Name and Tutor group:

Year 9 Knowledge Organiser

Term 2

Contents

CORSHAM CHARACTER

INTELLECTUAL VALUES

The pursuit of truth, knowledge and understanding.

Be reflective. Be curious. Be open-minded. Be creative.

PERFORMANCE VALUES

Maximum effort, maximum focus.

Be resilient. Always Persevere. Contribute to Teamwork. Be ambitious.

DREAM BELIEVE ACHIEVE

Knowledge organiser – Year 9 Art

PROPAGANDA

Images that are used to persuade and encourage

EXAMPLES OF FINAL OUTCOMES:

YOU WILL LEARN:

Skills to produce a propaganda poster using text, and your chosen theme in the style of a contemporary artist.
You will make use of composition and layering with different materials to develop our art and design skills

Why am I learning this?

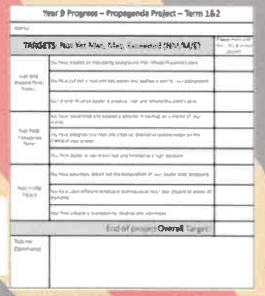
To know and understand the way posters were created and used.
You will build on your knowledge and skills with each project as they increase in difficulty, enabling you to express yourself in a confident way.

Propaganda Art
https://www.youtube.com/watch?v=kQHImN068S

Homework Tasks:

Tick when complete ✓

1. Research a theme
2. Research WW1 and WW2 propaganda
3. Create a Shepard Fairey Poster
4. Research Andrea Bowers
5. Redesign a historic poster



HOW WELL AM I DOING?

CONTEXTUAL KNOWLEDGE:

Shepard Fairey

Shepard Fairey is an American contemporary artist, activist and founder of OBEY Clothing.

Andrea Bowers

Andrea Bowers, is an American artist working in a variety of media including video, drawing, and installation

Keywords	
Propaganda	Images that are used to persuade and encourage
Symbol	A material object representing something abstract.
Composition	The arrangement of elements within a work of art.
Political	Relating to the government or public affairs of a country.
Typographic	Typography is the art and technique of arranging type to make written language legible, readable and appealing when displayed
Protest Art	Protest art involves creative works grounded in the act of addressing political or social issues

Marking Your Work – Meeting Expectations

NYM **NOT YET MET = Yellow Dot**

M **MET = Green Dot**

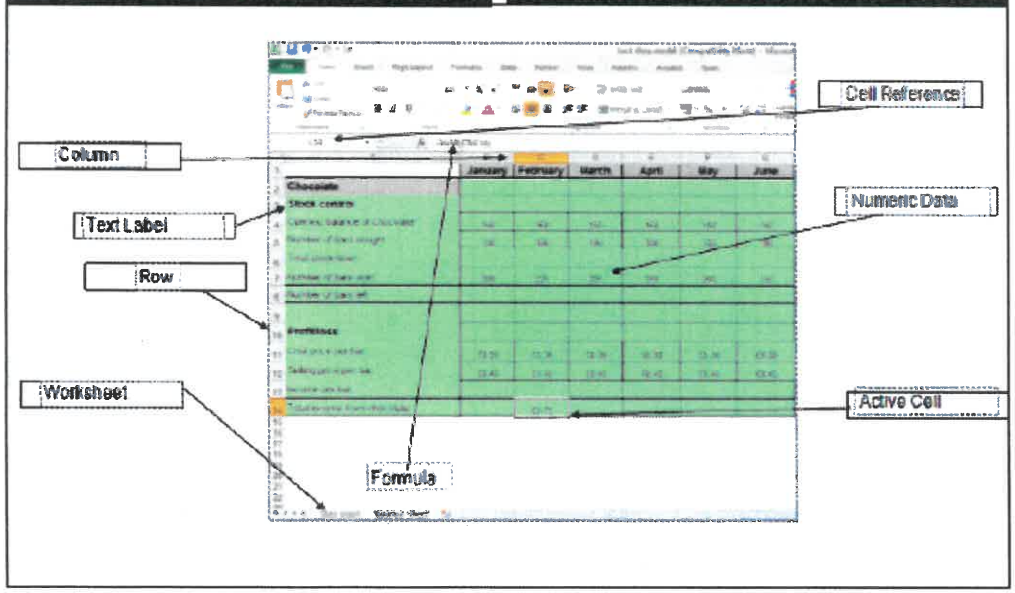
EX **EXCEEDING = Blue Dot**

Year 9 Knowledge organiser - Spreadsheets

Spreadsheets are used to store information and data. Once we have our information in a spreadsheet we can run powerful calculations, make graphs and charts and analyse patterns.

Other uses for spreadsheets –

- Modelling and Planning
- Home/Business Finance and Budgeting
- Wages/Invoices
- Predictions / Simulations / Calculations
- Creating charts and graphs



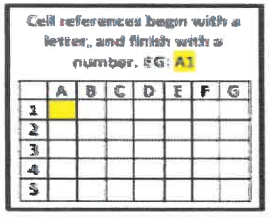
What is a Function?	A **function** is a standard routine used to perform common tasks. It represents a complex formula that uses reserved words e.g. VLOOKUP, IF. A **function** performs a specific set of operations on its input values to produce a single output value.
What is a Formula?	Using **formulas** in **spreadsheets** can allow you to quickly make **calculations** and get totals of multiple cells, rows, or columns in a **spreadsheet**.
Conditional Formatting	is a tool that allows you to apply **formats** to a cell or range of cells, and have that **formatting** change depending on the value of the cell or the value of a formula. For example, you can have a cell appear bold only when the value of the cell is greater than 100.

Common Formulas/Functions

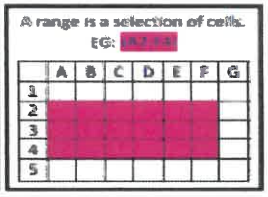
= SUM	Adds a range of cells together
= AVERAGE	Finds an average for a range of cells
= MIN	Returns the smallest value in range
= MAX	Returns the highest value in a range
= COUNT	Counts cells if they meet a condition

Golden rule: every formula always starts with an =

Cell references begin with a letter, and finish with a number. EG: A1



A range is a selection of cells. EG: A2:F4



Operators	
+	Adds two numbers / cells
-	Subtracts one cell or number from another
*	Multiplies two numbers/cells
/	Divides one number / cell from another one
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to

IF	one of the logical **functions**, to return one value **if** a condition is true and another value **if** it's false. For example: =**IF**(A2>B2,"Over Budget","OK") =**IF**(A2=B2,B4-A4,"")
Count IF	=COUNTIF (Where do you want to look?, What do you want to look for?)
Auto SUM	**Excel automatically** enters a formula (that uses the **SUM**function) to **sum** the numbers

@ COMPUTING CORSHAM

FAMILY ENTERTAINMENT PERFORMED AROUND CHRISTMAS.

PANTOMIME

HISTORY

THE ROMANS STARTED IT ALL

BRITISH MUSIC HALL
VICTORIAN ENTERTAINMENT FROM AROUND 1850.
SONGS, COMEDY, SPECIALITY ACTS.

16th Century Italy
Comedia Dell'Arte
A form of very visual theatre made up of improvised performances using comic situations.

HA HA!
APPARENTLY SNOW WHITE HAS TAKEN UP A NEW CAREER AS A JUDGE. AFTER ALL, SHE'S THE FAIREST OF THEM ALL!
HA HA!
HA HA!

POPULAR PANTOS:
CINDERELLA
ALADDIN
DICK WHITTINGTON
SNOW WHITE
JACK & THE BEANSTALK
BABES IN THE WOOD
SLEEPING BEAUTY

SLAPSTICK
A PERFORMANCE WITH LARGER THAN LIFE PHYSICAL MOVEMENT AND LOTS OF ACCIDENTS AND MISHAPS.

Two wooden slats forming a club like object. Produces a loud smacking noise with very little contact with the person being struck.

EARLY 18TH CENTURY FIRST USE OF THE WORD PANTOMIME IS HEARD

JOHN RICH-CREDITED WITH INVENTING THE PANTOMIME GENRE.

1717
BALLET PANTOMIME 'THE LOVE OF MARS AND VENUS'

Comedia Dell'Arte reproduced in England as mimes known as Harlequinades.

"HARLEQUIN SORCERER", PRODUCED BY JOHN RICH, WHO UNDER HIS STAGE NAME "LUN" PLAYED HARLEQUIN.

1800
MOST FAMOUS PANTO CLOWN 'JOSEPH GRIMALDI' MAKES HIS FIRST APPEARANCE.

Oh yes he is!

He's Behind You!

APPEARANCE OF THE FIRST EVER FEMALE 'PRINCIPAL BOY', ELIZA POVEY, IN THE ROLE OF JACK.1819

1819
THEATRE ROYAL, DRURY LANE. FIRST PANTO WITH DIRECT LINKS TO MODERN PANTO. 'JACK & THE BEANSTALK'

JOSEPH WAS RESPONSIBLE FOR DEVELOPING ANOTHER MODERN ELEMENT OF PANTO - CROSS DRESSING.

LARGE FACIAL EXPRESSIONS

FIRST PANTO DAME 1806

OH NO HE ISN'T !

PLOT

PANTO MEANT 'ALL' AND MIMOS ALLUDED TO A DANCER WHO WOULD PLAY ALL THE ROLES OF A STORY.

... SHORTENED TO PANTO!

- BASED ON A FAIRY TALE / FOLK STORY
- MAINLY AIMED AT CHILDREN
- GOOD BATTLING EVIL
- VILLAIN IS DEFEATED
- TRUE LOVE CONQUERS ALL
- EVERYONE LIVES HAPPILY EVER AFTER.

WHAT MAKES A PANTO?

CHASE SCENES

SONGS

JOKES

HA HA!

UNFORTUNATELY CINDERELLA DIDN'T MAKE IT AS A FOOTBALLER. SHE KEPT RUNNING AWAY FROM THE BALL.

SLAPSTICK COMEDY

HA HA!

DANCING

AUDIENCE PARTICIPATION

"I'm really passionate about pantomime because it is often the first introduction for a child to theatre, and if that child has a great experience at a pantomime they will continue to come year after year."
JOHN BARROWMAN

"PANTO HAS EVERYTHING THEATRICAL – SONG, DANCE, VERSE, SLAPSTICK, SOLILOQUY, AUDIENCE PARTICIPATION, SPECTACLE, CROSS-DRESSING AND A GOOD PLOT, STRONG ON MORALITY AND ROMANCE. WHAT MORE COULD YOU WANT FOR A FAMILY OUTING?" SIR IAN MCKELLEN

CHARACTERS

VILLAIN
Captain Hook
Wicked Queen

HERO / PRINCIPAL BOY
Often a girl playing a boy.
Jack
Dick Whittington

DAME
Traditionally a male playing a female character.
Usually the hero's mum.
Widow Twankey
NAMED AFTER TWANKEY TEA
Dame Trott

UGLY SISTERS
Comic Villains.

GOOD FAIRY
Tinker Bell
The Blue Fairy

COMIC
Wishee Washee
Buttons - FIRST APPEARED IN 1860 AT THE STRAND THEATRE, LONDON.

The real Dick Whittington was the son of a knight. He became rich selling fabrics to kings & nobles. The wealthiest merchant of his day, he served 3 terms as Lord Mayor of London in the late 1300s and early 1400s.

HISS!!

BOOO!!

SR – STAGE RIGHT – The good fairy would be the 2nd character to enter stage from stage right.

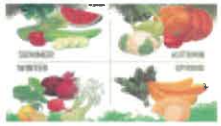
SL – STAGE LEFT – The dark side. The panto villain traditionally enters first from this side.

The good side (SR) and the dark side (SL) of the stage were developed in medieval times when these were always used as the entrances to heaven and hell.

Year 9 Food and Nutrition- Knowledge Organiser

Nutritional needs of people at different life stages	
Babies 0-1 year - Fast body growth and development. Energy needs increase with activity 	All nutrients, especially protein, vitamins and minerals Avoid adding sugar and salt to foods
Pre-school children 1-4 years - Fast body growth and development. A lot of energy is used in play.	All nutrients, especially protein, vitamins and minerals but Limit sugar & salt.
Children 5-12 years - Growth continues in spurts. Physical activity most of the time to prevent becoming overweight.	All nutrients, especially protein, vitamins and minerals Limit the number of free sugars and salt in foods and drinks
Teenagers - Fast body growth and development from child to adult. Minerals are put into the bones and teeth; Females start to have periods. Lack of sleep and pressures of school may lead to lack of energy and poor concentration	All nutrients, especially protein, vitamins and minerals Limit the number of free sugars and salt in foods and drinks 
Adults - Body stops growing at 21 years of age and needs to looked after to maintain health, prevent disease and be active Weight gain if the diet is unbalanced and not active	All nutrients, especially protein, vitamins and minerals 
Older adults The body needs to be looked after. Memory may become poor. Bones & teeth gradually start to lose minerals, and osteoporosis may develop.	All nutrients, especially protein, vitamins and minerals. Limit fatty and sugary foods to prevent weight gain.

Sustainable food – Sustainable food is food that is produced, processed, distributed, and disposed of in ways that are environmentally friendly and contribute to a healthy and nutritious food system. These food are unlikely to run out.



Nutrient	Functions - Why do we need it?	Sources
Carbs	Carbohydrates give us energy. Sugary ones give us quick release energy. Starchy ones give us slow release.	Bread, rice, pasta, potatoes
Protein	Needed for the growth and repair of our bodies and can also be used for energy.	Meat, fish, dairy products, tofu, soya, Quorn, nuts, sees, lentils
Fat	These keep us warm, protect us and provides our bodies with energy	Butter, oil, processed foods e.g. crisps, chips, chocolate, cake.
Water	Keeps us hydrated and keeps our body's working properly.	Fruit and vegetables, water, fruit juices, milk.
Vitamins	These are needed generally to keep us healthy. The allow all the chemical reactions in our body and protect us from diseases.	Fruit, vegetables, cereals, dairy products
Minerals	Helps build bones and teeth and allow muscles to work properly.	Green vegetables, dairy products and red meat
Fibre	These are needed to keep our digestive system working (help us go to the toilet) and helps to fill us up.	Wholegrain cereals, brown rice, pasta, bread, fruit, vegetables

Food Miles is the distance food travels from where it is grown to where it is purchased by the customer. The closer it is, the less damage to our environment.

Seasonality refers to the time of year when the food is at its peak, either in terms of harvest or flavour. This is usually when the product is cheapest and freshest.

Overfishing occurs when too many fish are caught at once, so the breeding population becomes too depleted to recover. It endangers ocean ecosystems and the billions of people who rely on seafood as a key source of protein. Buying fish with the blue **Marine Stewardship Council (MSC)** label, means the fish has been caught sustainably.

Fairtrade is a way of buying and selling products that ensure that the people who produce the goods receive a fair price. Fair trade brings a better standard of living for poor farmers in developing countries.

Keywords
Micronutrient, macro nutrient, sustainable food, seasonal food, food miles, fairtrade, overfishing, special diet.

Year 9 Electronics

DESIGN AND TECHNOLOGY

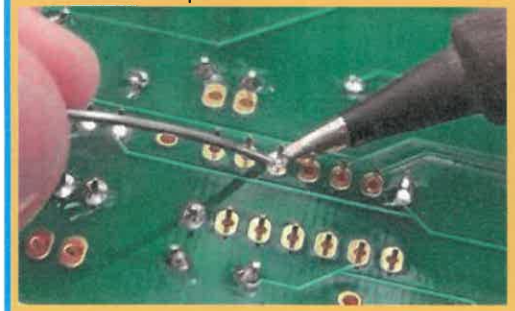
Tools and Equipment

Tools used for Soldering

Soldering iron, stand, sponge and heat mat		Electrically heated tip used to melt solder onto joint or PCB. Damp sponge used to clean the tip.
Side cutters		Cuts components or wire.
Helping hands tool		Holds wire, components or board whilst soldering.
Solder		Solder helps to connect components.
Wire Strippers		Used to remove the outer plastic layer of wires.

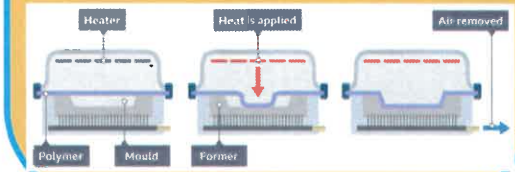
Soldering

Soldering is used to connect two or more contacts so that electricity can flow between components.



Vacuum Forming

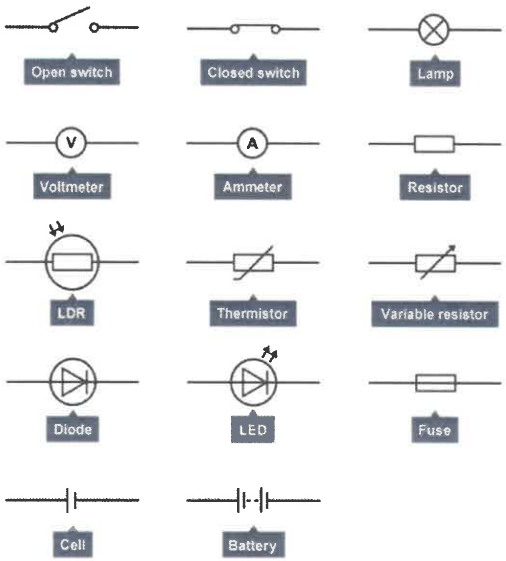
Vacuum forming is a polymer process. A sheet of thermoplastic is heated and pressed onto the former (mould) to create a shape.

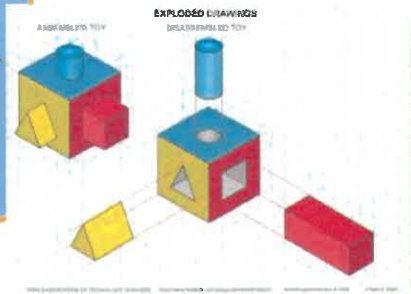


Keywords

- Cell
- Battery
- Resistor
- Lamp
- Circuit
- Buzzer
- Systems
- Input
- Output
- Switch
- Solder
- Wire Strippers
- Side Cutters
- Vacuum Former
- Mould
- Draft Angle
- HIPs

Circuit diagrams use simplified universal symbols to represent the electronic circuit and its components. These are some of the symbols used.





Memphis design movement

Established in the 1980s. Composed of designers based in Italy. Memphis designers, regarded aesthetics as the most important aspect of a product, not its function. Memphis designs/products can be regarded as pieces of art or exhibition pieces, not useable, practical items.

Ettore Sotsass

Maths in DT:

- Multiplication
- Divide
- Add / Subtract
- Measurement conversion
- Ratios
- Percentages
- Surface area

What is good design?

- Clear ideas
- Annotations
- Measurements
- Content
- Presentation
- Balance

Health and Safety in DT:

- Listen to your teacher's instructions
- Always wear an apron
- Long hair should be tied back
- Don't use equipment you are not trained on
- Always stand up during practical lessons
- When using machines, always wear safety glasses
- Only use the stop button in an emergency
- Work quietly and be sensible and careful at all times

KS3 Year 8/9 Design and Technology CAD CAM: Board Games

CAD: Computer Aided Design
CAM: Computer Aided Manufacture

Adobe Illustrator

Adobe Illustrator is the industry-leading graphic design tool that is a professional vector-based design and drawing program. Used as part of a larger design workflow, Illustrator allows for the creation of everything from single design elements to entire compositions.

TinkerCAD

Is a 3D modelling platform that has been launched by AutoDesk – a industry leading program. It allows you to create 3D models on the computer.

Key words

Vector	CAD/CAM	Automation
3D printing	Illustrator	Additive
Graphics	TinkerCAD	ACCESSFM

3D printing

3D printing is an additive technology used to manufacture parts. It is 'additive' in that it doesn't require a block of material or a mold to manufacture physical objects, it simply stacks and fuses layers of material. It's typically fast, with low fixed setup costs, and can create more complex geometries than 'traditional' technologies, with an ever-expanding list of materials. It is used extensively in the engineering industry, particularly for prototyping and creating lightweight geometries.

Tools and Equipment		
CAD CAM		
3D printer		3D printing or additive manufacturing is the construction of a three-dimensional object from a CAD model or a digital 3D model.
Template		A template is a tool used to mark out shapes repeatedly

Maths in DT:
Multiplication
Divide
Add / Subtract
Measurement conversion
Ratios
Percentages
Surface area

What is good design?
Clear ideas
Annotations
Measurements
Content
Presentation
Balance

Year 7 / 9 D&T RESISTANT MATERIALS

UCD &Modelling: Playgrounds

Tools and Equipment

Measuring and marking

Steel rule		An accurate tool for measuring and marking out.
Set square		A ruler to ensure you measure and mark accurate 45 / 90 degree angles.
Template		A template is a tool used to mark out shapes repeatedly

Card shaping and adhesives

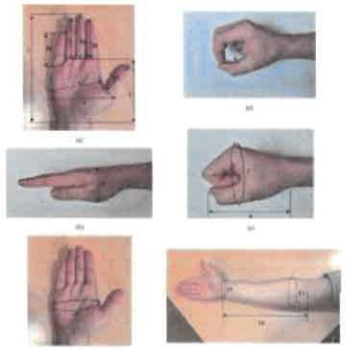
Slot		A joining technique to join card.
Curve cut		Kerf cutting (partial cuts) will ensure a smoother curve in the card.
Tabs		Tabs help to join the card components together.
Hot glue gun		An adhesive which joins card.
Masking tape		A temporary adhesive which joins card / paper.

Anthropometrics

Anthropometrics is the collection of maximum and minimum measurements of a target market. The data can be used to work out the dimensions of a product.

Ergonomics

Ergonomics Testing and analysing how a person interacts with the product can improve its ***functionality*** and how it fits into its surroundings.



Maths in DT:

Multiplication / Divide
Add / Subtract
Measurement conversion
Ratios /Percentages

Keywords

Modelling Iterative designs UCD
User needs Reformulate Creativity
Functional Innovative Anthropometrics
Ergonomics Social Client Testing
Evaluation

We use **ACCESS FM** to help us write a **specification** - a list of requirements for a design - and to help us **analyse and describe** an already existing product.

ACCESS FM - Helpsh

- **A** is for **Aesthetics**
- **C** is for **Cost**
- **C** is for **Customer**
- **E** is for **Environment**
- **S** is for **Size**
- **S** is for **Safety**
- **F** is for **Function**
- **M** is for **Material**

Cutting

Craft knife		A tool for precision cutting. This tool is used for accurate cutting of paper and card. Can cut in a straight or curved line.
Paper scissors		A tool for cutting paper or board.

Materials

Single corrugated card		Corrugations make the card strong.
Card		A compliant material which comes in a variety of colours .

Health and Safety in DT:

- Listen to your teacher's instructions
- Always wear an apron
- Long hair should be tied back
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- Always stand up during practical lessons
- When using machines, always wear safety glasses
- Only use the stop button in an emergency
- Work quietly and be sensible and careful at all times

USEFUL DEFINITIONS

Connotation: the meaning created by association.

Hyperbole: exaggeration to emphasise a point.

Imagery: visually descriptive or figurative language.

Inference: using observations to reach a conclusion.

Metaphor: describing something as something else.

Motif: recurring theme or symbol.

Onomatopoeia: a sound word.

Pathetic Fallacy: giving human emotions and conduct to things found in nature.

Personification: giving human qualities to inanimate objects.

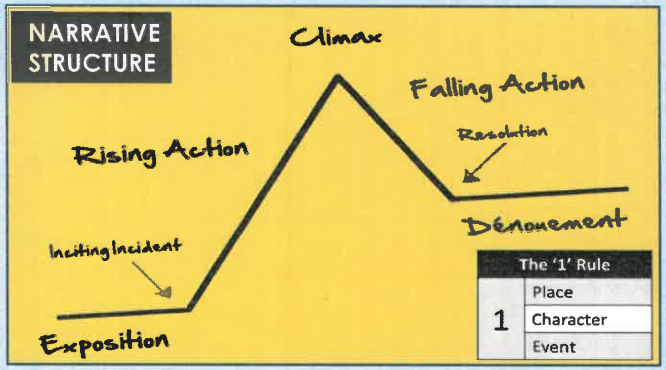
Semantic field: a group of words related in meaning.

Sibilance: use of the 's' sounds in quick succession.

Simile: a comparison of two things that uses the words 'like' or 'as'.

Symbolism: Use of symbols to represent ideas or qualities.

SENSORY IMAGERY



NARRATIVE VOICE

A story has to be 'told' to the reader and a 'narrator' is needed to do this. A narrator's voice can be first, second or third person.

First person: 'I' or 'we' to tell the story. In this case, the narrator is a character and you will read about events from their point of view. You are more likely to be able to relate to and sympathise with their feelings because of this.

Second person: 'you'. It is not often used in fiction texts and it's rare to find a story written entirely from this perspective (*try writing a piece in the second person to see how difficult it is*). However, some fiction texts, such as gamebooks (choose your own adventure) use this perspective.

Third person: 'he', 'she', 'it' or 'they'. The narrator of the story will usually be the writer. Some texts will give many different characters' viewpoints, but others will focus on one character, the hero or heroine, and the reader will usually relate to and sympathise with them more than others.

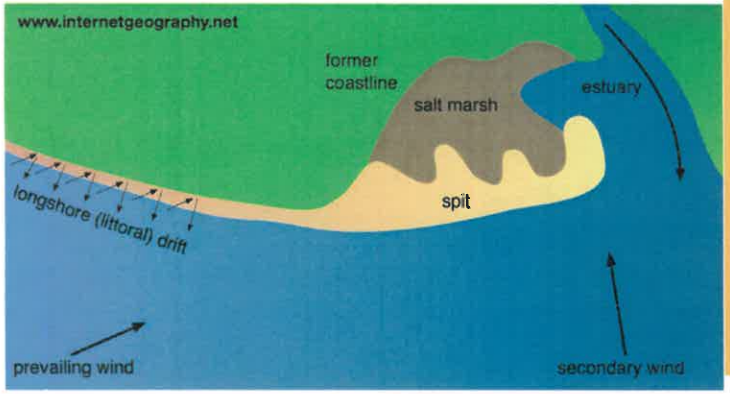
EXPLICIT V's IMPLICIT

Explicit meaning describes something that is very clear and without vagueness or ambiguity.

Implicit meaning often functions as the opposite, referring to something that is understood, but not described clearly or directly, and often using implication or assumption.

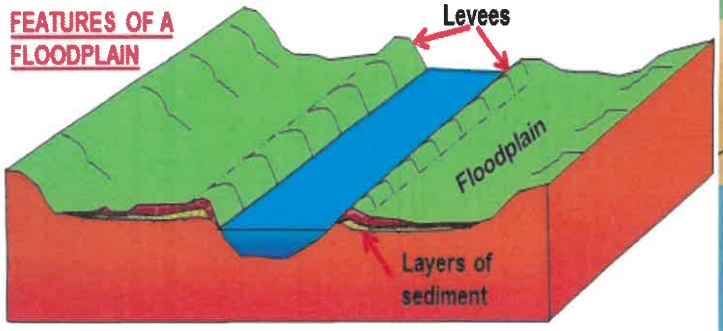
TERMINOLOGY	DEFINITION
CONTEXT	The context of a text is the place and time in which it was written, who it was written by, and where it was published.
NARRATIVE PERSPECTIVE	The point of view of a character in a text - "I crept cautiously towards the gate."
LITERARY GENRES	Categories of literature. Genres may be determined by literary technique, tone, content, or length (especially for fiction).
OMNISCIENT NARRATOR	A narrator who knows what is happening at all points of the story at all times - 'The young woman was very intelligent; she knew exactly what was going to happen.'
SPEECH	Words spoken sit inside speech marks, along with punctuation - "What time is it?" the boy asked.'

The formation of a spit



Spit formation

1. Longshore drift moves sediment along the coast;
2. Where the coast changes direction, longshore drift continues, creating an arm that projects out into the water;
3. A river flows out to sea, preventing the deposition of sediment across the estuary;
4. River deposits build up behind the spit, forming mudflats which may then evolve into saltmarshes;
5. A secondary wind will create hooked ends (recurve laterals) which, along with the rest of the spit, move over time.



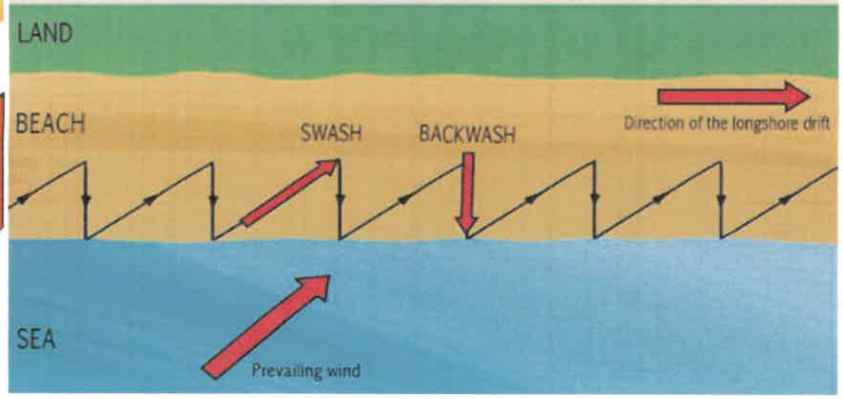
Types of erosion

Hydraulic action – waves crash against the cliff trapping air in cracks. This air is released under pressure eroding the rock as it does so.
Abrasion – sand and pebbles are thrown against the cliffs and scrape away the rockface over time.
Solution – mild acids in the seawater dissolve certain minerals in the rocks.
Attrition – pebbles bang against each other making them smaller and smoother.

Year 8 Topic 2: How important is protecting coasts from erosion?

Longshore drift

1. **Prevailing winds** push waves onshore at an angle;
2. The breaking wave **(swash)** pushes sand and pebbles up the beach at an angle;
3. The wave returns directly to the sea **(backwash)** as a result of **gravity,** moving sediment as it goes;
4. This process **repeats**, moving sediment along the coastline.



Geographic key words this topic:

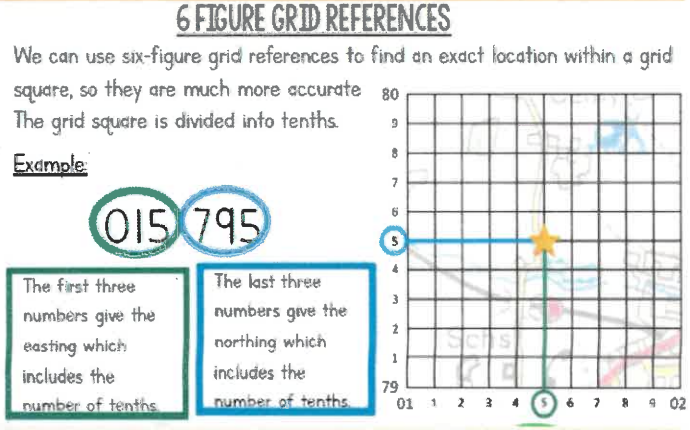
By the end of this topic you should be able to explain these words:
Erosion
Fetch
Geology
More/Less resistant
Hydraulic action
Abrasion
Solution
Attrition
Arch
Stack
Stump
Longshore drift
Deposition
Swash
Backwash
Prevailing wind
Spit
Mudflat
Estuary
Managed retreat
Geo tubes
Hard engineering
Soft engineering
Groynes
Seawall
Gabions
Rip-rap
Beach replenishment
Dune nourishment

Writing a developed answer

P	E	E	L
Point	**Evidence**	**Explanation**	**Link**
I strongly believe...	For example...	This shows...	From this we can conclude...
Another point to consider is...	This is illustrated by...	This means...	It is clear that...
First of all...	This can be seen by...	Therefore...	We can therefore see...
		As a result...	

6 Figure Grid references

We can use 6 figure grid references to find an exact location within a grid. Each square is divided up into 10 smaller squares. Remember to still go along the corridor and up the stairs.



Remember within each square, 5 is always ½ way along or up.

Yr 8 Term 2: Geographical Skills

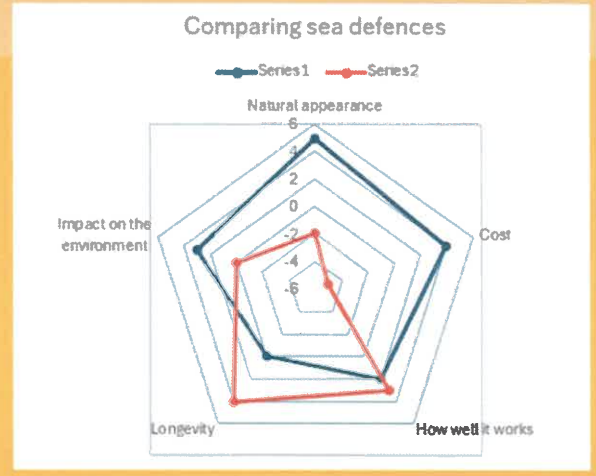
Social: relating to people's standard of living and access to education, healthcare and jobs.

Economic: how a country's wealth is spent and distributed.

Environmental: relating to nature and natural systems

Radar graphs

Radar graphs can be used to show and compare results of data categories on one graph at the same time.
This radar graph shows the scores given to two sea defences for various categories. The score for each category is plotted and then the points are joined up to form lines.



How do I decide what is more important when I evaluate?

Time scale – Long term could be more important
How many people are affected – More people – more important
Impact – Social/Economic/Environmental – which is more important?
Scale – Local/National/Global – global could be more important

Remember THIS!

Enquiry: How did the Holocaust happen?

Outline: When the Nazi Party came to power in Germany in 1933, they targeted many different groups and made life for them increasingly difficult. The main group targeted were Jewish people and the Nazis began a gradual policy of persecution which led to the genocide that we call the Holocaust today.

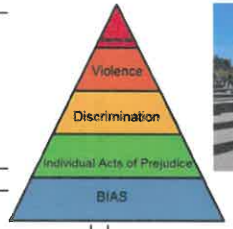
Date	Event	Description
1933	Targeting of Jewish people begins	Nazi party began banning Jewish people from places and jobs.
1935	Nuremberg Laws	Greater persecution with laws on who Jewish people could marry.
1938	Kristallnacht	Attack on Jewish people in Germany where shops and synagogues were targeted.
1941	First use of Auschwitz as a death camp	First murder of people at Jewish people. 1.1 million were killed there.
1941	Holocaust by bullets began	Targeting of mainly Jewish people in eastern Europe by mobile killing squads.
1942	Wannsee Conference	Meeting to decide on the Final Solution to the Jewish question = mass murder of Jewish people
1945	Liberation of Auschwitz	Soviet soldiers helped to close the camp.

Furthering learning

Want to find out more about the Holocaust?

Recent genocides:
1994 Rwanda
1995 Bosnia
2003 – Darfur
2014 – Uyghur
2017 - Rohingya

History – Year 9
Knowledge Organiser
Topic 2



Key individuals

Oskar Schindler. Used Jewish people as slave labour in his factory but then saved over 1,000 workers from death in the Holocaust.

Anne Frank. Jewish teenager who kept a diary whilst hiding from the Nazis in Amsterdam. Her family were betrayed and only her father survived.

Dina Pronicheva. One of Few survivors of the Massacre of Jewish people at Babi Yar in Kiev in 1941 where 33,771 were murdered In a day.

Leon Greenman. A Holocaust survivor who dedicated his life to educating people about the Holocaust. He lost his wife and child in the Holocaust.

Key vocabulary:

Antisemitism: racism against Jewish people.
Auschwitz-Birkenau: largest death camp where 1.1 million died. Located in Poland.
Concentration camp: where prisoners were kept as slave labour.
Dachau: first concentration camp near Munich, Germany.
Death camp: camp with the aim of killing as many as possible
Einsatzgruppen: Nazi units sent out to round up and kill people, mainly Jewish people in eastern Europe.
Final Solution: the name of the project to kill as many Jewish people as possible.
Genocide: mass murder of a group of people which is organised.
Ghetto: areas of cities were Jewish people were forced to live in overcrowded and dirty conditions.
Holocaust: when over 11 million people were murdered by the Nazis in Europe, including 6 million Jewish people. The word means "burned sacrifice"
Holocaust by bullets: murder of groups of people by the Einsatzgruppen in eastern Europe.
Indoctrinate: brainwash people into believing certain ideas using media, education and propaganda.
Kristallnacht: pogrom of Jewish people in Germany in 1938.
Persecution: unfair treatment of people which is relentless.
Pogrom: massacre of Jewish people.
"Resettlement": a Nazi term which referred to the deportation of Jewish people to the east. Really it meant their murder.
Scapegoat: when someone is blamed for an event even though it isn't their fault.
Shoah: the Jewish word for the events of the Holocaust. It means "catastrophe"
Wannsee: where the final solution was decided, near to Berlin.

Enquiry: How did the Holocaust happen?

History – Year 9
Knowledge Organiser
Topic 2

A drawing made by Holocaust survivor David Friedman in 1967. Friedman was sent to Auschwitz-Birkenau and his wife and child died there.

Historical skill focus: using evidence

- What is the nature, origin and purpose of a source?
- What makes a source useful?

What to focus on	Starting sentences
What is the NATURE of the source? Does this make it useful? What is the ORIGIN of the source? Does this make it useful? What is the PURPOSE of the source? Does this make it useful?	Source A is useful because... This is shown by... The source is also useful due to its purpose which was to...

Nature = type of source like a painting or letter
Origin = date made and who made it
Purpose = why it was made = motivate/justify/persuade

Point = One way the source is useful is...
Evidence = This is shown by the nature of the source...
Explain = This is useful because...

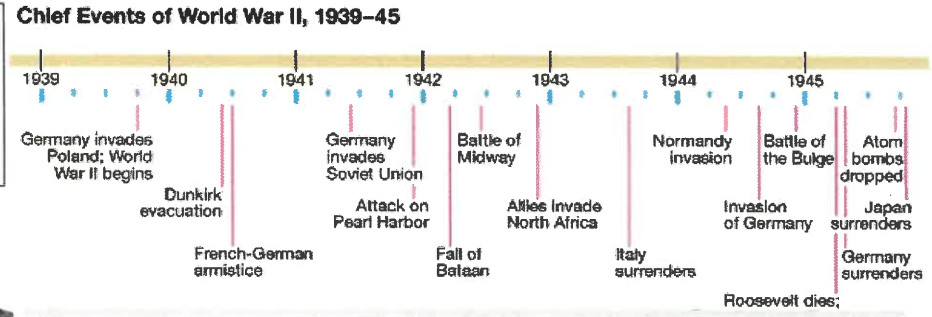
Using evidence

Write at least two paragraphs to answer this question:
How useful is this source to a historian investigating the Holocaust?

Developing	Secure	Exceeding
I can explain how a source can be useful/not useful in a PEE paragraph. I am starting to think about the nature, origin and purpose of the source and its impact.	I can explain how useful a source is and then make a judgement based on this information. I can write this in a PEEL paragraph. I can accurately comment on the purpose of a source	I can make a complex judgement on the purpose of a source – linking this to the date of the source. I can begin to think about the conscious and subconscious bias of a source.

Preparation for summative assessment

History – Year 9
Knowledge Organiser
Topic 1



Historical skill focus: cause and consequence

- Why do events happen?
- What is the impact of these events?

Can you explain why?

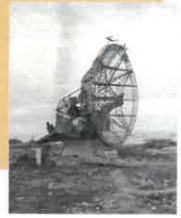
You could **write one or two paragraphs** to explain.

➢ Why did the Allies win WW2?

What to focus on:	Starting sentences
One or two reasons why the event happened. Think about the actions of the countries and people involved Think about political reasons or military reasons?	One cause of… The most significant cause was… This cause led to…

Point = A key cause was…
Evidence = This cause led to…
Explain = This is important because…

Developing	Secure	Exceeding
I can explain why an event happened in a PEE paragraph.	I can make a judgement on why an event happened, using causes in a PEEL paragraph. I can identify long and short term causes and use these in my answers.	I can make a judgement on the significance of causes in a PEEL paragraph. I can make links between different causes in my response.



Preparation for summative assessment

History – Year 9
Knowledge Organiser
Topic 1

Historical skill focus: using evidence

- What is the nature, origin and purpose of a source?
- What makes a source useful?

What to focus on	Starting sentences
What is the NATURE of the source? Does this make it useful?	Source A is useful because...
What is the ORIGIN of the source? Does this make it useful?	This is shown by...
What is the PURPOSE of the source? Does this make it useful?	The source is also useful due to its purpose which was to...

Nature = type of source like a painting or letter
Origin = date made and who made it
Purpose = why it was made = motivate/justify/persuade

A British cartoon made on 16 June 1940 after the fall of France to German invasion.

Using evidence

Write at least two paragraphs to answer this question:
How useful is this cartoon to a historian investigating the impact of the Dunkirk evacuation?

Developing	Secure	Exceeding
I can explain how a source can be useful/not useful in a PEE paragraph. I am starting to think about the nature, origin and purpose of the source and its impact.	I can explain how useful a source is and then make a judgement based on this information. I can write this in a PEEL paragraph. I can accurately comment on the purpose of a source	I can make a complex judgement on the purpose of a source – linking this to the date of the source. I can begin to think about the conscious and subconscious bias of a source.

Point = One way the source is useful is...
Evidence = This is shown by the nature of the source...
Explain = This is useful because...

YEAR 9 – CONSTRUCTING IN 2D/3D...

3D Shapes

@whisto_maths

What do I need to be able to do?

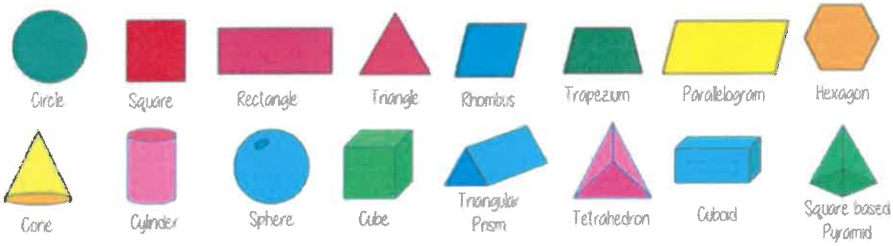
By the end of this unit you should be able to:

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

Keywords

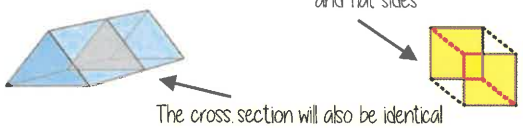
2D: two dimensions to the shape e.g length and width
3D: three dimensions to the shape e.g length, width and height
Vertex: a point where two or more line segments meet
Edge a line on the boundary joining two vertex
Face: a flat surface on a solid object
Cross-section: a view inside a solid shape made by cutting through it
Plan: a drawing of something when drawn from above (sometimes birds eye view)
Perspective: a way to give illustration of a 3D shape when drawn on a flat surface.

Name 2D & 3D shapes



Recognise prisms

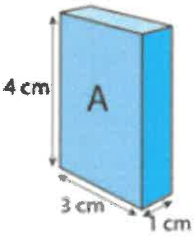
A solid object with two identical ends and flat sides

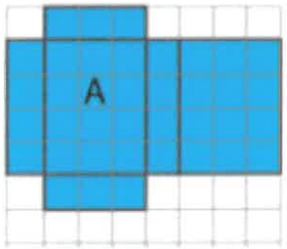


The cross section will also be identical to the end faces.

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

Nets of cuboids

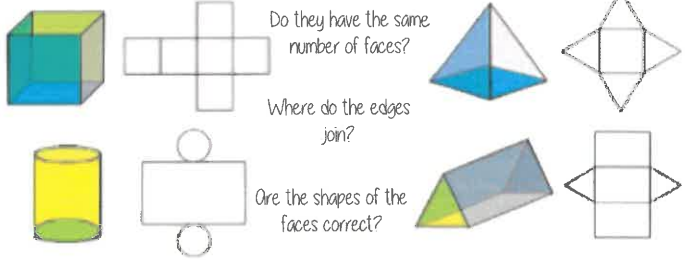




1cm grids help to draw accurately

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

Sketch and recognise nets

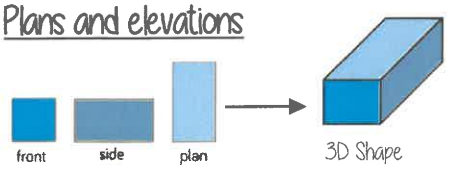


Do they have the same number of faces?

Where do the edges join?

Are the shapes of the faces correct?

Plans and elevations



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

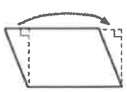
Area of 2D shapes

R

Rectangle
Base x Height

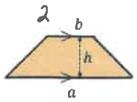
Triangle
½ x Base x Perpendicular height

Parallelogram/ Rhombus
Base x Perpendicular height



Area of a trapezium

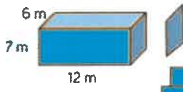
$\frac{(a+b)\times h}{2}$



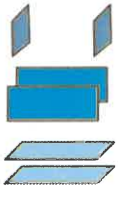
Area of a circle
π x radius^2

Surface area

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

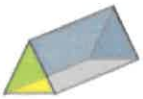


For cubes and cuboids you can also find one of each face and double it



Sides 6 x 7, 6 x 7
Front and back 12 x 7, 12 x 7
Top and Bottom 12 x 6, 12 x 6

Sum of all sides is surface area



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

Surface area - cylinders

The area of the circle **π x radius^2**

Circumference

The width of this face is the same as the circumference **π x diameter x height**

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

Volumes

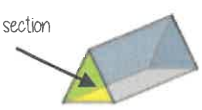
Volume is the 3D space it takes up – also known as capacity if using liquids to fill the space

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

Cubes/ Cuboids = base x width x height

Remember multiplication is commutative

Cross section



Cross section

Prisms and cylinders = area cross section x height

Height can also be described as depth

Areas – square units
Volumes – cube units

Areas and volumes can be left in terms of pi π

YEAR 9 — CONSTRUCTING IN 2D/3D...

Constructions & congruency

@whisto_maths

What do I need to be able to do?

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

- Draw and measure angles
- Construct scale drawings
- Find locus of distance from points, lines, two lines
- Construct perpendiculars from points, lines, angles
- Identify congruence
- Identify congruent triangles

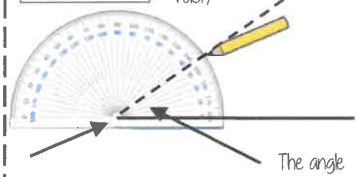
Keywords

Protractor: piece of equipment used to measure and draw angles
Locus: set of points with a common property
Equidistant: the same distance
Discorectangle: (a stadium) — a rectangle with semi circles at either end
Perpendicular: lines that meet at 90°
Arc: part of a curve
Bisector: a line that divides something into two equal parts
Congruent: the same shape and size

Draw and measure angles (R)

Draw a 35° angle

Make a mark at 35° with a pencil and join to the angle point (use a ruler)



The angle

Make sure the cross is at the end of the line (where you want the angle)

Scale drawings (R)

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

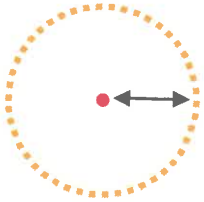
For every 1cm on my image is 30cm in real life

The car image is 10cm

Image	Real life
1cm	30cm
10cm	300cm

(×10 / ×10)

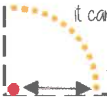
Locus of a distance from a point



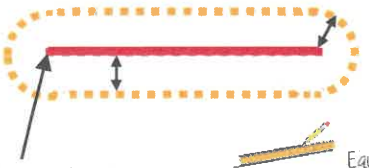
All points are equidistant (the same distance) from the fixed point in the middle.

Equipment needed
The radius is the distance from the fixed point

If the point is in the corner it can only make a quarter circle



Locus of a distance from a straight line

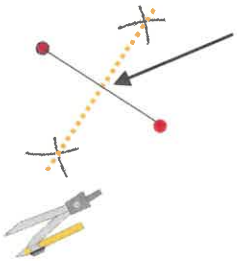


All points are equidistant (the same distance) from line

The ends of the line are fixed points

Equipment needed
The line is straight so a ruler is used for the straight lines parallel to your original line

Locus equidistant from two points

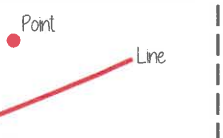


Also a perpendicular bisector
Because if the points are joined, this new line intersects it at a 90°

Keep the compass the same size and draw two arcs from each point

Join the intersections with a ruler.
All points on this line are equidistant from both points

Construct a perpendicular from a point



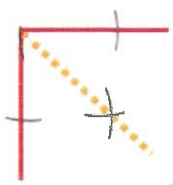
Use a compass and draw an arc that cuts the line. Use the point to place the compass

Keep the compass the same distance and now use your new points to make new interconnecting arcs

Connecting the arcs makes the bisector

If P is a point on the line the steps are the same

Locus of a distance from two lines



Also an angle bisector
This cuts the angle in half

From the angle vertex draw two arcs that cut the lines forming the angle

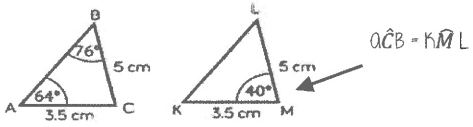
Keep the compass the same size and use the new arcs as centres to draw intersecting arcs in the middle

Join the vertex to the intersection

Congruent figures

Congruent figures are identical in size and shape — they can be reflections or rotations of each other

Congruent shapes are identical — all corresponding sides and angles are the same size



$A\hat{C}B = K\hat{M}L$

Because all the angles are the same and AC=KM BC=LM triangles ABC and KLM are **congruent**

Congruent triangles

Side-side-side

All three sides on the triangle are the same size

Angle-side-angle

Two angles and the side connecting them are equal in two triangles

Side-angle-side

Two sides and the angle in-between them are equal in two triangles (it will also mean the third side is the same size on both shapes)

Right angle-hypotenuse-side

The triangles both have a right angle, the hypotenuse and one side are the same

Constructing Triangles (R)

Link to steps

Side, Angle, Angle

Side, Angle, Side

Side, Side, Side

KNOWLEDGE ORGANISER - Film Music - Year 9

1. KEY IDEAS & CONCEPTS	
2. Purpose	Music in a film is there to **set the scene, enhance the mood, tell the audience things** that the visuals cannot, or **manipulate** their feelings. **Sound effects are *not* music!**
3. Specially composed music	Some music is **composed specially** for a film. Much of this is broadly classical in style.
4. Borrowed music	Some music used in film soundtracks was composed for other (non-film) purposes, but is **adopted** for use in a film because it fits the film-maker's intentions.
5. Theme song	Sometimes a song, usually a pop song, is used as a **theme song** for a film. This helps with marketing and **publicity**.

6. KEY TERMS	
7. Click Track	A **click metronome** heard by musicians through headphones as they record.
8. Cues	The **parts of the film that require music**. This is agreed between the director and the composer.
9. Diagetic	**Music that is part of the action**: the characters in the film can hear it.
10. Leitmotif	A **short melody** that is **associated with a character** or idea in a film.
11. Mickey Mousing	When the **music fits precisely** with a specific part of the action in a film.
12. Non-diagetic	**Music that is *not* part of the action**: the characters in the film **cannot hear it**. It is just for the audience.
13. Syncing / sync point	A precise moment where the timing of the music needs to fit with the action.
14. Underscore	Where **music is played at the same time** as the action or dialogue.

15. INSTRUMENTS & COMMON ASSOCIATIONS (Musical Cliche's)	
16. Woodwind	**Natural** sounds such as bird song, animals, rivers
17. Bassoons	Sometimes used for **comic effect** (e.g. a drunkard)
18. Brass	**Soldiers**, war, royalty, **ceremonial** occasions
19. Tuba	**Large** and slow-moving things
20. Harp	**Tenderness**, love
21. Glockenspiel	**Magic**, music boxes, fairy tales
22. Timpani / Drums	War, **fighting, thunder**
23. Strings	Often used to portray **emotions**: passion, grief, etc.
24. Tremolo Strings	**Tension**, fear, drama

25. KEY COMPOSERS
26. Bernard **Herrmann**
27. John **Williams**
28. John **Barry**
29. Jerry **Goldsmith**
30. Hans **Zimmer**
31. James **Horner**
32. Danny **Elfman**
33. Alan **Silvestri**
34. Howard **Shore**

35. MUSICAL ELEMENTS & COMMON ASSOCIATIONS (Musical Cliche's)		
36. Tempo	**Fast**	**Excitement**, action or fast-moving things (e.g. a chase scene)
	Slow	**Contemplation**, rest or slow-moving things (e.g. a funeral procession)
37. Melody	**Ascending**	Upward movement, or a feeling of **hope** (e.g. climbing a mountain)
	Descending	Downward movement, or feeling of **despair** (e.g. movement down a hill)
	Large Leaps	**Distorted** or grotesque things (e.g. a monster)
39. Harmony	**Major**	Happiness, **optimism**, success
	Minor	Sadness, **seriousness** (e.g. a character learns of a loved one's death)
	Dissonant	**Scariness**, pain, mental anguish (e.g. a murderer appears)
40. Rhythm & Metre	**Strong sense of pulse**	**Purposefulness**, action (e.g. preparations for a battle)
	Dance-like rhythms	**Playfulness**, dancing, partying (e.g. a medieval feast)
	Irregular rhythms	Excitement, **unpredictability** (e.g. a fast-moving fight)
	Rhythmic ostinato	**Menace**, tension (e.g. the countdown to an invasion)
41. Dynamics	**Loud**	**Surprise**, power, large things (e.g. a vast panorama)
	Soft	**Gentleness**, weakness, intimacy, small things (e.g. a new-born lamb)
	Crescendo / Diminuendo	Objects or events getting **closer** / objects getting **further away**

Absolutism: The belief that there is a right course of action which is correct in *all* situations.

Agape: Selfless, sacrificial, unconditional love. Christians believe Jesus is the perfect example of this.

Deontological: To do with moral obligations, duties and ethics.

Ethics: Moral principles that govern a person's behaviour.

Eudaimonia

Morality: The distinction between right and wrong or good and bad behaviour.

Relativism: The belief that the right course of actions depends on a variety of things and may *differ* from person to person.

Teleological: focuses on the consequences or outcomes of the actions being classed as right or wrong

Utilitarianism: ethical theory that suggests actions are right if they are useful or for the benefit of a majority.

Virtue Ethics

Virtue ethics is a philosophy developed by Aristotle. It is the quest to understand and live a life of moral character.

This character-based approach to morality assumes that we acquire virtue through practice. By practicing being honest, brave, just, generous, and so on, a person develops an honorable and moral character. According to Aristotle, by honing virtuous habits, people will likely make the right choice when faced with ethical challenges.

So, virtue ethics helps us understand what it means to be a virtuous human being. And, it gives us a guide for living life without giving us specific rules for resolving ethical dilemmas.

https://youtu.be/NMblKpkKYao

The principal virtues and vices

Sphere of feeling or action	Excess (vice)	Mean (virtue)	Deficiency (vice)
Fear and confidence	Rashness	Courage	Cowardice
Pleasures and pains	Self-indulgence	Temperance	Insensibility (rare)
Getting and spending (minor)	Prodigality	Liberality	Meanness
Getting and spending (major)	Tastelessness	Magnificence	Niggardliness
Honour and dishonour (major)	Vanity	Proper pride	Pusillanimity
Honour and dishonour (minor)	Ambition	Proper ambition	Lack of ambition
Anger	Irascibility	Good temper	Lack of spirit
Self-expression	Boastfulness	Truthfulness	Mock modesty
Conversation	Buffoonery	Wittiness	Boorishness
Disposition to others	Obsequiousness	Friendliness	Cantankerousness
Shame	Bashfulness	Modesty	Shamelessness
Indignation	Envy	Proper indignation	Spite

Utilitarianism

Utilitarianism is all about choosing '***the greatest good for the greatest number'.***

This makes it a teleological ethical theory.

Everyone has an equal right to happiness, so utilitarian's say we should consider how a decision will affect everyone involved, not just ourselves.

It seems sensible to base ethics on producing **happiness** and reducing unhappiness.

https://www.youtube.com/watch?v=bOpf6KcWYyw

Absolute morality

If you believe in absolute morality you will have faith that there is a right course of action to take in a moral dilemma, which is true in all situations regardless of culture, religious tradition, time or age.

How would a follower of this sort of morality respond to the commandment You shall not murder? They would try to make sure that they were not involved in any killing, which would affect their views on issues such as war, abortion and euthanasia. They would say that these actions are wrong in all circumstances.

https://en.wikipedia.org/wiki/Ten_Commandments

Are there universal moral rules?

Chapter 1: Atomic structure

Knowledge organiser

Development of the model of the atom

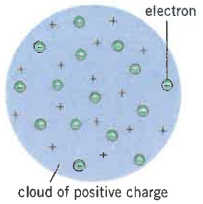
Dalton's model

John Dalton thought of the **atom** as a solid sphere that could not be divided into smaller parts. His model did not include **protons**, **neutrons**, or **electrons**.

The plum pudding model

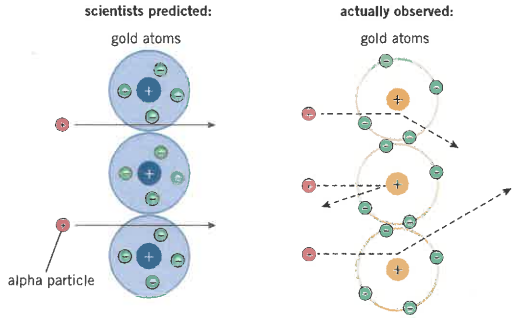
Scientists' experiments resulted in the discovery of sub-atomic charged particles. The first to be discovered were electrons – tiny, negatively charged particles.

The discovery of electrons led to the plum pudding model of the atom – a cloud of positive charge, with negative electrons embedded in it. Protons and neutrons had not yet been discovered.



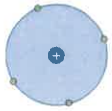
Alpha scattering experiment

1. Scientists fired small, positively charged particles (called alpha particles) at a piece of gold foil only a few atoms thick.
2. They expected the alpha particles to travel straight through the gold.
3. They were surprised that some of the alpha particles bounced back and many were deflected (alpha scattering).
4. To explain why the alpha particles were repelled the scientists suggested that the positive charge and mass of an atom must be concentrated in a small space at its centre. They called this space the **nucleus**.



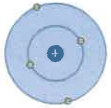
Nuclear model

Scientists replaced the plum pudding model with the nuclear model and suggested that the electrons **orbit** the nucleus, but not at set distances.



Electron shell (Bohr) model

Niels Bohr calculated that electrons must orbit the nucleus at fixed distances. These orbits are called **shells** or **energy levels**.



The proton

Further experiments provided evidence that the nucleus contained smaller particles called protons. A proton has an opposite charge to an electron.

The neutron

James Chadwick carried out experiments that gave evidence for a particle with no charge. Scientists called this the neutron and concluded that the protons and neutrons are in the nucleus, and the electrons orbit the nucleus in shells.

Relative mass

One property of protons, neutrons, and electrons is **relative mass** – their masses compared to each other. Protons and neutrons have the same mass, so are given a relative mass of 1. It takes almost 2000 electrons to equal the mass of a single proton – their relative mass is so small that we can consider it as 0.

Size

The atom has a radius of 1×10^{-10} m. Nuclei (plural of nucleus) are around 10 000 times smaller than atoms and have a radius of around 1×10^{-14} m.

Elements and compounds

Elements are substances made of one type of atom. Each atom of an element will have the same number of protons.

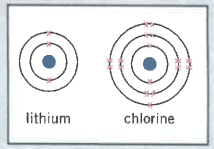
Compounds are made of different types of atoms chemically bonded together. The atoms in a compound have different numbers of protons.

Drawing atoms

Electrons in an atom are placed in fixed shells. You can put

- up to two electrons in the first shell
- eight electrons each in the second and third shells.

You must fill up a shell before moving on to the next one.



Mixtures

- A mixture consists of two or more elements or compounds that are not chemically combined together.
- The substances in a mixture can be separated using physical processes.
- These processes do not use chemical reactions.

Separating mixtures

- filtration – insoluble solids and a liquid
- crystallisation – soluble solid from a solution
- simple distillation – solvent from a solution
- fractional distillation – two liquids with similar boiling points
- paper chromatography – identify substances from a mixture in solution

Atoms and particles

	Relative charge	Relative mass	
Proton	+1	1	= atomic number
Neutron	0	1	= mass number – atomic number
Electron	−1	0 (very small)	= same as the number of protons

All atoms have equal numbers of protons and electrons, meaning they have no overall charge:

total negative charge from electrons = total positive charge from protons

Isotopes

Atoms of the same element can have a different number of neutrons, giving them a different overall mass number. Atoms of the same element with different numbers of neutrons are called **isotopes**.

The **relative atomic mass** is the average mass of all the atoms of an element:

$$\text{relative atomic mass} = \frac{(\text{abundance of isotope 1} \times \text{mass of isotope 1}) + (\text{abundance of isotope 2} \times \text{mass of isotope 2}) \ldots}{100}$$

Key terms

Make sure you can write a definition for these key terms.

abundance, atom, atomic number, aqueous, compound, electron, element, energy level, isotope, neutron, nucleus, orbit, product, proton, reactant, relative atomic mass, relative charge, relative mass, shell

Chapter 1: Atomic structure

Retrieval questions

Learn the answers to the questions below then cover the answers column with a piece of paper and write as many as you can. Check and repeat.

C1 questions	Answers
1 What is an atom?	smallest part of an element that can exist
2 What is Dalton's model of the atom?	atoms as solid spheres that could not be divided into smaller parts
3 What is the plum pudding model of the atom?	sphere of positive charge with negative electrons embedded in it
4 What did scientists discover in the alpha scattering experiment?	some alpha particles were deflected by the gold foil – this showed that an atom's mass and positive charge must be concentrated in one small space (the nucleus)
5 Describe the nuclear model of the atom.	dense nucleus with electrons orbiting it
6 What did Niels Bohr discover?	electrons orbit in fixed energy levels (shells)
7 What did James Chadwick discover?	uncharged particle called the neutron
8 Where are protons and neutrons?	in the nucleus
9 What is the relative mass of each sub-atomic particle?	proton: 1, neutron: 1, electron: 0 (very small)
10 What is the relative charge of each sub-atomic particle?	proton: +1, neutron: 0, electron: −1
11 How can you find out the number of protons in an atom?	the atomic number on the Periodic Table
12 How can you calculate the number of neutrons in an atom?	mass number – atomic number
13 Why do atoms have no overall charge?	equal numbers of positive protons and negative electrons
14 How many electrons would you place in the first, second, and third shells?	up to 2 in the first shell and up to 8 in the second and third shells
15 What is an element?	substance made of one type of atom
16 What is a compound?	substance made of more than one type of atom chemically joined together
17 What is a mixture?	two or more substances not chemically combined
18 What are isotopes?	atoms of the same element (same number of protons) with different numbers of neutrons
19 What are the four physical processes that can be used to separate mixtures?	filtration, crystallisation, distillation, fractional distillation, chromatography
20 What is relative mass?	the average mass of all the atoms of an element

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Chapter 2: The Periodic Table

Knowledge organiser

Development of the Periodic Table

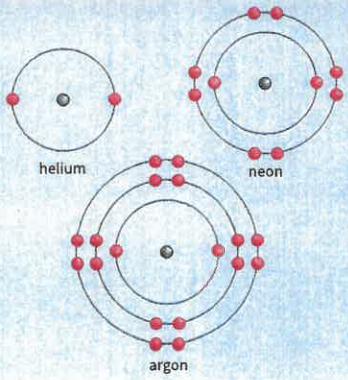
The Periodic Table has changed over time as scientists have organised it differently. Mendeleev was able to accurately predict the properties of undiscovered elements based on the gaps in the table.

	First lists of elements	Mendeleev's Periodic Table	Modern Periodic Table
How are elements ordered?	by atomic mass	normally by atomic mass but some elements were swapped around	by atomic number
Are there gaps?	no gaps	gaps left for undiscovered elements	no gaps – all elements up to a certain atomic number have been discovered
How are elements grouped?	not grouped	grouped by chemical properties	grouped by the number of electrons in the outer shells
Metals and non-metals	no clear distinction	no clear distinction	metals to the left, non-metals to the right
Problems	some elements grouped inappropriately	incomplete, with no explanation for why some elements had to be swapped to fit in the appropriate groups	—

Group 0

Elements in **Group 0** are called the **noble gases**. Noble gases have the following properties:

- full outer shells with eight electrons, so do not need to lose or gain electrons
- are very unreactive (**inert**) so exist as single atoms as they do not bond to form molecules
- boiling points that increase down the group.

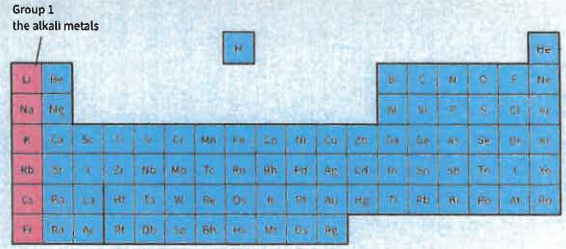


Group 1 elements

Group 1 elements react with oxygen, chlorine, and water, for example:

lithium + oxygen → lithium oxide
lithium + chlorine → lithium chloride
lithium + water → lithium hydroxide + hydrogen

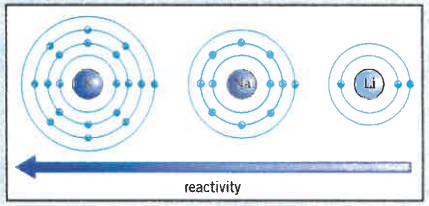
Group 1 elements are called **alkali metals** because they react with water to form an alkali (a solution of their metal hydroxide).



Group 1 properties

Group 1 elements all have one electron in their outer shell.
Reactivity increases down Group 1 because as you move down the group:

- the atoms increase in size
- the outer electron is further away from the nucleus, and there are more shells shielding the outer electron from the nucleus
- the electrostatic attraction between the nucleus and the outer electron is weaker so it is easier to lose the one outer electron
- the melting point and boiling point decreases down Group 1.



Group 7 elements

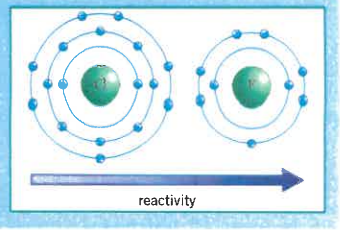
Group 7 elements are called the **halogens**. They are non-metals that exist as molecules made up of pairs of atoms.

Name	Formula	State at room temperature	Melting point and boiling point	Reactivity
fluorine	F_2	gas	increases down the group	decreases down the group
chlorine	Cl_2	gas		
bromine	Br_2	liquid		
iodine	I_2	solid		

Group 7 reactivity

Reactivity decreases down Group 7 because as you move down the group:

- the atoms increase in size
- the outer shell is further away from the nucleus, and there are more shells between the nucleus and the outer shell
- the electrostatic attraction from the nucleus to the outer shell is weaker so it is harder to gain one electron to fill the outer shell.



Group 7 displacement

More reactive Group 7 elements can take the place of less reactive ones in a compound. This is called **displacement**.
For example, fluorine displaces chlorine as it is more reactive:

fluorine + potassium chloride → potassium fluoride + chlorine

Key terms

Make sure you can write a definition for these key terms.

alkali metals chemical properties displacement groups halogens inert isotopes noble gas organised Periodic Table reactivity undiscovered unreactive

Chapter 2: The Periodic Table

Retrieval questions

Learn the answers to the questions below then cover the answers column with a piece of paper and write as many as you can. Check and repeat.

	C2 questions	Answers
1	How is the modern Periodic Table ordered?	by atomic number
2	How were the early lists of elements ordered?	by atomic mass
3	Why did Mendeleev swap the order of some elements?	to group them by their chemical properties
4	Why did Mendeleev leave gaps in his Periodic Table?	leave room for elements that had not yet been discovered
5	Why do elements in a group have similar chemical properties?	have the same number of electrons in their outer shell
6	Where are metals and non-metals located on the Periodic Table?	metals to the left, non-metals to the right
7	What name is given to the Group 1 elements?	alkali metals
8	Why are the alkali metals named this?	they are metals that react with water to form an alkali
9	Give the general equations for the reactions of alkali metals with oxygen, chlorine, and water.	metal + oxygen → metal oxide metal + chlorine → metal chloride metal + water → metal hydroxide + hydrogen
10	How does the reactivity of the alkali metals change down the group?	increases (more reactive)
11	Why does the reactivity of the alkali metals increase down the group?	they are larger atoms, so the outermost electron is further from the nucleus, meaning there are weaker electrostatic forces of attraction and more shielding between the nucleus and outer electron, and it is easier to lose the electron
12	What name is given to the Group 7 elements?	halogens
13	Give the formulae of the first four halogens.	F_2, Cl_2, Br_2, I_2
14	How do the melting points of the halogens change down the group?	increase (higher melting point)
15	How does the reactivity of the halogens change down the group?	decrease (less reactive)
16	Why does the reactivity of the halogens decrease down the group?	they are larger atoms, so the outermost shell is further from the nucleus, meaning there are weaker electrostatic forces of attraction and more shielding between the nucleus and outer shell, and it is harder to gain an electron
17	What is a displacement reaction?	when a more reactive element takes the place of a less reactive one in a compound
18	What name is given to the Group 0 elements?	noble gases
19	Why are the noble gases inert?	they have full outer shells so do not need to lose or gain electrons
20	How do the melting points of the noble gases change down the group?	increase (higher melting point)

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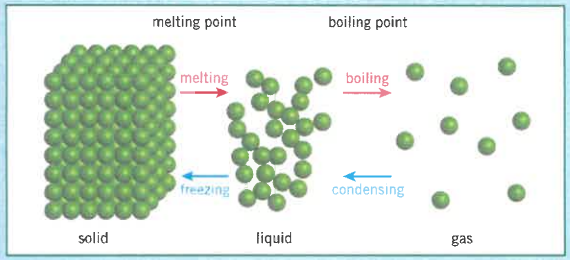
Chapter 3: Bonding 1

Knowledge organiser

Particle model

The three states of matter can be represented in the particle model.



(HT only) This model assumes that:

- there are no forces between the particles
- that all particles in a substance are spherical
- that the spheres are solid.

The amount of energy needed to change the state of a substance depends on the forces between the particles. The stronger the forces between the particles, the higher the melting or boiling point of the substance.

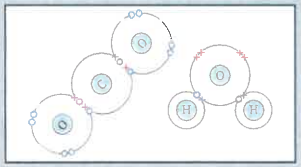
Covalent bonding

Atoms can share or transfer electrons to form strong chemical bonds.

A **covalent bond** is when electrons are *shared* between **non-metal** atoms.

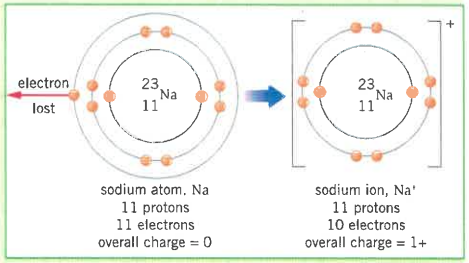
The number of electrons shared depends on how many extra electrons an atom needs to make a full outer shell.

If you include electrons that are shared between atoms, each atom has a full outer shell.
Single bond = each atom shares one pair of electrons.
Double bond = each atom shares two pairs of electrons.



Ions

Atoms can gain or lose electrons to give them a full outer shell. The number of protons is then different from the number of electrons. The resulting particle has a charge and is called an **ion**.



Conductivity

Solid ionic substances do not conduct electricity because the ions are fixed in position and not free to carry charge.

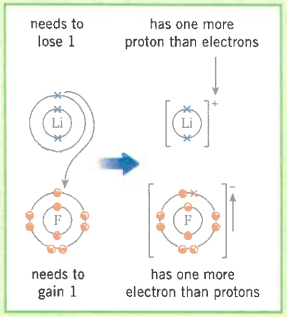
When melted or dissolved in water, ionic substances do conduct electricity because the ions are free to move and carry charge.

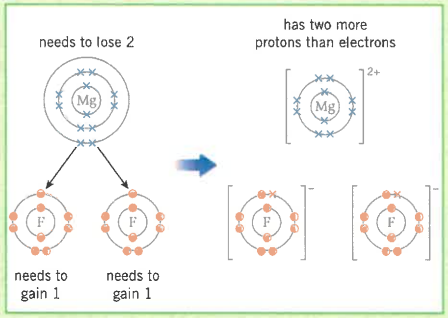
Melting points

Ionic substances have high melting points because the electrostatic force of attraction between oppositely charged ions is strong and so requires lots of energy to break.

Ionic bonding

When metal atoms react with non-metal atoms they **transfer** electrons to the non-metal atom.

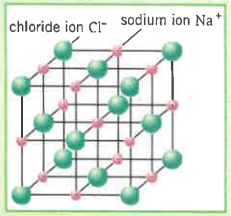




Metal atoms lose electrons to become positive ions. Non-metal atoms gain electrons to become negative ions.

Giant ionic lattice

When metal atoms transfer electrons to non-metal atoms you end up with positive and negative ions. These are attracted to each other by the strong **electrostatic force of attraction**. This is called ionic bonding.

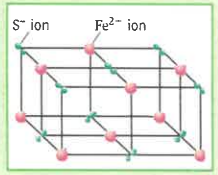


The electrostatic force of attraction works in all directions, so many billions of ions can be bonded together in a 3D structure.

Formulae

The formula of an ionic substance can be worked out

1. from its bonding diagram:
   for every one magnesium ion there are two fluoride ions – so the formula for magnesium fluoride is MgF_2
2. from a lattice diagram:
   there are nine Fe^{2+} ions and 18 S^- ions – simplifying this ratio gives a formula of FeS_2



Covalent structures

There are three main types of covalent structure:

Structure and bonding

Giant covalent

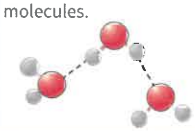
Many billions of atoms, each one with a strong covalent bond to a number of others.

An example of a giant covalent structure is diamond.

Small molecules

Each molecule contains only a few atoms with strong covalent bonds between these atoms. Different molecules are held together by weak **intermolecular forces**.

For example, water is made of small molecules.



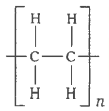
Large molecules

Many repeating units joined by covalent bonds to form a chain.

The small section is bonded to many identical sections to the left and right. The 'n' represents a large number.

Separate chains are held together by intermolecular forces that are stronger than in small molecules.

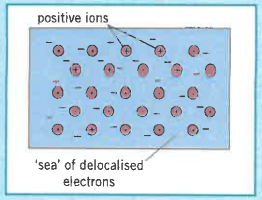
Polymers are examples of long molecules.



Metals: structure and properties

The atoms that make up metals form layers. The electrons in the outer shells of the atoms are **delocalised** – this means they are free to move through the whole structure.

The positive metal ions are then attracted to these delocalised electrons by the electrostatic force of attraction.



Some important properties of metals are:

- pure metals are **malleable** because the layers can slide over each other
- they are good **conductors** of electricity and of thermal energy because delocalised electrons are free to move through the whole structure
- they have high melting and boiling points because the electrostatic force of attraction between metal ions and delocalised electrons is strong so lots of energy is needed to break it.

Chapter 3: Bonding 2

Knowledge organiser

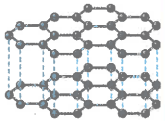
Properties			
	High melting and boiling points because the strong covalent bonds between the atoms must be broken to melt or boil the substances. This requires a lot of energy. Solid at room temperature.	Low melting and boiling points because only the intermolecular forces need to be overcome to melt or boil the substances, not the bonds between the atoms. This does not require a lot of energy as the intermolecular forces are weak. Normally gaseous or liquid at room temperature.	Melting and boiling points are low compared to giant covalent substances but higher than for small molecules. Large molecules have stronger intermolecular forces than small molecules, which require more energy to overcome. Normally solid at room temperature.

Most covalent structures do not conduct electricity because they do not have **delocalised electrons** or ions that are free to move to carry charge.

Graphite

Graphite is a giant covalent structure, but is different to other giant covalent substances.

Structure



Made only of carbon – each carbon atom bonds to three others, and forms hexagonal rings in layers. Each carbon atom has one spare electron, which is delocalised and therefore free to move around the structure.

Hardness

The layers can slide over each other because they are not covalently bonded. Graphite is therefore softer than diamond, even though both are made only of carbon, as each atom in diamond has four strong covalent bonds.

Conductivity

The delocalised electrons are free to move through graphite, so can carry charges and allow an electrical current to flow. Graphite is therefore a conductor of electricity.

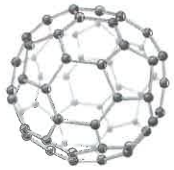
Graphene

Graphene consists of only a single layer of graphite. Its strong covalent bonds make it a strong material that can also conduct electricity. It could be used in composites and high-tech electronics.

Fullerenes

- hollow cages of carbon atoms bonded together in one molecule
- can be arranged as a sphere or a tube (called a **nanotube**)
- molecules held together by weak intermolecular forces, so can slide over each other
- conduct electricity

Spheres

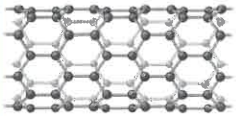


Buckminsterfullerene was the first fullerene to be discovered, and has 60 carbon atoms.

Other fullerenes exist with different numbers of carbon atoms arranged in rings that form hollow shapes.

Fullerenes like this can be used as lubricants and in drug delivery.

Nanotubes

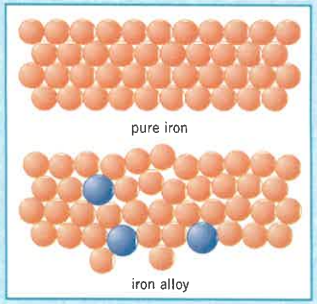


The carbon atoms in nanotubes are arranged in cylindrical tubes.
Their high **tensile strength** (they are difficult to break when pulled) makes them useful in electronics.

Alloys

Pure metals are often too soft to use as they are. Adding atoms of a different element can make the resulting mixture harder because the new atoms will be a different size to the pure metal's atoms. This will disturb the regular arrangement of the layers, preventing them from sliding over each other.

The harder mixture is called an **alloy**.



Measuring particles

We use different units and scales to measure the size of particles.

Particle	Particulate matter	Size	Standard form	Full form
grain of sand	N/A	0.1 mm	1×10^{-4} m	0.0001 m
coarse particles (e.g., dust)	PM_{10}	10 µm	1×10^{-5} m	0.00001 m
fine particles	$PM_{2.5}$	100 nm	1×10^{-7} m	0.0000001 m
nanoparticles	< $PM_{2.5}$	1 to 100 nm	1×10^{-9} to 1×10^{-7} m	0.000000001 m to 0.0000001 m

PM stands for **particulate matter** and is another way of measuring very small particles.

Uses of nanoparticles

Nanoparticles often have very different properties to bulk materials of the same substance, caused by their high surface area-to-volume-ratio.

Nanoparticles have many uses and are an important area of research. They are used in healthcare, electronics, cosmetics, and as catalysts.

However, nanoparticles have the potential to be hazardous to health and to ecosystems, so it is important that they are researched further.

Key terms

Make sure you can write a definition for these key terms.

conductivity conductor delocalised electron electrostatic force of attraction ion lattice layer malleable nanoparticle particulate matter surface area to volume ratio transfer

Chapter 3: Bonding

Retrieval questions

Learn the answers to the questions below then cover the answers column with a piece of paper and write as many as you can. Check and repeat.

C3 questions		Answers
1	How are covalent bonds formed?	by atoms sharing electrons
2	Which type of atoms form covalent bonds between them?	non-metals
3	Describe the structure and bonding of a giant covalent substance.	billions of atoms bonded together by strong covalent bonds
4	Describe the structure and bonding of small molecules.	small numbers of atoms group together into molecules with strong covalent bonds between the atoms and weak intermolecular forces between the molecules
5	Describe the structure and bonding of polymers.	many identical molecules joined together by strong covalent bonds in a long chain, with weak intermolecular forces between the chains
6	Why do giant covalent substances have high melting points?	it takes a lot of energy to break the strong covalent bonds between the atoms
7	Why do small molecules have low melting points?	only a small amount of energy is needed to break the weak intermolecular forces
8	Why do large molecules have higher melting and boiling points than small molecules?	the intermolecular forces are stronger in large molecules
9	Why do most covalent substances not conduct electricity?	do not have delocalised electrons or ions
10	Describe the structure and bonding in graphite.	each carbon atom is bonded to three others in hexagonal rings arranged in layers – it has delocalised electrons and weak forces between the layers
11	Why can graphite conduct electricity?	the delocalised electrons can move through the graphite
12	Explain why graphite is soft.	layers are not bonded so can slide over each other
13	What is graphene?	one layer of graphite
14	Give two properties of graphene.	strong, conducts electricity
15	What is a fullerene?	hollow cage of carbon atoms arranged as a sphere or a tube
16	What is a nanotube?	hollow cylinder of carbon atoms
17	Give two properties of nanotubes.	high tensile strength, conduct electricity
18	Give three uses of fullerenes.	lubricants, drug delivery (spheres), high-tech electronics
19	What is an ion?	atom that has lost or gained electrons
20	Which kinds of elements form ionic bonds?	metals and non-metals
21	What charges do ions from Groups 1 and 2 form?	Group 1 forms 1+, Group 2 forms 2+
22	What charges do ions from Groups 6 and 7 form?	Group 6 forms 2–, Group 7 forms 1–
23	Name the force that holds oppositely charged ions together.	electrostatic force of attraction
24	Describe the structure of a giant ionic lattice.	regular structure of alternating positive and negative ions, held together by the electrostatic force of attraction
25	Why do ionic substances have high melting points?	electrostatic force of attraction between positive and negative ions is strong and requires lots of energy to break
26	Why don't ionic substances conduct electricity when solid?	ions are fixed in position so cannot move, and there are no delocalised electrons
27	When can ionic substances conduct electricity?	when melted or dissolved
28	Why do ionic substances conduct electricity when melted or dissolved?	ions are free to move and carry charge
29	Describe the structure of a pure metal.	layers of positive metal ions surrounded by delocalised electrons
30	Describe the bonding in a pure metal.	strong electrostatic forces of attraction between metal ions and delocalised electrons
31	What are four properties of pure metals?	malleable, high melting/boiling points, good conductors of electricity, good conductors of thermal energy
32	Explain why pure metals are malleable.	layers can slide over each other easily
33	Explain why metals have high melting and boiling points.	electrostatic force of attraction between positive metal ions and delocalised electrons is strong and requires a lot of energy to break
34	Why are metals good conductors of electricity and of thermal energy?	delocalised electrons are free to move through the metal
35	What is an alloy?	mixture of a metal with atoms of another element
36	Explain why alloys are harder than pure metals.	different sized atoms disturb the layers, preventing them from sliding over each other
37	How big are nanoparticles?	1–100 nm
38	How are nanomaterials different from bulk materials?	nanomaterials have a much higher surface area-to-volume ratio
39	What is the relationship between side length and surface area-to-volume ratio?	as side length decreases by a factor of ten, the surface-area-to-volume ratio increases by a factor of ten
40	What are nanoparticles used for?	used in healthcare, electronics, cosmetics, and catalysts

Chapter 5: Communicable diseases

Knowledge organiser

Communicable diseases

Communicable diseases can be spread from one organism to another.

Viruses live and reproduce rapidly inside an organism's cells. This can damage or destroy the cells.

Viruses

	Spread by	Symptoms
measles	inhalation of droplets produced by infected people when sneezing and coughing	• fever • red skin rash • complications can be fatal – young children are vaccinated to immunise them against measles
HIV (human immunodeficiency virus)	• sexual contact • exchange of body fluids (e.g., blood when drug users share needles)	• flu-like symptoms at first • virus attacks the body's immune cells, which can lead to AIDS – where the immune system is so damaged that it cannot fight off infections or cancers
TMV (tobacco mosaic virus – plants)	• direct contact of plants with infected plant material • animal and plant vectors • soil: the pathogen can remain in soil for decades	• mosaic pattern of discolouration on the leaves – where chlorophyll is destroyed • reduces plant's ability to photosynthesise, affecting growth

Bacteria reproduce rapidly inside organisms and may produce **toxins** that damage tissues and cause illness.

Bacteria

	Spread by	Symptoms	Prevention and treatment
Salmonella	bacteria in or on food that is being ingested	*Salmonella* bacteria and the toxins they produce cause • fever • abdominal cramps • vomiting • diarrhoea	poultry are vaccinated against *Salmonella* bacteria to control spread
gonorrhoea	direct sexual contact – gonorrhoea is a **sexually transmitted disease** (STD)	• thick yellow or green discharge from the vagina or penis • pain when urinating	• treatment with antibiotics (many antibiotic-resistant strains have appeared) • barrier methods of contraception, such as condoms

Fungi

	Spread by	Symptoms	Prevention and treatment
rose black spot	water and wind	• purple or black spots on leaves, which turn yellow and drop early • reduces plant's ability to photosynthesise, affecting growth	• **fungicides** • affected leaves removed and destroyed

Protists

	Spread by	Symptoms	Prevention and treatment
malaria	mosquitos feed on the blood of infected people and spread the protist pathogen when they feed on another person – organisms that spread disease by carrying pathogens between people are called **vectors**	• recurrent episodes of fever • can be fatal	• prevent mosquito vectors breeding • mosquito nets to prevent bites • anti-malarial medicine

Detection and identification of plant diseases

Signs that a plant is diseased

- stunted growth
- spots on leaves
- areas of rot or decay
- growths
- malformed stems or leaves
- discolouration
- pest infestation

Ways of identifying plant diseases

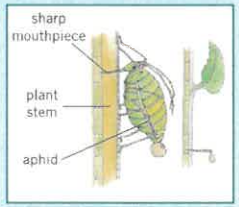
- gardening manuals and websites
- laboratory testing of infected plants
- testing kits containing monoclonal antibodies (Chapter 9 *Monoclonal antibodies*)

Plant diseases and insects

Plant diseases can also be directly caused by insects.

Aphids are insects that suck sap from the stems of plants. This results in

- reduced rate of growth
- wilting
- discolouration of leaves.



Ladybirds can be used to control aphid infestations as ladybird larvae eat aphids.

Plant defences

Physical barriers

- cellulose cell walls – provide a barrier to infection
- tough waxy cuticle on leaves
- bark on trees – a layer of dead cells that can fall off

Chemical barriers

- many plants produce antibacterial chemicals
- poison production stops animals eating plants

Mechanical adaptations

- thorns and hairs stop animals eating plants
- leaves that droop or curl when touched to scare herbivores or dislodge insects
- some plants **mimic** the appearance of unhealthy or poisonous plants to deter insects or herbivores

Controlling the spread of communicable disease

There are a number of ways to help prevent the spread of communicable diseases from one organism to another.

Hygiene

Hand washing, disinfecting surfaces and machinery, keeping raw meat separate, covering mouth when coughing/sneezing, etc.

Isolation

Isolation of infected individuals – people, animals, and plants can be isolated to stop the spread of disease.

Controlling vectors

If a vector spreads a disease destroying or controlling the population of the vector can limit the spread of disease.

Vaccination

Vaccination can protect large numbers of individuals against diseases.

Key terms

Make sure you can write a definition for these key terms.

aphid, bacterium, communicable disease, fungicide, fungus, isolation, mimic, pathogen, protist, sexually transmitted disease (STD), toxin, vaccination, vector, virus

Chapter 5: Communicable diseases

Retrieval questions

Learn the answers to the questions below then cover the answers column with a piece of paper and write as many as you can. Check and repeat.

	B5 questions	Answers
1	What is a communicable disease?	a disease that can be transmitted from one organism to another
2	What is a pathogen?	a microorganism that causes disease
3	Name four types of pathogen.	bacteria, fungi, protists, viruses
4	How can pathogens spread?	air, water, direct contact
5	How do bacteria make you ill?	produce toxins that damage tissues
6	How do viruses make you ill?	reproduce rapidly inside cells, damaging or destroying them
7	Name three examples of viral diseases.	measles, HIV, tobacco mosaic virus
8	Name two examples of bacterial diseases.	*Salmonella*, gonorrhoea
9	Name four methods of controlling the spread of communicable disease.	good hygiene, isolating infected individuals, controlling vectors, vaccination
10	Describe an example of a protist disease.	malaria – caused by a protist pathogen that is spread from person to person by mosquito bites, and causes recurrent fevers
11	Describe an example of a fungal disease in plants.	rose black spot – spread by water and wind, and affects plant growth by reducing a plant's ability to photosynthesise
12	How can the cause of a plant disease be identified?	gardening manuals and websites, laboratory testing, monoclonal antibody kits
13	What are three mechanical defences that protect plants?	thorns and hairs, leaves that droop or curl, mimicry to trick animals
14	Give three physical defences of plants.	cellulose cell walls, tough waxy cuticles, bark on trees
15	How can aphids be controlled by gardeners?	introduce ladybirds to eat the aphids
16	How can plant diseases be detected?	areas of decay, discolouration, growths, malformed stems or leaves, presence of pests, spots on leaves, and stunted growth

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Chapter 6: Preventing and treating disease

Knowledge organiser

Non-specific defences

Non-specific defences of the human body against all pathogens include:

Skin

- physical barrier to infection
- produces antimicrobial secretions
- microorganisms that normally live on the skin prevent pathogens growing

Nose

Cilia and **mucus** trap particles in the air, preventing them from entering the lungs.

Trachea and bronchi produce mucus, which is moved away from the lungs to the back of the throat by cilia, where it is expelled.

Stomach

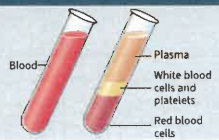
Produces strong acid (pH 2) that destroys pathogens in mucus, food, and drinks.

White blood cells

If a pathogen enters the body, the immune system tries to destroy the pathogen.

The function of **white blood cells** is to fight pathogens.

There are two main types of white blood cell – lymphocytes and phagocytes.



Lymphocytes

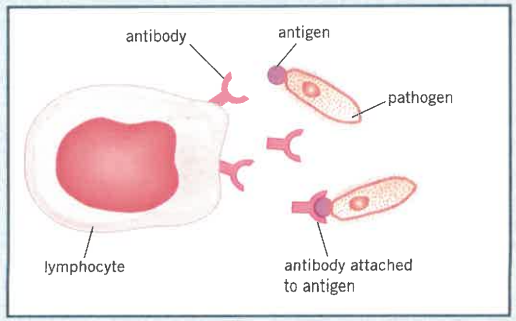
Lymphocytes fight pathogens in two ways:

Antitoxins

Lymphocytes produce **antitoxins** that bind to the toxins produced by some pathogens (usually bacteria). This *neutralises* the toxins.

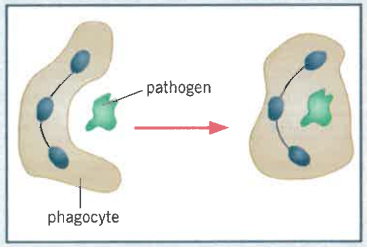
Antibodies

Lymphocytes produce **antibodies** that target and help to destroy specific pathogens by binding to **antigens** (proteins) on the pathogens' surfaces.



Phagocytes

1. Phagocytes are attracted to areas of infection.
2. The phagocyte surrounds the pathogen and engulfs it.
3. Enzymes that digest and destroy the pathogen are released.



Monoclonal antibodies (HT only)

Monoclonal antibodies are produced by mouse lymphocytes which are combined with a tumour cell to make a hybridoma cell. These can divide to make an antibody which can later be cloned and used to treat diseases such as cancer or used in pregnancy tests.

Key terms

Make sure you can write a definition for these key terms.

antibiotic, antibody, antigen, antitoxin, dose, double-blind trial, efficacy, Herd immunity, monoclonal antibodies, mucus, peer review, placebo, toxicity, vaccination, white blood cell

Treating diseases

Antibiotics

- **Antibiotics** are medicines that can kill *bacteria* in the body.
- Specific bacteria need to be treated by specific antibiotics.
- Antibiotics have greatly reduced deaths from infectious bacterial diseases, but antibiotic-resistant strains of bacteria are emerging.

Treating viral diseases

- Antibiotics *do not* affect viruses.
- Drugs that kill viruses often damage the body's tissues.
- Painkillers treat the symptoms of viral diseases but do not kill pathogens.

Discovering and developing new drugs

Drugs were traditionally extracted from plants and microorganisms, for example

- the heart drug digitalis comes from foxglove plants
- the painkiller aspirin originates from willow trees
- penicillin was discovered by Alexander Fleming from *Penicillium* mould.

Most modern drugs are now synthesised by chemists in laboratories.

New drugs are extensively tested and trialled for

- **toxicity** – is it harmful?
- **efficacy** – does it work?
- **dose** – what amount is safe and effective to give?

Stages of clinical trials

Pre-clinical trials

Drug is tested in cells, tissues, and live animals.

Clinical trials

1. Healthy volunteers receive very low doses to test whether the drug is safe and effective.
2. If safe, larger numbers of healthy volunteers and patients receive the drug to find the optimum dose.

Peer review

Before being published, the results of clinical trials will be tested and checked by independent researchers. This is called **peer review**.

Double-blind trials

Some clinical trials give some of their patients a **placebo** drug – one that is known to have no effect.

Double-blind trials are when neither the patients nor the doctors know who has been given the real drug and who has been given the placebo. This reduces biases in the trial.

Vaccinations

Vaccinations involve injecting small quantities of dead or inactive forms of a pathogen into the body. This stimulates lymphocytes to produce the correct antibodies for that pathogen. If the same pathogen re-enters the body, the correct antibodies can be produced quickly to prevent infection. If a large proportion of the population is vaccinated against a disease, it is less likely to spread. This is called **herd immunity**.

Chapter 6: Preventing and treating disease

Retrieval questions

Learn the answers to the questions below then cover the answers column with a piece of paper and write as many as you can. Check and repeat.

	B6 questions	Answers
1	What non-specific systems does the body use to prevent pathogens getting into it?	• skin • cilia and mucus in the nose, trachea, and bronchi • stomach acid
2	What three functions do white blood cells have?	phagocytosis, producing antibodies, producing antitoxins
3	What happens during phagocytosis?	phagocyte is attracted to the area of infection, engulfs a pathogen, and releases enzymes to digest the pathogen
4	What are antigens?	proteins on the surface of a pathogen
5	Why are antibodies a specific defence?	antibodies have to be the right shape for a pathogen's unique antigens, so they target a specific pathogen
6	What is the function of an antitoxin?	neutralise toxins produced by pathogens by binding to them
7	What does a vaccine contain?	small quantities of a dead or inactive form of a pathogen
8	How does vaccination protect against a specific pathogen?	vaccination stimulates the body to produce antibodies against a specific pathogen – if the same pathogen reenters the body, white blood cells rapidly produce the correct antibodies
9	What is herd immunity?	when most of a population is vaccinated against a disease, meaning it is less likely to spread
10	What is an antibiotic?	a drug that kills bacteria but not viruses
11	What do painkillers do?	treat some symptoms of diseases and relieve pain
12	What properties of new drugs are clinical trials designed to test?	toxicity, efficacy, and optimum dose
13	What happens in the pre-clinical stage of a drug trial?	drug is tested on cells, tissues, and live animals
14	What is a placebo?	medicine with no effect that is given to patients instead of the real drug in a trial
15	What is a double-blind trial?	a trial where neither patients nor doctors know who receives the real drug and who receives the placebo
16	What is a monoclonal antibody?	A monoclonal antibody is an antibody produced by a single clone of cells.
17	Give two examples in which monoclonal antibodies can be used for.	Treating cancer, in pregnancy tests

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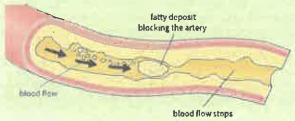
Chapter 7: Non-communicable diseases

Knowledge organiser

Coronary heart disease

Coronary heart disease (CHD) occurs when the coronary arteries become narrowed by the build-up of layers of fatty material within them.

This reduces the flow of blood, resulting in less oxygen for the heart muscle, which can lead to heart attacks.



Health issues

Health is the state of physical and mental well-being.

The following factors can affect health:

- communicable and non-communicable diseases
- diet
- stress
- exercise
- life situations.

Different types of disease may interact, for example:

- defects in the immune system make an individual more likely to suffer from infectious diseases
- viral infection can trigger cancers
- immune reactions initially caused by a pathogen can trigger allergies, for example skin rashes and asthma
- severe physical ill health can lead to depression and other mental illnesses.

Treating cardiovascular diseases

Treatment	Description	Advantages	Disadvantages
stent	inserted into blocked coronary arteries to keep them open	• widens the artery – allows more blood to flow, so more oxygen is supplied to the heart • less serious surgery	• can involve major surgery – risk of infection, blood loss, blood clots, and damage to blood vessels • risks from anaesthetic used during surgery
statins	drugs that reduce blood **cholesterol** levels, slowing down the deposit of fatty material in the arteries	• effective • no need for surgery • can prevent CHD from developing	• possible side effects such as muscle pain, headaches, and sickness • cannot cure CHD, so patient will have to take tablets for many years
replace faulty heart valves	heart valves that leak or do not open fully, preventing control of blood flow through the heart, can be replaced with biological or mechanical valves	• allows control of blood flow through the heart • long-term cure for faulty heart valves	• can involve major surgery – risk of infection, blood loss, blood clots, and damage to blood vessels • risks from anaesthetic used during surgery
transplants	if the heart fails a donor heart, or heart and lungs, can be transplanted **artificial hearts** can be used to keep patients alive whilst waiting for a heart transplant, or to allow the heart to rest during recovery	• long-term cure for the most serious heart conditions • treats problems that cannot be treated in other ways	• transplant may be rejected if there is not a match between donor and patient • lengthy process • major surgery – risk of infection, blood loss, blood clots, and damage to blood vessels • risks from anaesthetic used during surgery

Risk factors and non-communicable diseases

A **risk factor** is any aspect of your lifestyle or substance in your body that can increase the risk of a disease developing.

Some risk factors cause specific diseases. Other diseases are caused by factors interacting.

Risk factor	Disease	Effects of risk factor
diet (obesity) and amount of exercise	Type 2 diabetes	body does not respond properly to the production of insulin, so blood glucose levels cannot be controlled
	cardiovascular diseases	increased blood cholesterol can lead to CHD
alcohol	impaired liver function	long-term alcohol use causes liver cirrhosis (scarring), meaning the liver cannot remove toxins from the body or produce sufficient bile
	impaired brain function	damages the brain and can cause anxiety and depression
	affected development of unborn babies	alcohol can pass through the placenta, risking miscarriages, premature births, and birth defects
smoking	lung disease and cancers	cigarettes contain carcinogens, which can cause cancers
	affected development of unborn babies	chemicals can pass through the placenta, risking premature births and birth defects
carcinogens, such as ionising radiation, and genetic risk factors	cancers	for example, tar in cigarettes and ultraviolet rays from the Sun can cause cancers
		some genetic factors make an individual more likely to develop certain cancers

Cancer

Cancer is the result of changes in cells that lead to uncontrolled growth and division by mitosis.

Rapid division of abnormal cells can form a **tumour**.

Malignant tumours are cancerous tumours that invade neighbouring tissues and spread to other parts of the body in the blood, forming secondary tumours.

Benign tumours are non-cancerous tumours that do not spread in the body.

Treatment

Treatment of non-communicable diseases linked to lifestyle risk factors – such as poor diet, drinking alcohol, and smoking – can be very costly, both to individuals and to the Government.

A high incidence of these lifestyle risk factors can cause high rates of non-communicable diseases in a population.

Key terms

Make sure you can write a definition for these key terms.

artificial heart benign carcinogen cholesterol coronary heart disease
health malignant risk factor statin stent transplant tumour

Chapter 7: Non-communicable diseases

Retrieval questions

Learn the answers to the questions below then cover the answers column with a piece of paper and write as many as you can. Check and repeat.

	B7 questions	Answers
1	What is coronary heart disease?	layers of fatty material that build up inside the coronary arteries, narrowing them – resulting in a lack of oxygen for the heart
2	What is a stent?	a device inserted into a blocked artery to keep it open, allowing more blood and oxygen to the heart
3	What are statins?	drugs that reduce blood cholesterol levels, slowing the rate of fatty material deposit
4	What is a faulty heart valve?	heart valve that doesn't open properly or leaks
5	How can a faulty heart valve be treated?	replace with a biological or mechanical valve
6	When do heart transplants take place?	in cases of heart failure
7	What are artificial hearts used for?	keep patients alive whilst waiting for a transplant, or allow the heart to rest for recovery
8	Define health.	state of physical and mental well-being
9	What factors can affect health?	disease, diet, stress, exercise, life situations
10	What is a risk factor?	aspect of lifestyle or substance in the body that can increase the risk of a disease developing
11	Give five risk factors.	poor diet, smoking, lack of exercise, alcohol, carcinogens
12	What is cancer?	a result of changes in cells that lead to uncontrolled growth and cell division by mitosis
13	What are malignant tumours?	cancerous tumours that can spread to neighbouring tissues and other parts of the body in the blood, forming secondary tumours
14	What are benign tumours?	non-cancerous tumours that do not spread in the body
15	What two types of risk factor affect the development of cancers?	lifestyle and genetic risk factors
16	What is a carcinogen?	a substance that can cause cancers to develop