large batches e.g. 20,000. Some classic products like jeans are mass produced for a world market. | High-level design, pattern making and sampling skills; cost-effective materials; products often made overseas where labour costs are low |

# Technical Textiles

A 'Smart material' is one which reacts to an external stimulus or input. This means that it can alter its functional or aesthetic properties in response to a changing environment. This group of materials can react to stimuli such as heat, pressure, moisture, stress, PH level, light (including UV) and electricity.

| Name and **stimulus** | Characteristics | Uses |
|---|---|---|
| Thermochromic pigments **Heat** | Pigments embedded into the thermochromic material respond to temperature changes by changing colour. They normally change as they heat up and cool down, but some versions are irreversible. | Flexible thermometers, temperature indicators, clothing, novelty goods, over-heating or over cooling indicators. |
| Photochromic pigments **UV light** | The pigments that are embedded into photochromic material respond to changes in the UV light levels by changing colour or darkening. Once the UV light is taken away they change back or lighten. | Novelty products, paints and clothing that change colour in UV light |
| Shape Memory Alloy (Nitinol) **Heat or electricity** | A shape can be programmed when heated to 540°C; it can be deformed and will return to the memory shape when reheated to 70°C. | Frames for glasses, dental braces, self-expanding stents used In surgical procedures to open capillaries. |
| Hydrochromic | Hydrochromic inks change colour (become transparent) when wet or if moisture is present. | Often used on novelty products to bring out the colours of text or an image – e.g. an umbrella. |
| Hydrophobic | Hydrophobic finishes **REPEL** water and cause water to form nearly perfect spheres that roll off coated materials. | Products that require waterproofing –outdoor items such as tents and awnings. |
| Photo luminescent (Glow-in-the dark) **Light** | Glow in the dark materials carry inorganic phosphors that absorb light in the visible and ultra violet wavelengths and then re-emit visible light, or a "glow". | Toys, stickers, paints, clock face/dials, emergency signs. |

Modern materials are materials that are constantly progressing as well as new ways of working with materials.

| Name | Characteristics | Uses |
|---|---|---|
| **Polylactic acid PLA** | Widely used in 3D printers as reels of filament, it is non-toxic, easily moulded and fully biodegradable. | Bottles, pots, disposable food and drink containers, pens, phone cases and 3D printed items |
| **Polyhydrox y-butyrate PHB Biopol** | Stable, stiff, quite brittle, non-toxic, easily processed and moulded, has limited chemical resistance, fully (but slowly) biodegradable. | Bottles, pots, household items, disposable food containers. |
| **Flexible MDF** | Flexible in one direction along the cut groove, easily shaped into natural curves and waves, easily finished, can be laminated and veneered, not good in wet conditions | Modern furniture, curved and wave-shaped forms for interior spaces, interior walls and room dividers. |
| **Titanium** | High strength to weight ratio, anti-corrosive, can be easily formed and welded, hypoallergenic. | Jewellery and watches, medial uses such as joint and dental implants, aircraft, spacecraft and sports car parts. |
| **Fibre optics** | Flexible cable capable of transferring digital data at extremely fast speeds, light and images can be sent and received. | Data transfer cables, endoscopic cameras, novelty and bespoke lighting displays |
| **Graphene** | Highly conductive, flexible, stretchable, incredibly strong yet lightweight, impermeable to all known substances. | To be developed but potential use in the medical, electronic and energy industries amongst many others. |
| **Metal foams** | Strong, lightweight, electrically and thermally conductive, very porous, good sound absorptions. | Medical implants, aircrafts, aircrafts and car parts, lightweight load-bearing structures, impact absorption in vehicles. |

Technical textiles are textiles that have been developed with enhanced properties to withstand specific uses.
The function is vastly more important that the aesthetics.

Composite Materials are formed when two to more distinctly different materials are combined together to create a new material with improved properties and functionality.

| Name | Characteristic | Uses |
|---|---|---|
| Gore-Tex | Waterproof, wind proof, breathable fabric, moisture vapour can escape. | Outdoor clothing from skiwear to mountain wear, walking boots, cross country trainers, gloves sportswear. |
| Kevlar Poly-paraphenylene terephtalamide | Extremely strong and hard-wearing, excellent cut and tear resistance, high thermal protection, non-flammable, good chemical resistance. | Personal armour, helmets, bullet-proof vests, motorcycle safety clothing, extreme sports equipment, audio equipment, musical instruments. |
| Conductive fabrics and threads | The thread or fabric can pass an electrical current along its length, linking electronic components. It allows for flexible and wearable control of electronic products for entertainment, safety health and fitness. | Connecting wearable inputs, processes and outputs, such as switches, lights, Bluetooth connectivity and speakers in technical clothing, children's soft electronic toys, wearable electronic sports equipment and anti-static clothing. |
| Fire resistant fabrics | Resists heat and ignition from the naked flame to protect the wearer. | Fire blankets, firefighting or safety clothing such as gloves, aprons and boiler suits. Protection for racing car drivers. |
| Microfibres & Micro-encapsulation | Very depending on the specific textile, can be statically charged to pick up dust and filter particles, can be absorbent yet fast drying. | Medical textiles, fabrics, cloths and towels. High-tech clothing which can be anti-bacterial, heat regulating or insect repelling. |

| Name | Characteristics | Uses |
|---|---|---|
| Glass Reinforced Plastic (GRP) | Lightweight, good strength to weight ratio, good corrosion, chemical and heat resistance, waterproof, high VOCs/resins used. Can be trimmed with rotating blade. Labour intensive to produce. | Boat hulls, car and truck parts, liquid storage tanks, pipes, helmets, seating. |
| Carbon-fibre reinforced plastic. | Very high strength to weight ratio, good tensile strength but not good compressive strength, stiff and rigid, very expensive, high VOCs/resins used, waterproof, and resistant to chemicals. Manufacture is labour-intensive and skilled process. | Supercars and sports cars, top-end sports equipment, bespoke boats and musical instruments, increasingly developed for prosthetic uses. |
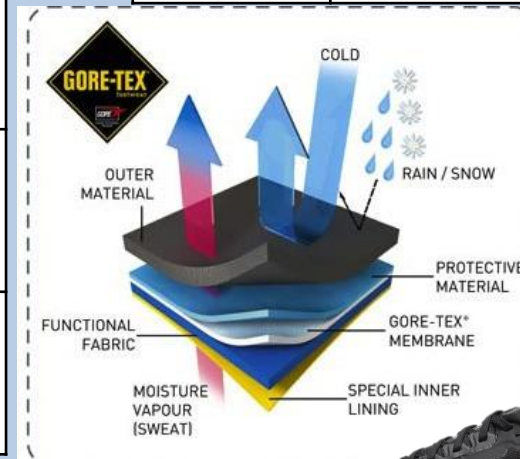
Gore-Tex

Kevlar
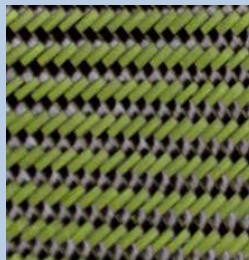
## Design Strategies

You can use design strategies to come up with initial design ideas without getting you on a bad one. Designing is a really complex process and there are several different ways of doing it:

**Systems approach:** This means breaking down the process into a number of different strategies and doing each in turn.

**User-Centred design:** The wants and needs of the client are prioritised- their thoughts are given a lot of attention at every stage of design and manufacture

**Iterative design:** Centred around the design process of evaluation and improvement at each stage of designing.

When you are designing a product it is easy to get stuck on a particular idea. This is called design fixation and it can stop you thinking creatively and coming up with innovative ideas.

Following the design strategy can help you avoid design fixation and encourage you to look at your design in a critical way to make improvements.

A=Aesthetics
C= Cost
C= Customer
E=Environment
S=Size
S=Safety
F=Function
M=Materials

You can also annotate your designs to fully explain further using ACCESSFM

- Different people and cultures have different needs. Technology and design affects and can have an impact on culture.
- The culture of a particular country or a group of people covers everything from their religion, beliefs and laws to their dress and traditions.

- If you're designing a product aimed at a specific target market, you'll need to take into account their views and feelings of people from that particular culture.
- New technology can also impact fashion and trends.
- Fashion itself is continually affected by new materials and techniques. Technology can also have an impact on fashion trends. The internet allows people to find out about fashion trends that are happening all over the world and new clothes can be seen by a global audience e.g. social media and blogs.
- Products can be designed to avoid having a negative impact on other people by being sensitive to their needs.
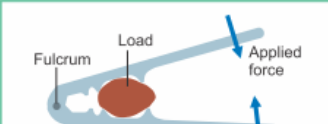
### Eyelet Press

An eyelet press is a hand tool that uses a lever arm that converts your simple movement into enough pressure to crimp and press a mental eyelet and washer together securely. This creates a neat and strong hole for cord to pass through.

| First class lever | Second class lever | Third class lever |
|---|---|---|
| Lever in which **fulcrum is situated in between load and effort** is called first class lever. e.g. pair of scissors, see-saw, pliers | Lever in which **load is situated inbetween fulcrum and effort** is called second class lever. e.g. nut cracker, wheel barrow, bottle opener | Lever in which **effort is situated inbetween the fulcrum and the load** is called third class lever. e.g. fishing road, pair of tongs, stapler |
| Scissor | Nut cracker | Pair of tongs |
| See-saw | Wheel barrow | Fishing rod |

A lever is used to lift a load with the least amount of effort. Placing the fulcrum (the point which the lever turns) in different places effects where the load can be lifted.

The table on the left shows you the three different classes of lever.

## Design Culture

GCSE Preparation.

*"Design creates culture. Culture shapes values. Values determine the future."* Robert L Peters.

### Vivienne Westwood (1941-2022)

Her iconic clothing became popular during the punk rock movement in the 1970s. She has since become a world famous fashion designer. Her designs often take inspiration from traditional British clothing and historical paintings.
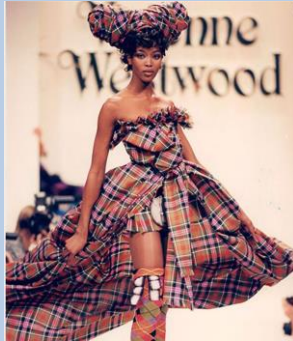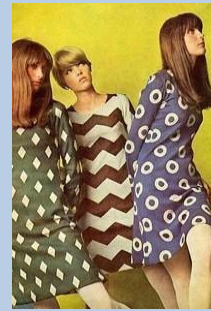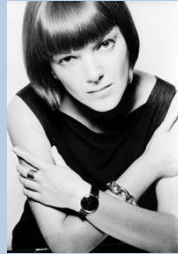
### Coco Chanel (1883-1971)

A fashion designer known for introducing practical casual-chic clothing for women who had traditionally worn corsets and long skirts.

### Mary Quant (1934-2023)

A fashion designer who popularised the mini skirt, hot pants and OVC in the sixties. Her clothing often featured white collars, simple shapes and bold colours.

### Alexander McQueen (1969-2010)

An influential fashion designer known for his theatrical, well tailored clothing and dramatic catwalk presentation displaying his collections.
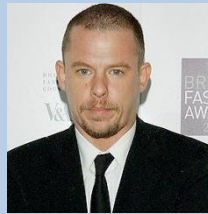
### Rei Kawakubo (1942 - Present)

Rei Kawakubo is a self-taught Japanese fashion designer based in Tokyo and Paris. She is the founder of Comme des Garçons

### Pierre Davis

The founder of gender-neutral fashion label No Sesso (Italian for No Gender). Their belief is fashion is about pursuing art and inclusivity.

### William Morris (1834-1896)

A wallpaper, furniture and furnishings designer. His designs were often based on nature and repeat patterns. He is one of the founders of the Arts and Crafts movement

### Joe Casely-Hayford OBE (1959 - 2019)

A renowned British fashion designer known for his innovative designs and contributions to men's fashion. Early in his career he dressed The Clash and U2 whilst working on his eponymous brand for men and women.

## Macro and Micro nutrients

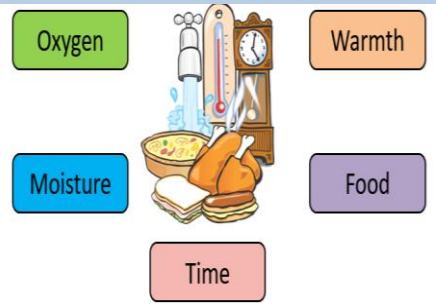There are 5 main groups of nutrients. These 5 groups can be divided into 2 groups **Macronutrients** which are needed by the body in large amounts. **Micronutrients** which are needed by the body in small amounts.

## Food Poisoning

Living organisms (including bacteria) need certain "things" or conditions to survive:

Oxygen | Warmth | Moisture | Food | Time

**What are Nutrients?**
Nutrients are the building blocks that make up food and have <u>specific</u> and <u>important roles to play in the body.</u> Some nutrients provide <u>energy</u> while others are essential for <u>growth</u> and <u>maintenance of the body.</u>

Macronutrients →

| Macro Nutrient | Role in the body | Food Example |
|---|---|---|
| Carbohydrate | The main source of energy for the body. | Bread, rice, pasta, potatoes |
| Protein | Provides the body with growth and repair. | Meat, poultry, beans, eggs, lentils, tofu, fish |
| Fat | Provides the body with insulation and a small amount protects vital organs. Provides essential fatty acids for the body. | Butter, oil, cheese, cream, nuts, oily fish, crisps |

Micronutrients →

| Vitamin | Role in the body | Food examples |
|---|---|---|
| A | Helps to keep the eyes healthy and strengthen the immune system. | Dark green leafy vegetables, carrots, liver |
| B | Helps to release the energy from the food we eat. | Bread, milk, cereals, fish, meat |
| C | Help with skin healing and healthy skin. Help with the absorption of Iron. | Fresh fruit, broccoli, tomatoes |
| D | Important for absorbing calcium and help with healthy bone structure | Oily fish, eggs, butter, Sunshine |

| Mineral | Role in the body | Food Examples |
|---|---|---|
| Calcium | Important for strong teeth and bones. It also helps with blood clotting. | Milk, yoghurt, soya, dark green leafy vegetables |
| Iron | Needed for red blood cells which help to transport oxygen around the body. | Nuts, whole grains, dark green leafy vegetables, meat, liver |

## Hygiene

HYGIENE

*Personal*
**Hair up** – Reduces the risk of bacteria transferring to food through hair dropping in
**Aprons on** – Protects you from spillages and reduces risk of bacteria transferring to food from everyday clothing
**Washing hands** - regularly using hot soapy water to reduce the bacteria on your hands
**Blue plasters** – Blue plasters should be used to cover cuts and grazes as they will be easily seen if they accidentally fall into food.

*Food* – Understanding the 4 C's Concept
**Cooking** – thorough cooking kills bacteria so ensure food is cooked to 75°c to make sure all bacteria are killed – check this by using a food probe.
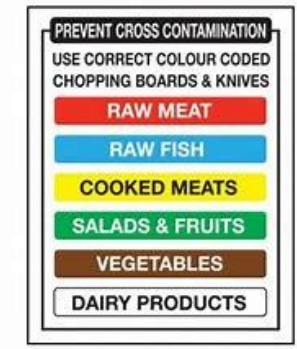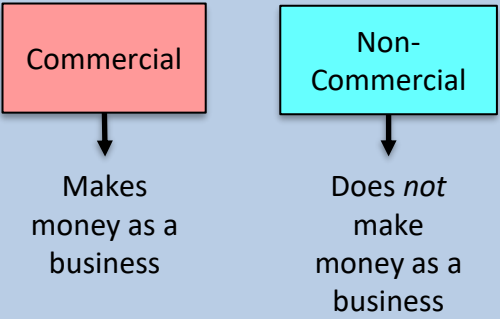**Cleaning** – effective cleaning removes harmful bacteria and stops them spreading so ensure all work tops, utensils and equipment are cleaned thoroughly with hot soapy water.
**Cooling** – effective chilling prevents harmful bacteria multiplying so ensure all food is stored at the correct temperatures, ensure cooked food is cooled within 90 minutes.
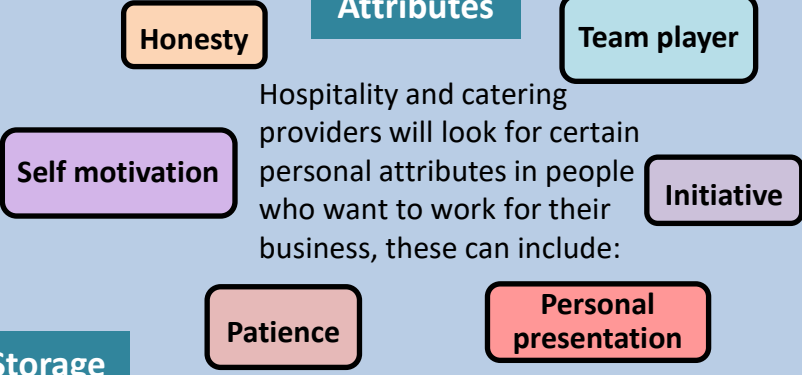**Cross contamination** – Good hygiene practice prevents Cross contamination so when raw food comes into contact with ready to eat food. For example raw meat juices spilling onto salad.

# Knowledge Organiser – Year 9 Food

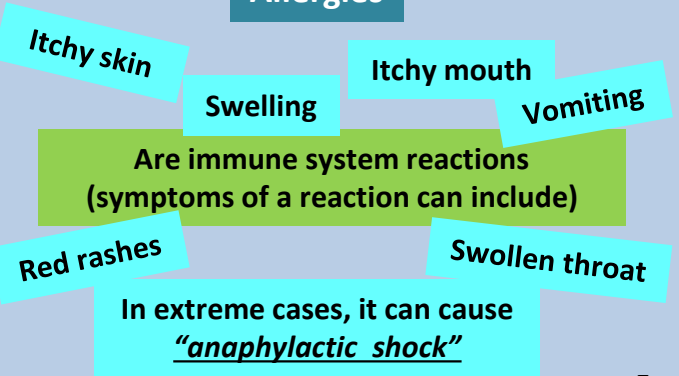Hospitality and Catering providers fall under two main categories

**Commercial**

↓

Makes money as a business

**Non-Commercial**

↓

Does *not* make money as a business



PREVENT CROSS CONTAMINATION
USE CORRECT COLOUR CODED CHOPPING BOARDS & KNIVES
- RAW MEAT
- RAW FISH
- COOKED MEATS
- SALADS & FRUITS
- VEGETABLES
- DAIRY PRODUCTS

## Personal Attributes

Hospitality and catering providers will look for certain personal attributes in people who want to work for their business, these can include:

- Honesty
- Team player
- Self motivation
- Initiative
- Patience
- Personal presentation

## Factors **affecting food choice**

| Biological | Hunger appetite and taste |
|---|---|
| Economic | Cost of food, income, availability |
| Physical | Access to shops, food skills, education, time |
| Social | Family, culture, meal patterns |
| Attitudes | Knowledge about food and beliefs |
| Seasonality | The food is locally grown at certain times, cheaper |
| Religion | Certain religions restrict certain foods |
| Ethical | Your beliefs prevent you from eating some foods |
| Medical | Some illnesses dictate your diet like diabetes |
| Age | Activity levels and mobility affect requirements |

## Allergies

- Itchy skin
- Itchy mouth
- Swelling
- Vomiting

**Are immune system reactions (symptoms of a reaction can include)**

- Red rashes
- Swollen throat

**In extreme cases, it can cause "anaphylactic shock"**

## Intolerances

A food intolerance is not the same as a food allergy.
It is not an immune system response.
It is a chemical reaction in the gut.

- Cramping gut
- Bloating
- Diarrhoea
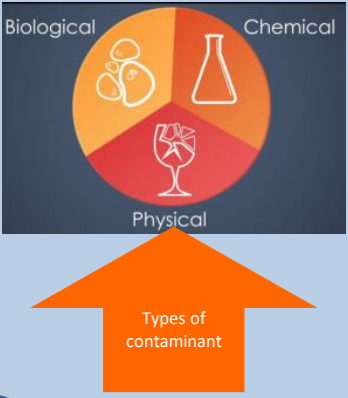- Migraine

**What are some of the symptoms?**

## Fridge Storage

You should store meat and poultry on the bottom shelf of the fridge to prevent liquid dripping on to other food. Store in a clean, sealed container. Keep cooked and raw meats separate to avoid cross contamination. The fridge temperature should be between 1°c - 5°c.
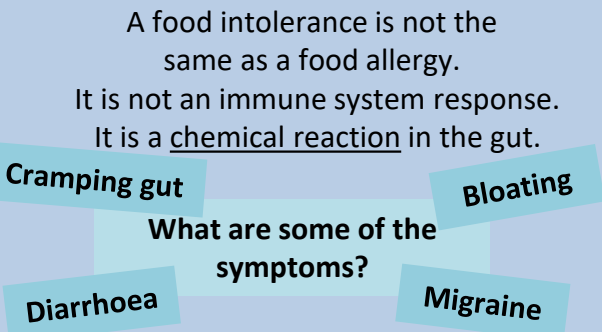


- yogurt • cheese
- milk • sauces
- cooked meat
- leftovers
- raw meat
- fish • poultry
- fruits
- vegetables
- butter
- eggs
- condiments
- jam
- jellies
- fruit juice

## Food Styling

Food styling is where a chef creates a dish and then uses a range of presentation techniques, these can include:
- Different textures
- Different flavours
- Different shapes/colour
- Interesting to look at
- Appetising

**smearing**

**garnishing**

**feathering**

**drizzling**

**Organoleptic** = using the senses



Understand the 4 C's Concept
- C – Good Hygiene practice prevents *Cross Contamination*
- C – Effective *Cleaning* removes harmful bacteria and stops them spreading
- C – Effective *Chilling* prevents harmful bacteria multiplying
- C – Thorough *Cooking* kills bacteria



Biological   Chemical   Physical

Types of contaminant

## Customer Demographic

A profile showing what particular groups of people want, need and expect.

- Opinions
- Technology
- Tastes
- Money /Costs
- Age
- Gender
- Choice
- Nationality
- Fashions

# Year 9 Graphics: Interior and Exterior

Interior and spatial designers are involved in the design or renovation of internal spaces, including structural alterations, furnishings, fixtures and fittings, lighting and colour schemes.

Exterior designers include, architects, public space designers, garden or landscape designers and many more! Exterior designers focus on the outside spaces and buildings, looking at functionality and aesthetics.
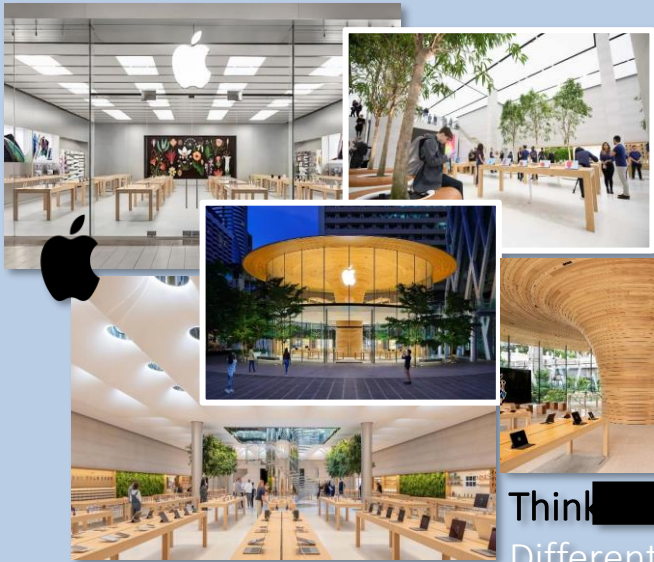
## What is the definition of commercial interior design?

Commercial interior design refers to the interior design done in commercial spaces, such as offices, **shops**, restaurants, lobbies, and other public spaces.

*British Design award winners 2021:*
- Michel Anastassiades
- Soane Britain
- Kitty Joseph
- Tom Raffiald
- Zoffany
- Sam Wilde

## EXISTING STORE RESEARCH

Architects:
- Zaha Hadid
- Potlemy Dean
- Jeanne Gang
- Frank Lloyd Wright
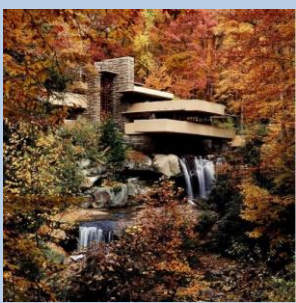
Garden/Landscape Designers:
- Tom Stuart Smith
- Getrude Jekyll
- Derek Jarman
- Capability Brown
- Beth Chatto

Think Different.
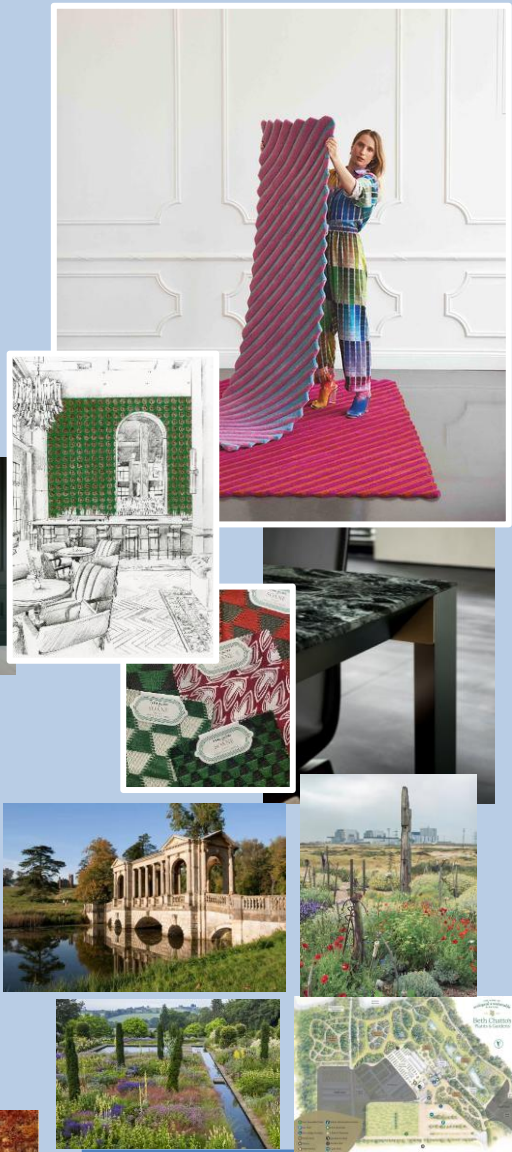
| KEY TERMS | DEFINITION |
|---|---|
| **Design Process** | An approach for breaking down a large project into manageable chunks. |
| **Target Audience** | A particular group at which a product is aimed towards. |
| **Design Brief** | Outlines the specifics of a design project which can include the design project overview, timelines, target audience information, and budget. |
| **Research** | A collection of new knowledge and/or the use of existing knowledge in a new and creative way so as to generate new concepts and understandings. |
| **Colour Theory** | The collection of rules and guidelines which designers use to communicate with users through appealing colour schemes in visual interfaces. |
| **Mood board** | An arrangement of images, materials, pieces of text, etc. intended to present a particular style or concept. |
| **Evaluation** | Is a process that critically examines a design. |
| **Modelling** | Making a model allows designers to visualise and test how a product looks and performs in 3D and is a great way of checking a product's viability . |

## Which Brand will you choose?...
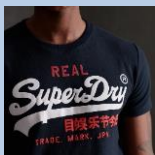


## COLOUR PALLETS

Colours can convey a message that give us an idea of how the product or company wants to be perceived. They can entice a certain type of customer and can make us think of different things.

### The Colour Wheel.
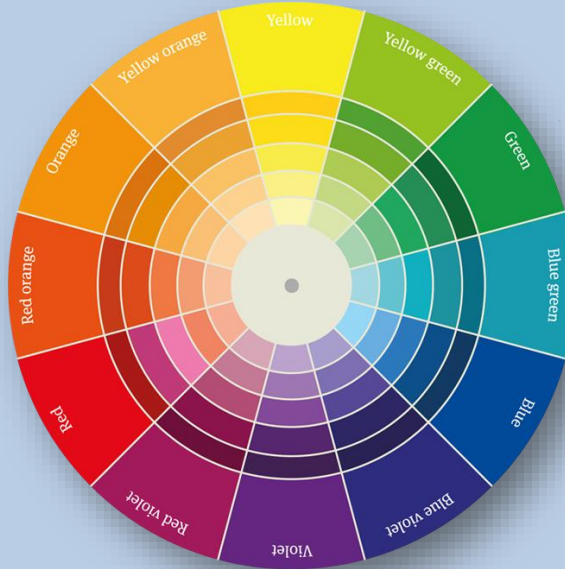


Colour pallets which effectively reflect our company brand.
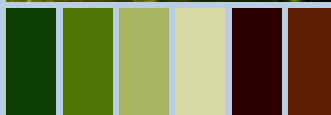


## Interior Design Considerations in Retail Store Design
• Value of Space. The value of space, depending on the location within the store, is expressed in sales per square foot of floor space, and sales per cubic foot of cubic space.
• Space Utilization and Allocation.
• Storage of Stock.
• Customer Traffic Flow.
• Types of Goods.

## CUSTOMER FLOW
Customer flow is the movement of customers around a store. Providing more check-outs increased customer flow, reduced bottlenecks and improved sales.
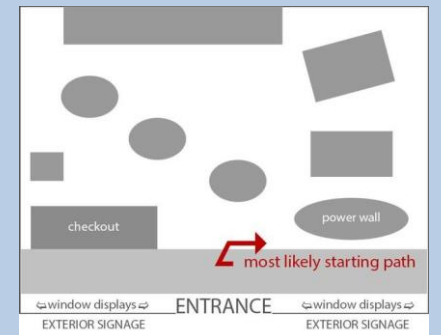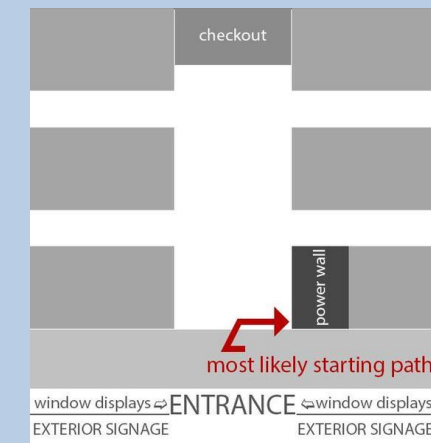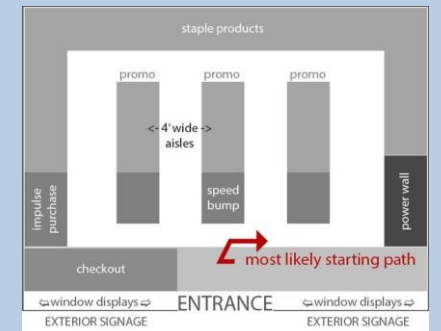
## MOOD BOARD

A mood board is a visual representation of ideas for a design project. At its most basic, a mood board is a collage of images. The purpose of a mood board is to help explore ideas and figure out the general style, mood, colours, and overall feel of a room or project space.



MODERN, LIGHTS, NEON, MINIMAL, CITY, URBAN



ORGANIC, NATURAL, WOOD, RUSTIC, COUNTRY



## ONE POINT PERSPECTIVE

One point perspective is a drawing method that shows how things appear to get smaller as they get further away, converging towards a single 'vanishing point' on the horizon line. It is a way of drawing objects upon a flat piece of paper (or other drawing surface) so that they look three-dimensional and realistic.
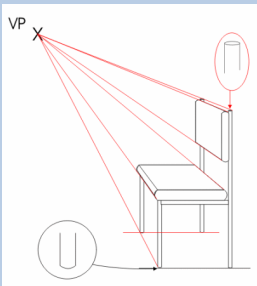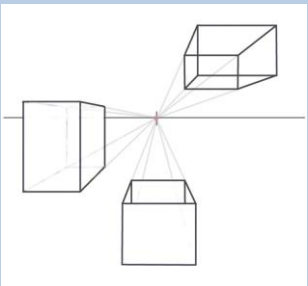


## 3D MODEL

What is model in interior design?

An architectural model is a 3D representation of a proposed building design. With an architecture model, you can see the potential scale and design of a construction or interior design project.