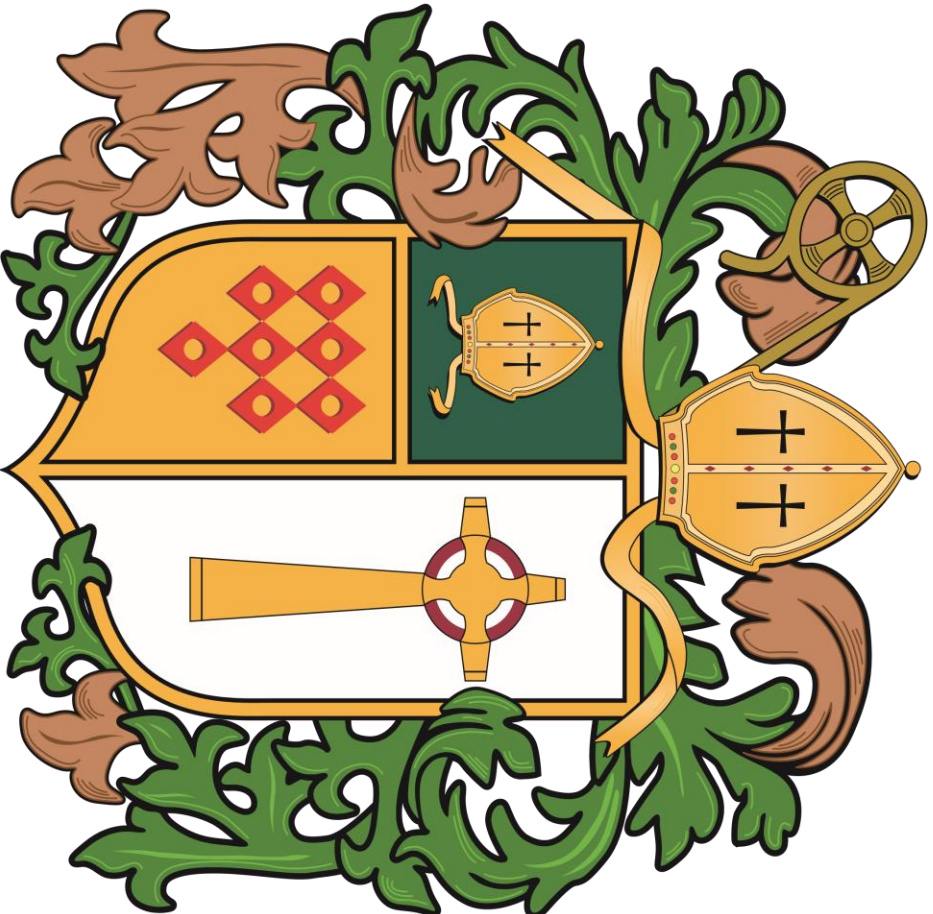


Cycle 1: Year 9



St Wilfrid's R.C. College

Name: _____

Form: _____

Tutor: _____

Page	Contents
3	Cycle 1 Homework overview
4-5	St Wilfrid's standard
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8-9	Art
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11	English
12-15	Geography
16-19	History
20-21	ICT
22-26	Maths
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29	Music
30-34	PE
35-40	RE
41-51	Science

How to use your 100% booklet:

1. Look at page 3 for what content you need to be learning and then use this contents page to take you to the right place
2. Make sure you're ready to be assessed during morning meeting time on the day stated
3. Eg: week 2, Thursday morning meeting will test MFL content. This means you need to make sure you've learnt that content **BEFORE** Thursday
4. At the back of your booklet, you will find a range of strategies (with blank sheets of these strategies) to help you learn your core knowledge
5. You will be given 5 questions to assess your knowledge during morning meeting time which will then be self assessed and corrected in green pen

Year 9 HW Cycle 1	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Monday	Maths P22 Q1-15	Maths P23 Q1-15	Maths P24 Q1-15	Maths P25 Q1-15	Maths P26 Q1-15	Maths P23 Q16-30
Tuesday	English P11 Q1-5	English P11 6-10	English P11 Q1-5	English P11 6-10	English P11 Q1-5	English P11 6-10
Wednesday	Science P41	Science P46	Science P50 1ST SET OF QS	Science P42	Science P47 Q1-5	Science P47 Q6-10
Thursday	RE: P.35-37, questions 1-5	MFL	RE: P.35-37, questions 6-10	MFL	RE: P.35-37, questions 11-15	Art: P8-9, Q1-5
Friday	Geography P13 9.1.1 Q1-3 9.1.2 Q1-2	History P.16-17 Q1- 6	Geography P13 9.1.3 Q1-4 9.1.4 Q1	History P.16-17 Q7- 12	Geography P13 9.1.5 Q1-3	DT: P.10
Year 9 HW Cycle 1	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Monday	Maths P24 Q16-30	Maths P25 Q16-30	Maths P26 Q16-30	Maths P22 & 23 Q1-10	Maths P24 & 25 Q1-10	Maths P26 Q1-20
Tuesday	English P11 Q1-5	English P11 6-10	English P11 Q1-5	English P11 6-10	English P11 Q1-5	English P11 6-10
Wednesday	Science P43 Q1-5	Science P48	Science P50 2ND SET OF QS	Science P43 Q6-10	Science P44 Q1-4	Science P44 Q5-7
Thursday	RE: P.38-40, questions 1-5	MFL	RE: P.38-40, questions 6-10	MFL	RE: P.38-40, questions 11-15	Music: Pg 29
Friday	History P.16-17 Q1- 7	Geography P15 9.2.1 Q1-5	History P.16-17 Q8- 14	Geography P15 9.2.3 Q1-5	History P.14-17	ICT p18 Q1-5

ST WILFRID'S STANDARD



We are **prepared** and **equipped** to learn.

In our school bag, we have...

Pupil planner



Reusable water bottle



Reading book



In our pencil case, we have...

Black pen



Pencil



Ruler



Green and purple pen



Rubber



Scientific calculator

This is how we present our books:

We write the date and title and underline using a ruler.

Monday 1st January
Romeo and Juliet: Act 2 Scene 2

We always write in black pen.

Retrieve

1. Romeo doesn't really enter at the beginning of this scene, he's been there all along, on the other side of Capulet's garden wall. ✓
2. Bathos- an anti-climax which is abrupt; usually humour that comes from an odd and sudden change. ✓
3. In the patriarchal system of Elizabethan England, women's status and security depended on the status of their fathers or husbands. ✓
4.
 - Violence and conflict ✓
 - Role of women ✓
 - Loyalty and honour ✓
 - Transformative power of love
 - Tragic fate

We always respond to feedback in green pen.

We always start sentences with capital letters.

We use subheadings to structure our work, if appropriate.

Example- We Do

Explore the ways in which Shakespeare presents the power of love between Romeo and Juliet in act 2 scene 2.

Shakespeare presents love as more powerful than hatred and prejudice in the play. Both Romeo and Juliet defy danger and oppose stronger forces to pursue love. Shakespeare's tragedy illustrates the lengths the doomed lovers are willing to go to in order to oppose the prejudice and hatred between their families. Their marriage, and subsequent tragic deaths, symbolise the sacrifice they make in the name of love and peace. AO1

We use a pencil and ruler for diagrams.



We correct any spelling, grammar or punctuation mistakes.

[SP]

Significant
Significant

In this extract, the power of the love Romeo feels for Juliet means he willingly puts himself in danger; he disregards the significant [SP] risk of trespassing on Capulet property. It is important to note that Romeo is hiding in the dark garden, and overhears Juliet.

We always write in our best handwriting.

Date is underlined

Questions answered in full sentences

We start sentences with capital letters

10/9/26	RE: 100% booklet
☐ Q1)	The word stewardship means to have a duty to care for the environment.
Q2)	Laudato Si is an encyclical written by Pope Francis.
Q3)	Tikkum Olam is a Jewish concept of repairing the world.
Q4)	Just war theory was written by Thomas Aquinas
Q5)	Thomas Aquinas said that your conscience must be your last part of a decision making process.
☐ Q6)	The word retribution means that a punishment is fit for the crime.
Q3)	Laudato Si is an encyclical teaching Catholics about stewardship.
	Spellings
	Maths
☐	

We write the subject, the title & **UNDERLINE**

No gaps left between questions

We use **BLACK** pen

Corrections made underneath

At St Wilfrid's RC College, our vision is clear:

We strive for every pupil to realise their God-given potential, become the very best version of themselves, and leave us equipped with the knowledge, character and skills needed to thrive in society.

Respectful

Perfect
uniform

No
answering
back

Responsible

Be fully
equipped

Attendance
and
punctuality

Resilient

On task

Homework



Perfect uniform

Full uniform worn correctly every day
Shirt tucked in, tie and blazer worn
Grey tailored trousers or pleated grey skirt worn
Correct school shoes
No extreme hairstyle
Skirts unrolled
No makeup
No mobile phones

Attendance and punctuality

Attendance and punctuality to school each and every day
Every pupil will be on the school yard, equipped, at 08:35
Pupils will arrive on time to every lesson

No answering back

Listen without interrupting
Communicate in a respectful tone to all members of the school community
Follow instructions
Use appropriate language

On task

Focus for 100% of the lesson
Sit upright and track the teacher
Ask and answer questions
Be 'on task' when completing an independent task

Be fully equipped

Clear pencil case
Black pen
Green pen
Pencil
Ruler
Rubber
Scientific calculator

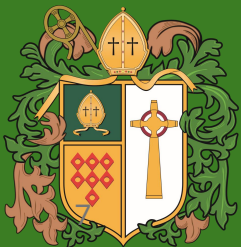
Homework

Homework will be completed on time
Write your homework in your planner
Use your knowledge organiser in lessons and at home

Respectful

Responsible

Resilient





St. Wilfrid's RC College - Knowledge Organiser

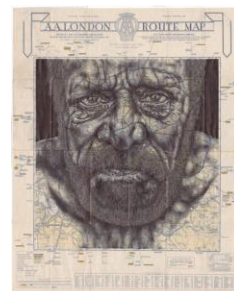
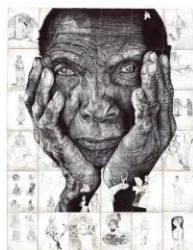
Year 9 - Art & Design - Identity

In this module you will learn how to analyse the work of an artist to help improve your drawing skills by:

- Learning how to describe an artists work using specific art vocabulary.
- Learning how to look at an artists style of work and evaluate it.
- Learning how to use the artists style to influence you to develop your own work.

Artist: Mark Powell

Mark Powell is a British portrait artist from Yorkshire. Powell also draws animals and objects, but he is well known for his contemporary drawings of people made using biro pen. Powell's biro drawings of people are often done onto antique documents such as maps and envelopes, giving a sense of history and timelessness to his artwork



Key Words:

Identity
Layering
Realism
Detailed
Tone
Hatching
Meaningful
Maps
Collage
Nostalgic
Ephemera
Convey
Portraiture
Aged

Top tips for success

Things to remember to create a successful drawing:

- Don't press too heavy when drawing. (No hard outlines).
- Make sure the shape and proportion is correct before adding the shading. (Check your accuracy).
- Make sure your pencil is sharpened before you start and re-sharpen continually
- Create a wider range of tones. Especially dark tones to create a higher contrast between light and dark (Carefully pick out the darkest areas).
- Use the shading techniques to create the definition without using outlines.
- (Make it look more 3D but putting the techniques closer together or further apart).
- Make sure you are using the most appropriate shading technique to create the tones and textures.

Tonal techniques!

Stippling



Scumbling



Shading



Smudging



Crosshatching



Glossary:

Nostalgic- longing for or thinking fondly of a past time

Realism-something that represents reality

Ephemera- documents of everyday life.

Ephemera are often paper-based, printed items, including ticket stubs, newspapers, postcards, posters, sheet music, stickers, and greeting cards.



Write down as much as you can to describe the artwork...

Use these key words to help you

• Colour

How has the artist used colour in this artwork?
Example, bold colour, bright colours, pale...

• Media

The material used to create the artwork..
Example Paint, pencil, biro pen, chalk...

• Technique

How has the artwork been created?
Example - shading techniques, blending, realistic...

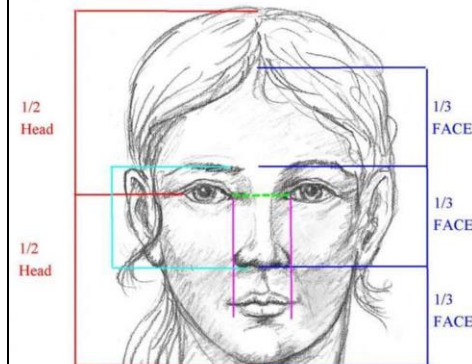
• Meaning

Is there a story in this piece?
It can be a story you think when looking at the artwork. What does the man look like? Where might he be from?

• Subject matter

This is the subject the work is on
Example- animals/portraits/ cars

BASIC FULL FACE PROPORTIONS



The eyes are halfway between the top of the head and the bottom of the chin. The FACE is divided into 3 parts: from hairline to eyebrow, from eyebrow to bottom of nose, from nose to chin. The distance between the eyes (In green) is approximately the width of one eye. This is the same width of the nose (and to some extent, the mouth at red). The ear length is from the eyebrow to the bottom of the nose. (In light blue)



St. Wilfrid's RC College - Knowledge Organiser

Year 9 - Art & Design - Identity

1. What unusual surfaces does Mark Powell often draw on?
2. Why does Mark Powell choose to draw on old maps and envelopes?
3. What was Mark Powell inspired?
4. Why does Mark Powell choose to draw in biro pen?
5. How do we describe the style of Mark Powell's work?
6. What age range does Mark Powell tend to draw?
7. How does what Mark Powell draws on top of help communicate ideas about identity and memory?
8. What does realism mean in art?
9. Name three tonal techniques shown in the knowledge organiser.
10. Practice a tonal technique from dark to light

Key word spellings.

1. **Hyper-realism**
2. **Historical**
3. **Portraiture**
4. **Meaningful**
5. **Detailed**

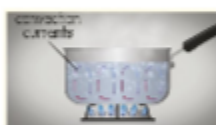
Knowledge Organiser: Year 9 Food Technology

Food Science



Key Knowledge

Heat Transfer Methods: Food is cooked by transferring heat in various ways. **Conduction** is the transfer of heat through a solid object. A metal pan heats up at the bottom and food is cooked in the hot pan. **Convection** is the transfer of heat through a liquid or gas. Air in an oven heats up and cooks food. **Radiation** is the transfer of heat through infrared rays. A grill heats food by heat waves spreading from a heated bar.



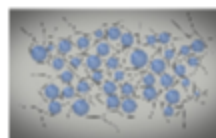
Raising Agents: Raising agents make food expand and rise. This adds volume and makes food more palatable. They can be **chemical** like baking powder, forming bubbles which make cakes rise. They can be **mechanical** like a whisk, adding air to cream. They can be **biological** like yeast, reacting in warmth to make bread rise.



Proteins: unfolds and changes shape – denaturation. Joins together to form big groups – **coagulation**. Molecules become stretchy in flour + water – **gluten**.

Carbohydrates: starch swells under heat – **gelatinisation**. Starch + dry heat changes colour and texture – **dextrinisation**. Sucrose (sugar) breaks up in heat – **caramelisation**.

Fats: fats spread easily – **plasticity**. Fats coating flour to create a crumbly texture – **shortening**. Trapping air to create a light texture – **aeration**. Oils and water held together in mayonnaise and ice cream – **emulsification**.



Key Skills

Being able to respond to **chemical, mechanical and biological reactions** in your ingredients. Why does a cake rise? What has happened when it doesn't rise? Being able to **stir, fold, knead, aerate and whisk** ingredients in order to add air and volume to them. Responding to heat on food to cook thoroughly, in different ways. Being able to respond to the way food ingredients change colour and texture.

Being able to predict, control and respond to a series of food experiments which taste raising agents and their reactions. Understanding the chemical reaction between some raising agents and cold or warm water. Understanding this effect when used in food likes cakes, biscuits, breads and pastries.

Eat Well Guide

Macronutrients: Protein, Carbohydrates, Fat
Micronutrients: Vitamins A-E, K, Minerals – Zinc, Iron, Potassium, Sulphur, Calcium, Sodium

Food Preparation Skills

Knife cutting techniques – claw grip, bridge grip
Using a pan on a hob – using low to medium heat to simmer ingredients, stir, remove from heat
Using an oven – use oven gloves, be aware of timings, upper part of the oven gets hotter, food may need turning round to cook evenly.

Often many of our foods have come from lots of different countries.

9 Tips to Reduce Your Food Miles

Shop Local

Eat Seasonally

Think About the Transport Method

Use Farmer's Markets and Local Small Stores

Buying in bulk

Cook From Scratch

Eat Less Meat

Don't Drive to the Shops

Grow Your Own food

Key words

High risk
Transfer
Boiled
Roasted
Convention
Conduction
Radiation
Denaturation
Coagulation
Synerisis
Shortening
Aeration
Gluten
Plasticity
Gelatinisation
Dextrinisation

Curriculum Links

Literacy:

specification
writing, design
communication,
key words.

Numeracy: Portion
control, weighing,
measuring,
budgeting,

Careers/Cultural

Capital: Looking at
local and cultural
foods, hospitality
and catering skills.

BBC bitesize links

How noodles are
made <https://www.bbc.co.uk/bitesize/clips/zjbxpv4>

How prawn
crackers are made.

<https://www.bbc.co.uk/bitesize/clips/zmchfg8>

Structuring your answers in Design Technology

P.E.E Chains

In Technology we use PEE chains to expand our answers so we are communicating our thoughts and ideas clearly. This makes sure that we say what we think and then back up, or justify, our thoughts with explanations and evidence from research which support them.

POINT	Say WHAT you think.	<i>I think the product should be...</i>
EXPLAIN	Say WHY you think it.	<i>This is because...</i>
EVIDENCE	Say what RESEARCH you've done to back this up.	<i>I know this from my research into...</i>

ACCESS FM

ACCESS FM is an analysis and annotation tool which makes sure we consider all the important design criteria and the impact they have on products we are investigating, designing or evaluating.

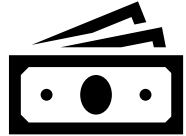
A	Appearance	Where did the designer get their inspiration? Could the product look better? Do you think it looks attractive or ugly, Why? What does the product look like? THINK shape, form, materials, size, beauty, ugliness.
C	Cost	Is it affordable to your customer? Will it make a profit? Is it value for money? How much does it cost to make?
C	Customer	What impact would it have on a customers life? Why would a customer buy it? What makes it suitable for them? Who would buy it? Who would use it?
E	Environment	What is the products impact on the environment? THINK batteries, rethink, refuse, reduce, reuse, recycle, lifecycle. How would the product be disposed of? Is the product needed or wanted? How long will it last?
S	Safety	Is the product high quality? Does it meet safety standards? How has the designer considered safety? Could the product hurt anyone? Are there any sharp edges?
S	Size	Is it an appropriate size? Would it work better if it was bigger or smaller? Does it come in different sizes? How big is it?
F	Function	Does the product work? Could the product work better? How does the product work? Why is the product needed? What does the product do? Is it easy to use?
M	Materials/Manufacture	What impact could the designer's choice of material have on the environment? Would a different material make it better? What material has it been made from? What process would be used to make it?



The Novel			Literary terminology		Vocabulary	
Malorie Blackman’s <i>Noughts and Crosses</i> is the first in a series of novels about an alternative present, where people of African descent, rather than European, are the dominant race in Britain and around the world. White people (known as “noughts”) were long the slaves of black people (known as “Crosses”). They are now free, but still heavily segregated and discriminated against. Enter the novel’s two heroes: Sephy, a Cross, and Callum, a nought. They are best friends, but the world seems determined to keep them apart. By reversing the racism seen in the real world, Blackman is able to hold up a mirror to the unfairness and absurdity of judging people by the colour of their skin			Dual narrative - tells a story from perspective of 2 narrators		Prejudice	
			Juxtaposition - Two things being seen or placed close together with contrasting effect.		Racism	
					Discrimination	
			Characterisation - is the way the writer reveals the personality of a character through the use of methods.		Advocate	
Contextual Links			Monologue – an extended speech by one person		Tolerance	
• Stephen Lawrence - • The Little Rock Nine – • The Civil Rights Movement – • Martin Luther King – • Rosa Parks -			Dystopia - an imagined community or society that is dehumanizing and frightening		Eurocentric	
			Foreshadowing – where the writer gives a hint of what is to come		Terrorist	
					Revolutionary	
			Extended metaphor – a metaphor that continues throughout		Liberation	
Key Revision Questions			Tragedy – a story in which a hero is brought down by his/her own flaws, usually by ordinary human flaws		Militia	
			Alliteration – repetition of a consonant sound		Segregation	
			Activism			
Section Summaries			Themes	Example	Characters	
1. Why has Malorie Blackman written Noughts & Crosses? What is she an advocate for? 2. What is the American Civil Rights movement and why is it important? 3. How does Blackman present the McGregor family? 4. How does Blackman present Sephy? 5. Why do you think Malorie Blackman drew inspiration from her life? 6. How many ‘nought’ scientists/mathematicians/historical figures are mentioned in the text? (ch30) These characters are based on real people. What can you find out about them and what they achieved? 7. How does martin Luther King link to the text? Why do you think this is important? 8. Do you think the text is a tragedy? Why do you think it is important that is a dystopian fiction?	Prologue		Racism		Sephy Hadley: a Cross	
	Three Years Later...		Terrorism		Callum McGregor: a Nought	
	The Picnic		Justice		Meggie McGregor: Callum’s mam	
	Breakdown		Heroes		Jasmine Hadley: Sephy's mam	
	The Split		Forbidden love		Ryan McGregor: Callum’s dad	
	The Trial		Friendship		Kamal Hadley: Sephy’s dad	
	The Way It Is...		Prejudice and discrimination		Jude McGregor: Callum’s brother	
	The Hostage		Violence		Minerva Hadley: Sephy’s sister	
	The Confession		Betrayal		Lynette McGregor: Callum’s sister	
	Decisions		Courage			
	Losing My Religion					

9.1

The Almighty Dollar



Geography Knowledge Organiser

9.1.1 Globalisation

What is globalisation?

Globalisation is the process where countries become more interconnected through the movement of goods, people, money, information, and culture. It involves:

Causes

Economic: Expansion of MNCs, reduced trade barriers, global markets, outsourcing.

Technological: Internet, smartphones, container shipping, cheap flights, advanced logistics.

Political: Trade blocs, global organisations.

Social/Cultural: Migration, tourism, global media, spread of ideas and lifestyles.

Impacts

Economic: Job creation, cheaper products, economic growth, access to global markets. Job losses in developed countries, worker exploitation, dominance of MNCs.

Social: Cultural diversity, spread of knowledge and technology.

Cultural erosion, rising inequality, overcrowded cities.

Environmental: Spread of green tech, global climate cooperation.

9.1.2 Multi-National Corporations

What are MNCs?

Multinational Corporations (MNCs) are large companies that operate in several countries. They usually have headquarters in a richer, developed country and run production, extraction, or services in other parts of the world.

Positives of MNCs

- Job creation
- Investment in infrastructure
- Technology and skills transfer
- Government revenue
- Community development

Negatives of MNCs

- Environmental damage
- Health impacts
- Limited local benefit
- Conflict and tension
- Economic dependence
- Profit leakage

9.1.3 Winners and losers of globalisation

	Winner or Loser?	Why?
China's Economic Growth	Winner	China has become a major global manufacturing hub, attracting investment, creating millions of jobs, and lifting huge numbers of people out of poverty. Global trade has boosted its economy and increased its global influence.
Rana Plaza Tragedy (Bangladesh)	Loser	Workers suffered unsafe conditions, extremely low pay, and the collapse killed over 1,100 people. It exposed how globalisation can lead to exploitation in supply chains where safety standards are weak.
UK Shoppers	Winner	Globalisation gives access to cheaper clothes, electronics, and food from around the world. Competition between global brands keeps prices low and increases choice.
African Farmers	Loser	Many African farmers struggle because global markets are dominated by large companies and subsidised Western farmers. They receive low prices for crops and face unfair trade rules, making it hard to compete.
Amazon Workers	Loser	Workers often face long hours, high pressure, strict monitoring, and low pay compared to the profits Amazon makes. Global competition pushes Amazon to cut costs, often at the expense of working conditions.

9.1.4 Tourism

What is Tourism?

Tourism is the movement of people away from their home area for leisure, business, or cultural experiences. It has become one of the world's largest industries, involving transport, hotels, attractions, and global travel networks.

Causes

- Cheaper and faster transport
- Internet and online booking
- Rising incomes worldwide
- Global media and social networks
- More open borders and relaxed visa rules
- Growth of global tourism companies
- Cultural globalisation

Impacts of Tourism

Positive Impacts: Economic growth, Infrastructure development, Cultural exchange, Environmental protection

Negative Impacts: Environmental damage, Over-tourism, Cultural erosion, Economic leakage, Seasonal jobs

9.1.5 The future of globalisation

What does the future look like?

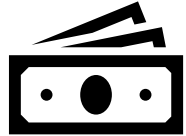
The future of globalisation refers to how global connections, trade, technology, and movement of people are likely to change over the coming decades. Instead of simply increasing, globalisation is becoming more digital, more automated, greener, and more locally focused due to new technologies and global challenges.

Key Drivers Shaping the Future of Globalisation

- More automation - factories and supply chains increasingly use robots, reducing the need for cheap labour abroad.
- Greener supply chains - companies aim to cut carbon emissions by using renewable energy and cleaner transport.
- Reshoring - some production moves back to home countries to shorten supply chains and avoid global disruptions.
- Rise of AI - AI transforms jobs, logistics, communication, and global services, making digital globalisation more important than physical trade.
- Climate-driven changes - extreme weather, rising sea levels, and new climate policies reshape where goods are produced and how people travel.

9.1

The Almighty Dollar



Test yourself

9.1.1 Globalisation

1. Define globalisation in your own words.
2. Give two technological causes of globalisation
3. Describe one economic impact and one social impact of globalisation.

9.1.2 Multi-National Corporations

1. Define what a Multinational Corporation is.
2. Give two positive impacts that MNCs can have on a host country.
3. Describe two negative impacts of MNCs on local communities or the environment.

9.1.3 Winners and losers of globalisation

1. Give one way China's economic growth can be seen as a positive outcome of globalisation.
2. Give two ways the Rana Plaza tragedy shows that globalisation can create losers in global supply chains.
3. Give two ways UK shoppers are considered "winners" of globalisation
4. Give two reasons why African farmers may be negatively affected by globalisation.

9.1.4 Tourism

1. Define tourism.
2. Give two causes of increased tourism.
3. Give one positive and one negative impact of tourism on a destination.

9.1.5 The future of globalisation

1. Describe what is meant by "the future of globalisation" and explain how it is changing.
2. Give one-way increased automation could affect global supply chains in the coming decades.
3. Give two reasons why some countries and companies are choosing to reshore production.

9.1b

Weather Hazards



Geography Knowledge Organiser

9.1.1 Weather hazards

Weather: Day to day conditions.

Climate: Long-term average weather pattern conditions.

Hazard: Physical event that has the potential to threaten human life and environment.

Disaster: Serious disruption to community function, causing widespread economic and/or environmental issues.

Vulnerability: How susceptible a community or place is to a natural hazard.

Resilience: The capacity of a place to withstand, adapt and recover from natural hazards.

Tropical Storm: A low-pressure system [air rising]

Heatwave: An extended period of hot weather

Drought: An extended period of hot, dry weather that leads to water shortages.

Wildfire: Uncontrolled fire that burns vegetation.

Factors that influence risk



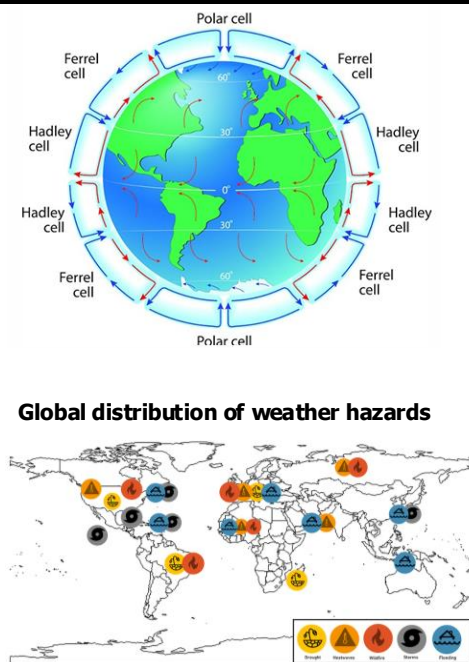
9.1.2 Global distribution

Global atmospheric circulation 3 cells operate circulating air through the troposphere – whole system is driven by the equator.

Hadley cell: Air rises at the equator (creates low pressure and rainfall) – when it reaches the atmosphere it can't go any further so travels north or south, then cools and falls creating low pressure and dry conditions at 30°.

Ferrel cell: Air descends at the tropics as it is pulled down by the adjacent air in the Hadley cell. Here the air is driven by the Hadley and Polar cells.

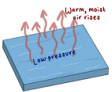
Polar cell: At around 60° this warm air rises, leading to clouds and rain. The air will then flow back to the poles.



9.1.3: Tropical Storms and Heatwaves, Droughts and Wildfires

Tropical Storm Formation

① Warm, moist air rises, leaving an area of low pressure below. This causes warm air from the surroundings to move into this low pressure area and rise too. Overall, warm air is constantly rising and accumulating in the atmosphere.



Causes of drought

Less Amount of Precipitation

Lack of water vapour in the atmosphere leads to low precipitation, which later on drives drought. High-pressure systems reduce moisture in the atmosphere.

Human Activities

Human activities, such as deforestation and building dams (reduction of water flow causes drought), also trigger droughts.

Climate Change

Climate change affects various factors related to drought, such as warmer temperatures, which increases atmospheric water vapour and evaporation.

A HEAT WAVE DURING DROUGHT?

Heat waves could happen during drought. Since drought brings about drier vegetation, it could contribute to bushfires and wildfires. During an intense heat wave in Europe in 2003, it caused wildfires in Portugal which damaged more than 3,000 square kilometres (sq. km.) of forest and 440 sq. km. of agricultural lands.

Causes of wildfires

Conditions:

-Dry weather and droughts

-Availability of fuel such as dead plant materials

-Fine, dry grasses and twigs which catch fire and burn easily



9.1.4: UK weather hazards

Prolonged Rainfall: In the winter, the UK experiences long periods of rainfall

Thunderstorms: In the spring and summer UK experiences intense thunderstorms due to increase in heat.

Extreme cold and heavy snow: In the winter, extremely cold periods of weather can bring heavy snow and sub-zero temperatures.

Strong winds: Often due to the remnants of storms from across the Atlantic Ocean.

Droughts and extreme heat: In the summer, long periods of extreme heat.

Is the weather becoming more extreme in the UK?

Extreme weather is becoming more frequent and intense.

Reasons:

There is more energy in the atmosphere [heat] which fuels storms.

It is getting hotter [climate change]

Atmospheric circulation affects moisture patterns and pressure due to climate change which is altering precipitation patterns.

Jet stream which controls UK weather can be blocked/stuck which causes weather patterns to be stuck until it moves again e.g. high temperatures for many weeks.



Snow falling in Sheffield, 2010.



9.1.5 Managing extreme weather

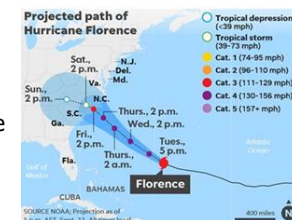
Predicting: Using computer modelling to predict the route of a storm.

Protection: Building infrastructure can protect people and property e.g:
Sea walls
Storm drains
Houses built on higher ground

Planning: Hazard mapping-identifying areas that are most at risk and take action e.g. ensuring important buildings such as hospitals and power plants are built away from high-risk areas.

Evacuation Routes and Safety Protocols: Creating evacuation routes and developing warning systems ensures population is prepared for a storm e.g. hurricane sirens

Raising awareness: Getting important supplies, organising documents, being aware of local shelters.



9.1b

Weather Hazards



Test Yourself

9.1.1 Weather hazards

1. Give the definition of weather.
2. Give the definition of hazard.
3. Give the definition of vulnerability.
4. Give the definition of resilience.
5. What influences a hazard turning into a disaster?

9.1.2 Global distribution

1. Hadley cell-what direction is the air travelling?
 2. Ferrel cell-what direction is the air travelling?
 3. What weather conditions does the Hadley Cell bring?
 4. What weather conditions does the Ferrel-cell bring?
 5. Give the global distribution of tropical storms.
- Success criteria:
Trend
Example
Anomaly

9.1.3: Tropical Storms and Heatwaves, Droughts and Wildfires

1. What direction is air travelling?
2. What is condensation?
3. How does the storm develop an "eye"?
4. Why is the "eye wall" an important part of a tropical storm?
5. Give one cause of drought.
6. Give one cause of wildfires.

9.1.4: UK weather hazards

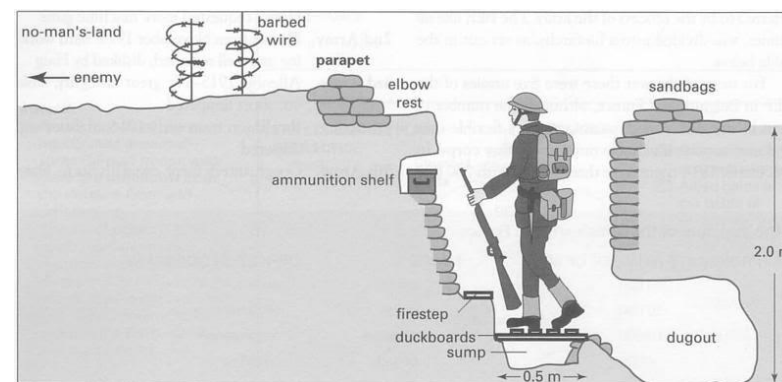
1. Give one weather hazard facing the UK.
2. Give one reason why the UK faces that hazard.
3. Give two reasons why the UK is facing more extreme weather.

9.1.5 Managing extreme weather

1. What are the 3P's to hazard management?
2. Give one way prediction can help manage extreme weather.
3. Give the definition of protection and one way it can be achieved.
4. Describe hazard mapping and how it can reduce the risk.

Triple Alliance	Triple Entente
- Germany - Austria-Hungary - Italy (until 1915)	- Britain - France - Russia (until 1917) - USA (1917+)
First World War Timeline	
Date	Event
28.6.1914	Assassination of Franz Ferdinand
4.8.1914	Britain declares war on Germany
15.8.1914	Kitchener's Army recruitment
19.10.1914	First Battle of Ypres
22.4.1915	Second Battle of Ypres
27.1.1916	Military Service Act
1.7.1916 – 18. 11. 1916	Battle of the Somme and first use of the tank
8.3.17	Russian Revolution – Tsar abdicates
9.4.1917	Battle of Arras
24-25.10.1917	Communist Russian Revolution
20.11.1917	Battle of Cambrai
1.1.1918	Rationing introduced
9.11.1918	Kaiser Wilhelm II abdicates
11.11.1918	Armistice signed

Weapons	Injuries
Lee Enfield Rifle .15 rounds a minute. Accurate to 600m	Shell shock. Shaking, mental breakdown
Vickers machine gun. 10 bullets per second. Caused 40% wounds	Trench fever. Caused by lice: fever, rash, aches.
Tanks. 8mph. First used at the Battle of the Somme. 400 used at Battle of Cambrai,	Trench foot. Gangrene of feet, caused by damp
Artillery. Used to bombard the enemy for hours before an attack. Could fire 13 miles.	Shrapnel wounds. 58% wounds - 41,000 amputated limbs.



Key features of the trench system	
Sandbag	Protective. Absorbs bullets, absorbs water – maintains trench walls.
Fire step	Stand on to fire over the top of the trench. Trenches were 2.5 m in height
Parapet	Low protective wall
Duckboards	Wooden boards to stop men standing in water. To prevent trench foot.
Dugout	Area dug into the side of the trench where men could take protective cover.
No Man's Land	Area between the two enemy trenches

Enquiry Question: How did the pillars of C19th civilisation crumble into the flames of war? (Hobsbawm)

Home Front	
DORA 1914	Personal restrictions: censorship, daylight savings time
Censorship	Government powers to censor/hide information. Only letters by GHQ/ government could be published. Letters censored.
Propaganda	Boost morale. Communicate messages e.g. rationing. To recruit soldiers and female workers.
Rationing 1.1.1918	German unrestricted submarine warfare – Britain 6 weeks from starving out. Sugar rationed, then tea, jam and butter. Ration cards
Increased female employment	Munitionettes – munitions workers, nickname canary girls. Land Girls – 13,000 Transport workers. Engineers and mechanics. 1.2 million joined - start of war.
Contract workers (additional labour)	Empire -100,000 Egyptians, tens thousands Indians. Other workers: Chinese workers 100,000, refugees - Birtley Belgians
Total war	Zeppelin raids – 57 in 1915. Whitby, Hartlepool. Gotha bombers 1917. Defensive measures: barrage balloons

Y9 Cycle 1: The First World War – Origins and Trench warfare

Retrieval Questions

Question	Answer	Question	Answer
1. Which alliance included Britain, France & Russia?		9. Identify 2 problems with conditions in the trenches.	
2. Which event triggered the alliance systems into action essentially kickstarting WW1?			
3. When did Britain declare war on Germany?			
4. What does the alliance system suggest about how stable Europe really was before 1914?			
5. Give two features of a Lee Enfield rifle (what could it do?)		10. What percentage of wounds were caused by shrapnel?	
6. What percentage of wounds were caused by machine guns?			
7. What was artillery used for?		11. Approximately how many shrapnel injuries resulted in amputations?	
8. Identify 3 features of the trench system.		12. Name two new jobs that more women were employed in during the First World War	

End of the First World War

- Kaiser Wilhelm II abdicated.
- 11.11.1918 Armistice signed



Enquiry Question: What long shadows did the First World War cast?
(Reynolds, *The Long Shadow*)

Germany	
Big Three	
Clemenceau – France	Wanted to punish Germany harshly. Wanted security for Germany. Wanted reparations
Lloyd-George - Britain	Wanted to punish Germany in some way, but also for them to recover enough to trade with.
Wilson - USA	Idealist. Wanted a lasting peace
The Treaty of Versailles	
War Guilt Clause	Germany to accept all blame for the war
Reparations	Pay damages to victorious powers. £6.6 billion
Land Loss	West: Alsace and Lorraine East: Port of Danzig, Polish Corridor Lost 11 colonies
Military restrictions	Army: 100,000, no conscription. Navy: 15,000, no submarines, 6 battleships
League of Nations	Not allowed to join the League of Nations
German reactions to the Treaty of Versailles	
Diktat	Dictated terms of the treaty. All of Germany's objections were ignored.
Dolchstoß	'Stab in the back.' Germany army felt Weimar Government politicians had stabbed them in the back by ending the war
November	Negative name given to the Weimar

Britain	
Changing role of women 1918-28	
Representation of the People Act, 1918	Women over 30 given the vote.
Parliament Qualification Bill 1918	Meant women could become MP's.
1919 Nancy Astor	first female MP to take seat in Commons
Equal Franchise Act, 1928	Women over 21 given vote. This meant that there were more women voters than men!
Divorce 1924	Women could divorce men for adultery.
Sex Discrimination Act 1918	Made discrimination against women in some professions illegal.
General Strike	
▪ 4.5.1926 General Strike started ▪ TUC went on strike: 8 million TUC members on strike ▪ OMS – Government organised volunteers and military presence to limit the strike	

USA	
Dark side	
Laws limiting immigration	• Immigration Law, 1917 • Emergency Quota Act, 1921 • National Origins Act, 1924
Red Scare	• Fear of communism, that it would spread from Russia, • Italian communist anarchist bomb attacks • 16.9.20 Wall St bomb led to Palmer Raids. • Sacco and Vanzetti executed 1927
Ku Klux Klan	• WASPs • Attacked: black people, Jews, Catholics, immigrants • 1925 5 million members • Committed violence, crime and lynchings
Boom side	
New industries	• Mass production Model T Ford car • Electricity 1929
Transport	• Car, bus and airplane transport increased
Construction	• Skyscrapers
Shopping	• Chain stores - Sears • Catalogue shopping
Entertainment	• Sports: Babe Ruth • Films: Charlie Chaplin • Music: jazz – Louis Armstrong

Y9 Cycle 1: The First World War – Impact of WW1

Retrieval Questions

Question	Answer
1. Which Treaty ended the First World War for Germany?	
2. Which clause said Germany had to accept blame for the war?	
3. How much did Germany have to pay back in reparations?	
4. Name one piece of land Germany lost under the Treaty of Versailles.	
5. What does the term ‘diktat’ mean?	
6. What does the term ‘Dolchstoß’ mean?	
7. Why did the War Guilt Clause cause anger in Germany	
8. Which act gave some women the vote in 1918?	

Question	Answer
9. Which act gave women equal voting rights with men (in Britain)?	
10. What was the Red Scare?	
11. Which organisation targeted Black people, Jews, Catholics and immigrants?	
12. Name one immigration law introduced in the USA after the war.	
13. Which country was most negatively impacted by the First World War: Germany, Britain or the USA?	
14. Which new car was mass produced in the USA in the 1920s?	

Key Term	Definition
IDLE	The software we use to write Python program code.
Python	A programming language.
Sequence	Writing lines of code that work in a set order.
Selection	Running sections of code based upon a condition.
Iteration	Repeating sections of code more than once.
Variable	Stores information that can be changed.

KS3 ICT Knowledge Organiser
Introduction to Python programming
Year 9 – Cycle 1



Data Types

Key Term	Definition	Example
Integer	Whole Number	1, 2
Real/Float	Decimal Number	1.5, 3.4
String	Text within quotes	"Hello"
Char	Single character	'p', '!
Boolean	True or False, 1 or 0	True, False, 1, 0

Inputting Data

Use the INPUT command to get information from the user into your program.

To INPUT a STRING:

```
sName = input("Please enter your name")
```

To INPUT a WHOLE number:

```
iWholeNumber = int(input("Please enter a whole number"))
```

To INPUT a DECIMAL number:

```
rDecimalNumber = float(input("Please enter a decimal"))
```

Selection

Use the IF/ELSE command to make a selection in your program.

```
if iPinNumber == "2473":
    print("Welcome - phone unlocked")
else:
    print("Incorrect PIN Number")
```

Variables

Use a VARIABLE to store and change data in your program:

```
iScore = iScore + 1
```

Iteration

Use the FOR or WHILE command to repeat lines of code:

```
for counter in range(1,11)
    print counter

while counter < 11:
    print counter
    counter = counter + 1
```

Outputting Data

Use the PRINT command to display information to the user from your program.

To OUTPUT a STRING:

```
print("Hello World!")
```

To OUTPUT a WHOLE or a DECIMAL number:

```
print("A whole number: " + str(iNumber))
print("A decimal number: " + str(fNumber))
```

Creating Shapes with Turtle Graphics:

Use this Python code to create a square:

```
# draw square in Python Turtle
import turtle

t = turtle.Turtle()

length = int(input("Enter the length of the side of the Square: "))

for side in range(4):
    t.forward(length) # Forward turtle by s units
    t.left(90) # Turn turtle by 90 degree
```



Programming Syntax



Ask for a copy....

Q1. What is IDLE?

Q2. What is Python?

Q3. What is an algorithm?

Q4. What is a sequence in programming?

Q5. What is selection?

Q6. What is iteration?

Q7. What is a variable?

Q8. What data type is used for whole numbers?

Q9. What data type is used for decimal numbers?

Q10. Which command is used to get input from the user

Q11. What does a Boolean represent?

Q12. How do you convert input into a whole number?

YEAR 9 — REASONING WITH ALGEBRA...

Straight Line Graphs

What do I need to be able to do?

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

- Compare gradients
- Compare intercepts
- Understand and use $y = mx + c$
- Find the equation of a line from a graph
- Interpret gradient and intercepts of real-life graphs

Keywords

Gradient: the steepness of a line

Intercept: where two lines cross. The y-intercept where the line meets the y-axis.

Parallel: two lines that never meet with the same gradient.

Co-ordinate: a set of values that show an exact position on a graph

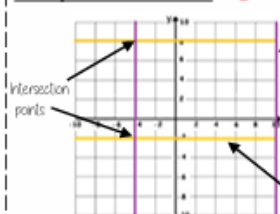
Linear: linear graphs (straight line) — linear common difference by addition/ subtraction

Asymptote: a straight line that a graph will never meet

Reciprocal: a pair of numbers that multiply together to give 1

Perpendicular: two lines that meet at a right angle

Lines parallel to the axes



All the points on this line have a x coordinate of 10

Lines parallel to the y axis take the form $x = a$ and are vertical

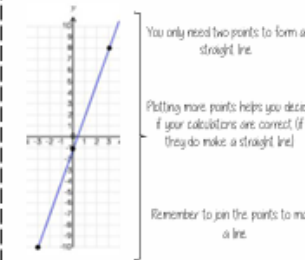
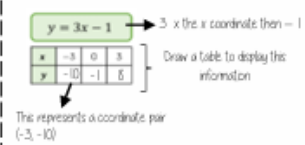
Lines parallel to the x axis take the form $y = a$ and are horizontal

All the points on this line have a y coordinate of -2

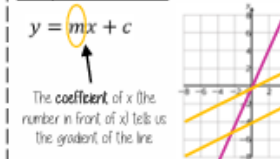
'a' can be ANY positive or negative value including 0

e.g. (3, -2) (7, -2) (-2, -2) all lay on this line because the y coordinate is -2

Plotting $y = mx + c$ graphs



Compare Gradients



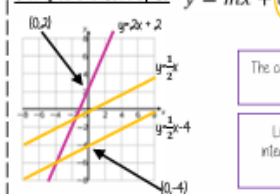
The greater the gradient — the steeper the line

Parallel lines have the same gradient

Positive gradients

Negative gradients

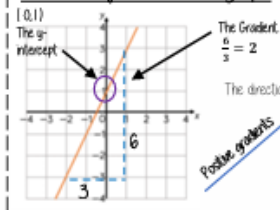
Compare Intercepts



Lines with the same y-intercept cross in the same place

The equation of a line can be rearranged. E.g. $y = c + mx$ $c = y - mx$ Identify which coefficient you are identifying or comparing

Find the equation from a graph

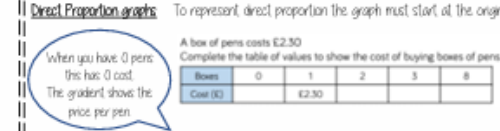
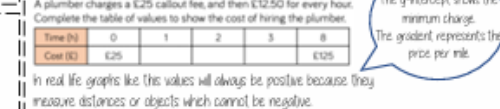


The direction of the line indicates a positive gradient

Positive gradients

Negative gradients

Real life graphs



Unit 1: Straight Line Graphs

1. What is gradient?

2. What is the y-intercept?

3. What do parallel lines have in common?

4. Coordinates of a y-intercept at 5?

5. Equation of horizontal line through -3?

6. Equation of vertical line through 8?

7. For $y = 2x + 1$, find y when $x = 3$.

8. What does m represent in $y = mx + c$?

9. What does c represent?

10. Which is steeper: $y = 4x$ or $y = x$?

11. Gradient rise 6 run 3?

12. Y-intercept of $y = 3x - 7$?

13. Equation gradient 2 intercept 1?

14. On a taxi graph what can gradient represent?

15. Why do direct proportion graphs pass through origin?

16. What coordinate always describes a y-intercept?

17. What does a positive gradient look like?

18. What is the gradient of $y = 0.5x$?

19. What does the coefficient of x tell you?

20. Do parallel lines ever meet?

21. Which axis is vertical?

22. Which axis is horizontal?

23. Find c in $y = 4x + 9$.

24. What is an intersection point?

25. Name a real-life graph using gradients.

26. What is the gradient of $y = 7$?

27. What is special about $x = a$ lines?

28. What is special about $y = a$ lines?

29. Can a y-intercept be negative?

30. How many points are needed for a straight line?

YEAR 9 — REASONING WITH ALGEBRA...

Forming and Solving Equations

What do I need to be able to do?

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

- Solve inequalities with negative numbers
- Solve equations with unknowns on both sides
- Solve inequalities with unknowns on both sides
- Substitute into formulae and equations
- Rearrange formulae

Keywords

Inequality: an inequality compares two values showing if one is greater than, less than or equal to another

Variable: a quantity that may change within the context of the problem

Rearrange: Change the order

Inverse operation: the operation that reverses the action

Substitute: replace a variable with a numerical value

Solve: find a numerical value that satisfies an equation

Solve equations with brackets

$3(2x + 4) = 30$
 Expand the brackets
 $6x + 12 = 30$
 $-12 \quad -12$
 $6x = 18$
 $\div 6 \quad \div 6$
 $x = 3$

Form and solve inequalities

Two more than treble my number is greater than 11
 Find the possible range of values
 $3x + 2 > 11$
 Solve
 $x > 3$

Inequalities with negatives

Method 1 Make x positive first
 $2 - 3x > 17$
 $+ 3x \quad + 3x$
 $2 > 17 + 3x$
 $-17 \quad -17$
 $-15 > 3x$
 $\div 3 \quad \div 3$
 $-5 > x$
 $x < -5$
 x is true for any value smaller than -5
 CHECK IT! $2 - 3(-6) = 20$ TRUE/CORRECT

Equations with unknown on both sides

$4x + 5 = 3x + 24$
 $-3x \quad -3x$
 $x + 5 = 24$
 $-5 \quad -5$
 $x = 19$

Inequalities with unknown on both sides

Solving inequalities has the same method as equations
 $5(x + 4) < 3(x + 2)$
 $5x + 20 < 3x + 6$
 $2x + 20 < 6$
 $2x < -14$
 $x < -7$
 Check it! $5(-8 + 4) < 3(-8 + 2)$
 $5(-4) < 3(-6)$
 $-20 < -18$
 -20 is smaller than -18

Method 2

Keep the negative x
 $2 - 3x > 17$
 $-2 \quad -2$
 $-3x > 15$
 $\div -3 \quad \div -3$
 $x > -5$
 When you multiply or divide x by a negative you need to reverse the inequality
 $x < -5$
 This cannot be true...

Formulae and Equations

Formulae — all expressed in symbols

Substitute in values

Equations — include numbers and can be solved

Rearranging Formulae (one step)

$x = y + z$
 Rearrange to make y the subject
 $y = x - z$
 $y \rightarrow +z \rightarrow x$
 $y \leftarrow -z \leftarrow x$
 Using inverse operations or fact families will guide you through rearranging formulae

Rearranging can also be checked by substitution

Language of rearranging...

Make XXX the subject

Change the subject

Rearrange

Rearranging Formulae (two step)

In an equation (find x)
 $4x - 3 = 9$
 $+3 \quad +3$
 $4x = 12$
 $\div 4 \quad \div 4$
 $x = 3$
 In a formula (make x the subject)
 $xy - s = a$
 $+s \quad +s$
 $xy = a + s$
 $\div y \quad \div y$
 $x = \frac{a+s}{y}$
 The steps are the same for solving and rearranging

Rearranging is often needed when using $y = mx + c$

e.g. Find the gradient of the line $2y - 4x = 9$

Make y the subject first $y = \frac{4x+9}{2}$
 Gradient = $\frac{4}{2} = 2$

Unit 2: Forming and Solving Equations

1. Solve $3x + 2 = 11$.

2. Solve $5x - 7 = 18$.

3. Inequality for two more than treble a number is greater than 11.

4. Solve $2 - 3x > 17$.

5. Why reverse an inequality after dividing by a negative?

6. Solve $3(2x + 4) = 30$.

7. Solve $4x + 5 = 3x + 24$.

8. Solve $5(x + 4) < 3(x + 2)$.

9. Difference between formula and equation?

10. Substitute $x = 4$ into $y = 2x + 3$.

11. Make y the subject of $x = y + z$.

12. Make x the subject of $xy - s = a$.

13. Solve $4x - 3 = 9$.

14. What does make x the subject mean?

15. Make y the subject of $2y - 4x = 9$.

16. What is an inverse operation?

17. What is a variable?

18. Solve $x + 8 = 15$.

19. Solve $2x = 18$.

20. Solve $x - 6 = -2$.

21. What symbol means greater than?

22. What symbol means less than?

23. Solve $7x = 49$.

24. Substitute $x = 2$ in $3x + 1$.

25. Expand $2(x + 5)$.

26. Solve $x/4 = 3$.

27. What is substitution?

28. Solve $9 + x = 20$.

29. Solve $2x + 1 = 13$.

30. Why check solutions?

YEAR 9 — REASONING WITH ALGEBRA...

Testing conjectures

What do I need to be able to do?

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

- Use factors, multiples and primes
- Reason True or False
- Reason Always, sometimes never true
- Show that reasoning
- Make conjectures about number
- Expand binomials
- Make conjectures with algebra
- Explore the 100 grid

Keywords

Multiples: found by multiplying any number by positive integers

Factor: integers that multiply together to get another number

Prime: an integer with only 2 factors

HCF: highest common factor (biggest factor two or more numbers share)

LCM: lowest common multiple (the first time the times table of two or more numbers match)

Verify: the process of making sure a solution is correct

Proof: logical mathematical arguments used to show the truth of a statement

Binomial: a polynomial with two terms

Quadratic: a polynomial with four terms (often simplified to three terms)

Unit 3: Testing Conjectures

1. Define multiple.

2. Define factor.

3. What is a prime number?

4. List factors of 30.

5. LCM of 9 and 12?

6. HCF of 18 and 30?

7. What is a conjecture?

8. What is a counterexample?

9. How many counterexamples are needed?

10. Always true means?

11. Numerical verification?

12. Algebraic verification?

13. Expand $(x+3)(x+3)$.

14. What is a binomial?

15. One row below n on a 100 square?

16. One space right of n ?

17. What is proof?

18. Is 2 prime?

19. Is 9 prime?

20. What are common factors?

21. What are common multiples?

22. Is 1 prime?

23. Give an even number expression.

24. Give an odd number expression.

25. What is verification?

26. Prime factors of 12?

27. LCM stands for?

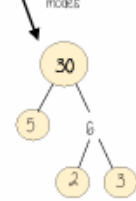
28. HCF stands for?

29. Can a conjecture be false?

30. What helps disprove a pattern?

Factors, Multiples and Primes

Multiplication part-whole models



HCF — Highest common factor

HCF of 18 and 30

18: 1, 2, 3, 6, 9, 18

30: 1, 2, 3, 5, 6, 10, 15, 30

Common factors are factors two or more numbers share.

LCM — Lowest common multiple

LCM of 9 and 12

9: 9, 18, 27, 36, 45, 54

12: 12, 24, 36, 48, 60

Common multiples are multiples two or more numbers share.

True or False?

Conjecture

A pattern that is noticed for many cases

1, 2, 4, ...
The numbers in the sequence are doubling each time.

Counterexamples

Conjecture

Only **one** counterexample is needed to disprove a conjecture.

Always, Sometimes, Never true.

Always Every value always supports the statement.

Sometimes Examples show the statement being true and counter examples to show when it is false.

Never No example supports the statement.

Examples to try:
• 0 and 1
• Fractions
• Negative numbers

Show that

Numerical verification Show the stages to a solution with numerical values

Algebraic verification Show algebraic properties of the solution. You may want to use pictorial images to support this.

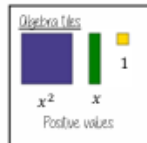
Proof Simple proofs using algebra.

Compare the left hand side of an equation with the right hand side — are they the same or different?

Expanding binomials

$$2(x+2) \equiv 2x+4$$

Algebra tiles can represent a binomial expansion. Has two terms.



$$(x+3)(x+3) \equiv x^2+6x+9$$

This is a quadratic. It has four terms which simplified to three terms.

The order of the binomial has no impact on the outcome.
e.g. $(x+3)(3+x)$

Conjectures

Even $(2n)$
Multiple of 2

Odd $(2n+1)$
One more than any even

Use numerical verification first.
Use pictorial verification — the representations of numbers of odd and even.

Exploring the 100 square

In terms of 'n' is used to make generalisations about relationships between numbers.

Positions of numbers in relation to n form expressions.

E.g. one space to the right of n
 $n+1$

E.g. One row below n
 $n+10$

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

The size of the grid for generalisation changes the relationship statements.

YEAR 9 — CONSTRUCTING IN 2D/3D...

3D Shapes

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

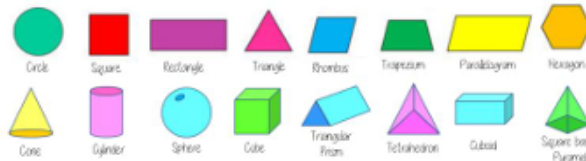
Face: a flat surface on a solid object

Cross-section: a view inside a solid shape made by cutting through it

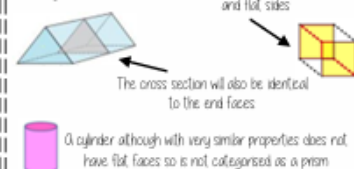
Plan: a drawing of something when drawn from above (sometimes birds eye view)

Perspective: a way to give illustration of a 3D shape when drawn on a flat surface

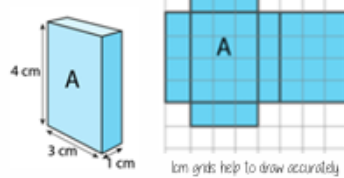
Name 2D & 3D shapes



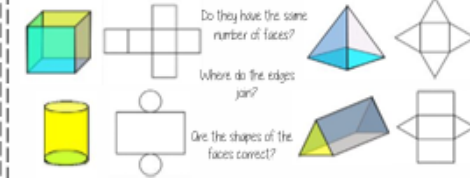
Recognise prisms



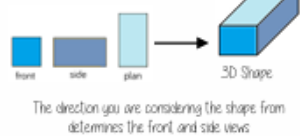
Nets of cuboids



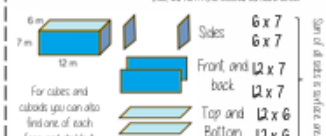
Sketch and recognise nets



Plans and elevations



Surface area

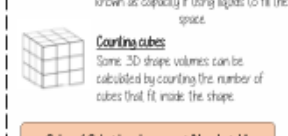


Surface area - cylinders



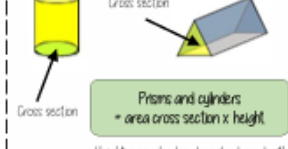
$$2 \times \pi \times \text{radius}^2 + \pi \times \text{diameter} \times \text{height}$$

Volumes



$$\text{Cubes/ Cuboids} = \text{base} \times \text{width} \times \text{height}$$

Remember multiplication is commutative



Areas — square units
Volumes — cube units
Areas and volumes can be left in terms of π

Unit 4: 3D Shapes

1. What does 3D mean?

2. What is a vertex?

3. What is an edge?

4. What is a face?

5. What is a cross-section?

6. What is a plan view?

7. What is a prism?

8. Is a cylinder a prism?

9. Formula for rectangle area?

10. Formula for triangle area?

11. Formula for trapezium area?

12. Formula for circle area?

13. What is surface area?

14. Volume of cuboid?

15. Volume of prism?

16. Units for area?

17. Units for volume?

18. How many faces does a cube have?

19. What helps visualise surface area?

20. What is perspective drawing?

21. What shape is a cuboid net folded into?

22. What is capacity?

23. Can answers be left in terms of π ?

24. What is circumference?

25. Why use 1 cm grids for nets?

26. What is a 2D shape?

27. Name a prism.

28. What determines front elevation?

29. Volume measures what?

30. What is a net?

YEAR 9 — CONSTRUCTING IN 2D/3D...

Constructions & congruency

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°

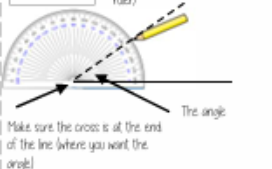
Arc: part of a curve

Bisector: a line that divides something into two equal parts

Congruent: the same shape and size

Draw and measure angles

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

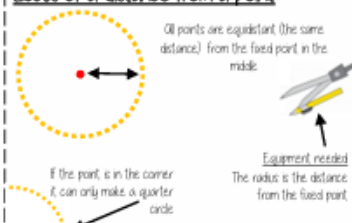


Scale drawings

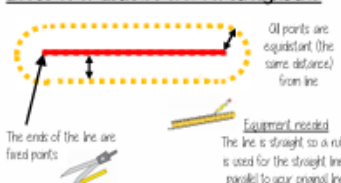
A picture of a car is drawn with a scale of 1:30



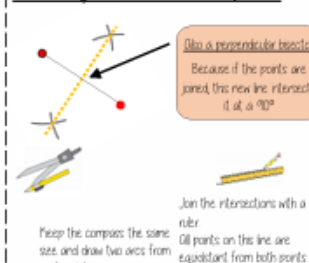
Locus of a distance from a point



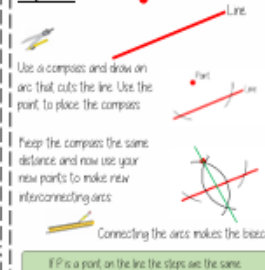
Locus of a distance from a straight line



Locus equidistant from two points



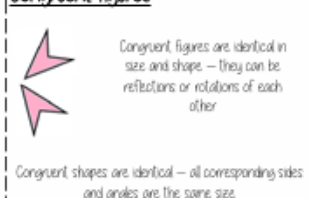
Construct a perpendicular from a point



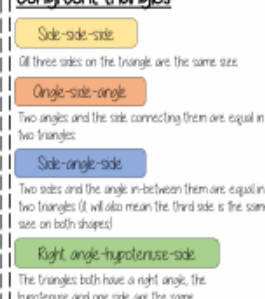
Locus of a distance from two lines



Congruent figures



Congruent triangles



Constructing Triangles



Unit 5: Constructions and Congruency

1. What is a protractor used for?
2. What is a locus?
3. What does equidistant mean?
4. What are perpendicular lines?
5. What is an arc?
6. What is a bisector?
7. What does congruent mean?
8. Draw a 35° angle using what tool?
9. What does scale 1:30 mean?
10. Locus from a point forms what shape?
11. What is the radius?
12. Locus equidistant from two points?
13. What is an angle bisector?
14. What construction creates a 90° line?
15. SSS stands for?

16. SAS stands for?
17. ASA stands for?
18. RHS stands for?
19. Can congruent shapes be rotated?
20. Can congruent shapes be reflected?
21. What must congruent figures share?
22. What tool draws arcs?
23. What is a scale drawing?
24. What does a perpendicular bisector do?
25. How many degrees in a right angle?
26. What is the hypotenuse?
27. What is needed to join construction points?
28. Why use a compass in constructions?
29. What is a congruent triangle?
30. What is the first step in measuring an angle?

Semana 1

Gramática

'Dar' and 'querer' in the 1st person plural

To say 'we give', use 'damos'.

To say 'we want', use 'queremos'.

Idiomatic uses of 'dar'

'Dar' usually translates as 'give', but there are some exceptions. For example, 'dar' is often used to describe **how something makes people feel**. In English, we often use 'to be' + adjective.

Da risa. It's funny. (literally, 'it gives laughter')

Da miedo. It's scary. (literally, 'it gives fear')

Other nouns that work in this way are 'pena', 'tristeza', 'ánimo', 'rabia', 'vergüenza', 'sueño' and 'alegría'.

Suffix -ción

-tion at the end of an English word often changes to -ción in Spanish. All -ción words in Spanish are feminine.

option → la opción station → la estación

nm	el ánimo	encouragement	nf	la traducción	translation
nm	el apoyo	support	nf	la intención	intention
nf	la pena	sadness	nf	la izquierda	left
nf	la vergüenza	embarrassment	nf	la derecha	right
nf	la rabia	anger	nm	el paso	step
nf	la tristeza	sadness	adv	adelante	forward
nf	la risa	laughter	adv	atrás	backward
nf	la alegría	happiness joy	conj	así que	so

Vocabulario

Semana 2

Gramática

'Ir' in the 3rd personal plural

To say 'they go' (or 'they are going'), use 'van'.

As you know, to talk about **what someone is going to do** (future plans), use part of the verb 'ir' + a + infinitive

Vas a ir al cine. You are going to go to the cinema.

Va a ir a la costa. S/he is going to go to the coast.

Remember, to mean 'to the' use 'a la' for singular feminine nouns and 'al' for singular masculine nouns.

Using 'para' + infinitive

The word 'para' can mean 'for' or 'in order to'.

El regalo es para mi madre. The present is for my mum.

Voy para ver un partido. I go (in order) to watch a match.

When used in this way, 'para' is always followed by an infinitive.

Expressions with 'ir de' + noun

There are a number of expressions in Spanish with 'ir de + noun'.

ir de vacaciones to go on holiday

ir de paseo to go for an outing

ir de tiendas to go window shopping

ir de compras to go shopping (with the intention of buying)

ir de copas to go for a drink

ir de tapas to go for tapas

Tapas: small plates of food served in bars in Spain! These include olives and dried meats.

Vocabulario

Describing where people go and why

vb	van	they go they are going
vb	tomar	to take to drink
vb	presentar	to present presenting
vb	enseñar	to teach teaching
nm	el país	country
nm	el café	coffee, café
nf	la costa	coast
nm	el tema	topic issue
nm	el paseo	outing
nf	la compra	purchase
nf	la tapa	lid, cover
nf	la copa	drink, glass
adj	próximo	next
adv	pronto	soon
prep	para	for in order to

Próximo is commonly used before the noun (e.g. la próxima clase).

Translate these sentences.

1	Damos la traducción al profesor.	
2	Queremos dar el apoyo.	
3	Dan pena las noticias.	
4	El mensaje de mi madre da ánimo.	
5	Las comedias dan risa.	
6	Pasar tiempo con amigos da alegría.	
7	Perder mi móvil da rabia.	
8	Ver películas de terror da mucho miedo.	
9	Hacer deberes por la tarde da sueño.	
10	La estación está a la izquierda pero el mercado está a la derecha.	

3

Can you put these sentences into Spanish?

1. I go on holiday in order to spend time with my family.
2. We give support to friends
3. She is going to go shopping.

present tense -er/-ir verbs in the 3rd person [revisited]

Use the verb ending -e to mean 's/he' or 'it'.

Un idioma indígena existe en Bolivia.
An indigenous language exists in Bolivia.

Use the verb ending -en to mean 'they'.

Las montañas pueden ser muy altas.
The mountains can be very high.

Bolivia

Suffixes -ía and -ia

-y at the end of an English word often changes to -ía or -ia in Spanish.

economía economy familia family
geografía geography memoria memory

Words ending in -ía have stress on the final syllable.

Words ending in -ia have stress on the penultimate syllable.

vb	desaparecer	to disappear disappearing	nf	la frontera	border
vb	crecer	to grow growing	nf	la altura	altitude
vb	ganar	to win, to earn	adj	seco	dry
vb	dice	s/he says, it says	adj	suficiente	enough
nm	el paisaje	landscape	adj	mejor	better
nf	la lluvia	rain	adv	más	more
nm	el clima	climate	nm	mil	(a) thousand

-ar verbs in 1st person singular present (-o) [revisited]

Use the verb ending -o to mean 'I' in the present.

Publico comentarios en Facebook.
I post comments on Facebook.

-ar verbs in 3rd person singular preterite (-ó)

Use the verb ending -ó to mean 's/he' or 'it' in the past.

Envíé un correo sobre una fiesta.
S/he sent an email about a party.

Verbs ending in -ó have stress on the final syllable.

Using 'mucho' and 'poco'

When they are **adjectives** they need to agree in gender and number with the noun that they refer to.

Estudio muchas cosas.

I study many things.

Estudio poca geografía.

I study little (don't study much) geography.



Revisit vocab 1.2.5 & 1.1.7

Vocabulario

vb	crear	to create creating	adv	ayer	yesterday
vb	publicar	to publish to post	adj	poco	little, few
vb	dejar	to leave leaving	adv	al lado de	to the side of, next to
vb	enviar	to send sending	adv	encima de	on top of
nf	el comentario	comment			
nm	la foto	photo			
nf	la red	network			

¡Atención! 'Foto' ends in 'o' but is feminine!

10

Translate these sentences.

1	Mi familia dice que es mejor.	
2	El clima en Bolivia es más seco que en Inglaterra.	
3	Tenemos lluvia suficiente aquí.	
4	Bolivia tiene un paisaje hermoso.	
5	La frontera entre Bolivia y Argentina es muy larga.	
6	Al lado de la foto, puedo ver los comentarios.	
7	La red social, Facebook, es poco interesante.	
8	Normalmente publico una revista pero ayer publicó un libro.	
9	Encima de la mesa, hay una foto.	
10	El comentario da vergüenza.	

9

Using the verbs 'saber' and 'conocer'

Use the verb 'saber' to talk about facts and information.

¿Sabes dónde está el mercado?
Do you know where the market is?

Use the verb 'conocer' to refer to familiarity with a person, place or thing, including becoming familiar with it ('to get to know').

¿Conoces Argentina?
Do you know Argentina?

vb	conocer	to know, to get to know
vb	ofrecer	to offer offering
vb	sufir	to suffer suffering
vb	romper	to break breaking
vb	pasar	to pass, to spend (time), to happen
nf	la cultura	culture
nm	el accidente	accident
nm	los Estados Unidos	United States
adv	apenas	hardly, barely
adv	ya	already

Revisit vocab 1.2.6 & 1.2.1

You can use 'ya' in different tenses:
> Miguel **ya** está aquí. (present)
> El concierto **ya** pasó. (preterite)
The concert already happened.

13

-ar verbs in 1st person singular preterite (-é) [revisited]

Use the verb ending -é to mean 'I' in the past.

Caminé en la playa. I walked on the beach.

-ar verbs in 2nd person singular preterite (-aste) [revisited]

Use the verb ending -aste to mean 'you' in the past.

Viajaste a Costa Rica. You travelled to Costa Rica.

-ar verbs in 3rd person singular preterite (-ó) [revisited]

Use the verb ending -ó to mean 's/he' or 'it' in the past.

Sacó la basura. S/he took the rubbish out.

-er, -ir verbs in 1st person singular preterite (-í) [revisited]

Use the verb ending -í to mean 'I' in the past.

Elegí el billete nuevo. I chose the new ticket.

-er, -ir verbs in 2nd person singular preterite (-iste) [revisited]

Use the verb ending -iste to mean 'you' in the past.

Perdiste el partido otra vez. You lost the match again.

-er, -ir verbs in 3rd person singular preterite (-ió) [revisited]

Use the verb ending -ió to mean 's/he' or 'it' in the past.

Recibió el periódico. S/he received the newspaper.

Vocabulary mashups:



16

What is blues music?

Blues music is a genre of music that **originated** in the southern states of America. It evolved from the music of enslaved people and incorporated features of **work songs**, **spirituals** and **traditional music** from Africa.

Features of blues music:

Melody: Improvised melodies using the **blues scale**.



The double bass often plays a **walking bassline** - a pizzicato moving bassline that sounds like someone walking around

Harmony: Chord sequences based around **12 bar blues**. This uses the **primary chords**: tonic (I), subdominant (IV) and dominant (V)

12 bar blues			
I	I	I	I
IV	IV	I	I
V	IV	I	I

Blues music also uses **dissonance** by adding 7th chords.



Rhythm: Lots of **syncopated** rhythms (off beat rhythms) and **swung** rhythms

Texture: Lots of **homophonic** (a clear melody with all other parts providing accompaniment) textures and **call and response** (question and answer phrases) textures

Structure: AAB lyrics

Knowledge Organiser Blues Music

Typical blues instrumentation:



Trumpets, trombones, clarinets and saxophones play the **melody**



Pianos and guitars play **chords** (and melody)



Double Bass plays the **bassline**



Drum Kit provides **rhythm**

Key Terminology

TEMPO

Tempo is different to rhythm.
The TEMPO is how **fast** or **slow** the **pulse** of the music is.

Presto - very fast tempo
Allegro - fast tempo
Moderato - medium tempo
Andante - walking speed
Largo - slow tempo

DYNAMICS = volume

Abbreviation	Full word (Italian)	Definition
<i>pp</i>	Pianissimo	Very soft
<i>p</i>	Piano	Soft
<i>mp</i>	Mezzo-piano	Medium soft
<i>mf</i>	Mezzo-forte	Medium Loud
<i>f</i>	Forte	Loud
<i>ff</i>	Fortissimo	Very Loud
	Crescendo	Gradually Louder
	Decrescendo	Gradually Softer

Year 9 Music. Module 1 Homework Questions

1. Which group of people created Blues music?
2. Where in the world does Blues music originate?
3. Which instrument plays the bassline in Blues music?
4. What is the main role of the piano in Blues music?
5. What is the name of the chord sequence used in Blues music?
6. What are the technical terms for the three primary chords?
7. Dissonance is a key feature of Blues harmony. What types of chords often create the dissonance in Blues music?
8. Off beat rhythms are used in Blues music, what is the technical term for this?
9. What is a walking bassline?
10. Melodies are created from the notes of the Blues scale. Which notes make up the C Blues scale? Blues melodies are often improvised. What does this mean?
12. What is a homophonic texture?

Knowledge Organiser - Year 9 - Football



YEAR 9 CURRICULUM FOCUS: **FLUENCY**

Fluency: "Linking skills and movements together to gain a competitive advantage within a sporting situation."

Skill	Key teaching points To perform each skill with FLUENCY you must ...
Dribbling and Passing	- Arms outstretched for balance and to keep defenders away. - Use both feet and keep the ball close, keeping your head up to look for an appropriate pass. - A slightly larger touch to get the ball just away from your feet to use a side foot/long or drilled pass. - The transition from dribbling to passing must be quick to prevent the opposition getting close and dispossessing you.
Dribbling and Shooting	- Arms outstretched for balance and to keep defenders away. - Use both feet and keep the ball close, keeping your head up to look for an appropriate pass. - A slightly larger touch to get the ball just away from your feet before a shot, striking through with the laces with the body over the ball. - The transition from dribbling to shooting must be quick to prevent the opposition getting close and blocking or preventing a shot.
Passing and Shooting	- Arms outstretched for balance and to keep defenders away. - The non kicking foot next to the ball and your body over the ball to keep the pass low, using the side of the foot for a short side foot pass or the instep for a longer drilled pass. - Keep on the move to create space and when about to shoot, take a touch out of your feet, head up to see where to aim and strike the ball with the laces. - Keep your body over the ball to keep it low and keep the transition between the final pass and the shot quick to prevent the opposition getting close and blocking or preventing a shot.



Skill	Key teaching points To perform each skill with FLUENCY you must ...
Tackling and Dribbling	- Approach your opponent at speed but don't get too close. - Position yourself side on so you can turn at speed. - When you think you can win the ball transfer your weight forward to meet the ball with your leg, keeping your ankle and leg firm when making the tackle. - Once you have retrieved the ball lift your head to find space to dribble into, taking larger touches if there is a lot of space and smaller touches in a crowded area.
Tackling and Passing	- Approach your opponent at speed but don't get too close. - Position yourself side on so you can turn at speed. - When you think you can win the ball transfer your weight forward to meet the ball with your leg, keeping your ankle and leg firm when making the tackle. - Once you have retrieved the ball lift your head to find an appropriate pass, using the side of the foot for a short pass or the instep for a longer/drilled pass.
Basic rules	Explanation
Foul	A foul is awarded if a player commits an offence against an opponent in a manner considered by the referee to be careless, reckless or using excessive force, e.g. kicking/tripping an opponent.
Offside	A player is in an offside position if any part of the head, body or feet is in the opponents' half and nearer to the opponents' goal line than both the ball and the second-last opponent. The hands and arms are not considered.
Free Kicks	A free kick can either be direct or indirect. A goal can be scored directly from a direct free kick. A goal can only be scored from an indirect free kick if it touches at least one other player first. The free kick must be taken from a stationary position where the foul occurred.



Knowledge organiser - Year 9 - Handball



YEAR 9 CURRICULUM FOCUS: Fluency

Fluency: "Linking skills and movements together aesthetically within a sporting situation."

Skill	Key teaching points	Skill	Key teaching points
Passing and dribbling	Passing and receiving: Hands in a W when holding/receiving the ball. Extend arms, flick wrists and follow through in the direction that you want the ball to travel. Dribbling: Push the ball down using the fingertips, extend the shoulder and elbow, flex the wrist, keep head up, ball slightly out in front and absorb impact with your fingertips.	Blocking (defending and goalkeeping)	Blocking Defending: Hands and arms up, on balls of the feet, closing any gaps before opponent gets opportunity to shoot. Goalkeeping: stay on ball of the feet, low stance (centre of gravity), arms extended and head up.
Dribbling and shooting (Standing and Jump)	Standing - Receive the ball on the move when driving at the defence • Raise the throwing arm backwards and high (above the shoulder) • Transfer weight from back to front (nose over toes) • Release the ball at the highest point and aim the shot appropriately Jump - The third and/or final step should be explosive and allow the player to take off • The hips should go back with the throwing arm • The ball should be released before landing • The player can land inside the 6m line	Movement (body feints and ball feints)	Movement: Move into space, draw defenders outwards, be ready to shoot, use deception to try and attempt a shot at goal.
Frontal contact and tackling	Frontal contact and tackling: Have slightly bent legs, Use small and fast steps, Have both feet on the ground – avoid jumping, Move with legs parallel – do not cross over, Lift and wave arms, Look up – don't look at your feet.	Fluency	To perform each skill with FLUENCY you must try to link skills and movements together, i.e. receive a pass and start to dribble using teaching points highlighted, or, convert a dribble into a jump shot.

Basic rules	Explanation
Dribbling and movement	Once a player receives possession, they can pass, hold possession or shoot. If a player holds possession, they can dribble or take three steps for up to three seconds without dribbling.
Court	Only the goalkeeper is allowed within the goal area D.



Health Related Fitness (HRF)

Considerations for a personal trainer when working with a client...

• Gaining informed consent often using a written document...	• Pre-existing medical conditions of the client...	• The training needs of the client...	• Health and safety checks of equipment and training machinery...	• Building trust and a rapport with the client...
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Component of Fitness	Fitness Test	Training Method
Muscular Endurance	• One Minute Sit Up Test • Number of sit ups an individual can complete in one minute. • One Minute Press Up Test • Number of sit ups an individual can complete in one minute.	Circuit Training • A range of different exercises are used to train different muscles. Exercises are also selected which are relevant to specific sports. • Each exercise is performed a certain number of times or for a specific length of time before moving to the next exercise.
Speed	• 35m Sprint Test • From a standing start, pupils sprint as quickly as they can for 35m with their time recorded in seconds.	Interval Training • A short, high intensity work period followed by a rest period. Hollow Sprints • Sprints followed by a period of walking/jogging and so on. Acceleration Sprints • The pace is gradually increased from a standing start to jogging, then to striding, and then to a maximum sprint.
Power	• Vertical Jump Test • Stand against a wall, with their feet on the floor, reach up and make a mark with their finger tips. Again with feet on the floor from a standing position, jump and make a second mark, measuring the distance between the two marks in cm.	Plyometrics • Plyometric exercises require maximal force and these types of exercises include lunging, bounding, incline press ups, barrier hopping and jumping. • Exercises should be selected which are relevant to specific sports.
Aerobic Endurance	• Multi Stage Fitness Test • Continuously running 20m shuttle runs for as long as possible, ensuring that the individual running reaches the end of their 20m shuttle run before a bleep. If an individual misses three bleeps that is the end of the test.	Interval Training • An individual performs a work period followed by a recovery period. Typical work time can vary from 30 seconds to five minutes; recovery periods can be complete rest, walking or light jogging. Fartlek Training • The training is continuous with no rest period and the intensity of training is varied by running at different speeds or over different terrain (surface).



Fluency: "Linking skills and movements together to gain a competitive advantage within a sporting situation".

You can see that the dotted lines are where each player will run, and the full arrows are where the ball will be passed until it reaches the shooting circle.³³



Knowledge organiser - Year 9 - Rugby



YEAR 9 CURRICULUM FOCUS: **FLUENCY**

Fluency: "Linking skills and movements together to gain a competitive advantage within a sporting situation."

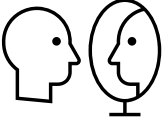
Skill	Key teaching points To perform each skill with FLUENCY you must ...	Skill	Key teaching points To perform each skill with FLUENCY you must ...
Passing	- Hold the ball in two hands with your fingers spread across the seam, with your chest facing forward. - Pull the ball back across one hip and keep your elbows slightly bent as you turn your chest away from the target. - Flick your wrists in the directions you want the ball to travel.	Rucking	- Stand over your player who has been tackled. - Legs either side of their body - Arms out ready to shield off opposition - Protect ball
Moving into space	- Be on the balls of your feet (Ready position) - Head up - Be alert - Look for space - Move into the space	Tackling	- Maintain strong, stable and low body stance. - Make contact with defender using the shoulder - Your cheek should be inline with the side of their bum (cheek to cheek) - Squeeze arms around legs - Fall to the ground with your opponent - Hold onto legs
Kicking	- For a right-footed kicker, the ball is held at an angle of approximately 45 degrees, with the left hand on top of the bottom half of the ball and the right hand below the top half of the ball. - The ball is held out at this angle and released as the foot comes up to strike the ball. The ball is kicked with the top part of the foot.	Scrums	- Front three in scrum stand side to side - Middle person puts arms up - Side people wrap inside arm around middle person. - Middle person wraps arms around outside two - Back two insert head into gaps of the front three.

How to score	Explanation
	A try is the most exciting way of scoring in rugby union. They are worth five points A try is scored when a player touches the ball down inside the opposition's in-goal area between the try line and dead ball line. This area includes the goal-line itself (but not the side or backlines) and the posts (even if the part of the post touched is not over the goal-line). A player must either: 1. Touch the ground with the ball - the player touches the ground with the ball while holding it in the hand or arms. No downward pressure is required. 2. Press down on the ball - if the ball is on the ground in the in-goal area the player must apply downward pressure "with a hand or hands, arm or arms, or the front of the body from waist to neck inclusive".

Rules of Rugby:

- Don't throw the ball forwards (only sideways or backwards)
- No tackles to be made above shoulders
- Ball must be touched down on the ground, when player is scoring a try.

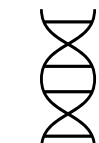
Branch 1: Image of God Key Terms

Key word	Definition	Image
Imago Dei	Means image of God. The belief that humans are special to God because they are <u>made in God's image</u>	
Inalienable dignity	<u>Humans</u> deserve to be <u>treated with respect</u> ; this cannot be taken away	
Human person	A person is a being who has certain attributes such as <u>reason, morality and self-consciousness</u>	
Relational	The <u>way we are all connected</u> and all have a <u>vocation to love.</u>	
Rational	Humans have the capacity for <u>moral reasoning</u> , where they apply logic by drawing valid conclusions from experience.	
Volitional	Humans have <u>free will</u> , which means the power to make your own decisions	
Sanctity of life	The belief that <u>human life is sacred</u> , holy and precious	
Sacrament of matrimony	A <u>legally recognised union</u> and commitment between two people, performed in <u>a Catholic church in the eyes of God.</u>	



What is Imago Dei and the Sanctity of Life?

- The term **Imago Dei** is Latin for human beings created in **the image and likeness of God**.
- Humans were made to **"resemble" God**. This does not mean that humans are like God in appearance, but that they have been **given the same mental, moral and social qualities of God**.
- Humans are the only part of creation to have been made in the image of God and therefore were **given a higher status than other species**, such as animals.
- **St Catherine of Siena** taught that humans were given a **soul** and a **conscience** by God because he made us out of love.
- The **Sanctity of Life** is the belief that all **human life is sacred and belongs to God** because we were made Imago Dei. As a result of this, Catholics believe **human life should be protected and preserved** and do not agree with abortion or euthanasia.



Branch 1: Image of God

What is the Sacrament of Matrimony?

- The Catechism teaches that the sacrament of marriage is a **life-long partnership between a man and a woman**.
- The purposes of marriage are; **1. Sacrament-** a sign of God's love through which the couple become more loving like God; **2. Permanent-** it lasts until you die; **3. Exclusive-** it excludes all other relationships; **4. Life Giving-** as a new union between the couple who are classed as one. **Marriage is for procreation.**
- The **Nuptial Mass** includes Bible readings, vows are made by the couple, the exchange of rings to show commitment, bidding prayers to bless them and the Eucharist, to remind them it is a sacrament.
- Catholic weddings are religious and made before God; **non-religious weddings are not based on faith.**
- Catholic ceremonies take place in a church with a priest; non-religious ceremonies can happen in **many venues with a registrar.**
- Catholic weddings include **prayers and Bible readings**; non-religious weddings do not.

What is the Catholic response to IVF?

- In vitro fertilisation (IVF) is a medical procedure where an egg is fertilised by sperm **outside the body in a lab**, and the resulting embryo is then placed into the woman's uterus to try to achieve pregnancy.
- The Catholic Church teaches that IVF is morally wrong because it separates sex from procreation and **involves the possible destruction of embryos.**
- Catholics believe **life is sacred from conception** so creating extra embryos or discarding them during IVF is seen as disrespecting human life.
- Some argue IVF helps create life, supporting the idea that life is a gift from God (**"For you created my inmost being..."**, **Psalm 139:13**). However, some say IVF is incompatible with sanctity of life because embryos may be destroyed, meaning **not all life is protected equally.**

What is the Catholic response to Euthanasia?

- Euthanasia means **'gentle and easy death'**. The term is used to describe the **deliberate ending of a person's life** for compassionate reasons **because they are suffering**, e.g. from a painful or incurable disease.
- **The Catholic Church disagree with euthanasia**, due to the belief in the Sanctity of Life. They believe **only God can decide who lives or dies** and that all human life has the same value and should be protected. The **Ten Commandments teach: 'do not kill'**. Pope St John Paul II also taught that euthanasia breaks the law of God. Catholics believe **hospice care is a clear alternative** to euthanasia.

Branch 1: Image of God

1. Define Sanctity of Life.
2. Define Inalienable Dignity.
3. Define Volitional.
4. What is Imago Dei and what does it reveal about humans?
5. What did St Catherine of Siena teach?
6. In Genesis, when does God create human beings and why?
7. Name one differences between Genesis 1 and 2.
8. What instruction did God give humans in Genesis 2?
9. What is the Sacrament of Matrimony?
10. Name two purposes of marriage.
11. Name two differences between the Sacrament of Matrimony and a non-religious ceremony.
12. What is IVF?
13. When do Catholics believe life begins?
14. Describe why the Church is against human trafficking.
15. Why does the Catholic Church disagree with euthanasia?

Branch 2: Women of Faith Key Terms

<u>Key word</u>	<u>Definition</u>	<u>Image</u>
Typology	The interpretation of <u>events, people, or things in the Old Testament as symbols that foreshadow events fulfilled in the New Testament.</u>	
Proto-Evangelium	<u>Genesis 3:15</u> is called the protoevangelium, meaning " <u>first gospel</u> ," as it is the <u>Bible's first hint of the good news of salvation.</u>	
Mother of God	A name given to the Virgin Mary, as <u>mother of the divine Christ.</u>	
Immaculate Conception	The belief that <u>Mary was free of original sin</u> from the moment of her conception.	
Our Lady	<u>An ancient title for the Virgin Mary,</u> used to emphasise her role as <u>a sign of hope and a guiding star for Christians.</u>	
New Eve	<u>A title for Mary;</u> Eve disobeyed God, but <u>Mary brought Jesus into the world by obeying God.</u>	
Magnificat	The Magnificat is a <u>hymn of praise to God, praising Him for His blessing to Mary</u> and His faithfulness to Israel.	
The Rosary	A <u>Catholic devotion to Mary</u> using a special <u>set of beads.</u>	



How do Adam and Eve point to Jesus and Mary?

- In the Bible, some people or events in the Old Testament are “**types**” – they hint at something that will happen later with Jesus.
- The thing they hint at is called the “**antitype**” – this is something about Jesus’ life or death in the New Testament.
- **Adam is a “type”** because he disobeyed God and brought sin into the world. Jesus is the “antitype” because He obeyed God and saved us from sin.
- Eve is a “type” because she gave in to temptation. **Mary is the “antitype”** because she said yes to God and helped bring Jesus into the world.

Why is Mary called the New Eve?

- Mary is called the "New Eve" because her story is the opposite of Eve’s.
- **Eve was a virgin with God’s grace**, but she chose to disobey God and listened to the serpent, which led to sin and death.
- **Mary was also a virgin, full of grace**, but she chose to obey God and became the mother of Jesus through the Holy Spirit.
- Eve’s choice brought evil into the world, but **Mary’s choice helped bring salvation** through Jesus.

What is the role of women in salvation history?

- **Salvation history** is the story of how God works in human history to save people, shown through key events and people in the Bible.
- Women were just as important as men because they played key roles in saving Israel (“**kept alive the hope of Israel’s salvation” CCC 664**), though some argue men were still more frequent leaders in the Bible.
- Pope John Paul II taught **women had an indispensable role**, acting with **faith, courage, and leadership** in God’s plan.
- **Deborah** was a judge and prophet who led Israel, and Jael fulfilled God’s plan by defeating the enemy, showing women as leaders and deliverers.
- **Judith** saved her people through bravery and trust in God by defeating Holofernes, showing women can be instruments of salvation in times of crisis.
- **Esther** used courage and wisdom to save her people by influencing the king, showing the power of intercession rather than violence.

What is the Magnificat?

- The Magnificat is taken from **Luke’s Gospel** (1:46-55), is the **Blessed Virgin Mary’s hymn of praise to the Lord**.
- It is known as the **Song of Mary** because recognises the connection between Mary’s humbleness and holiness.
- **She sings this song after Elizabeth announces her pregnancy**. The term ‘Magnificat’ comes from **the Latin for ‘to magnify’**.
- *“My soul glorifies the Lord and my spirit rejoices in God my Saviour”*
- *From now on all generations will call me blessed, for the Mighty*



Branch 2: Women of Faith

What is The Rosary and what are the Joyful Mysteries?

- The Rosary is a **Catholic devotion using beads to pray**, that **focuses on the life of Jesus and Mary**.
- The practice of **praying the Rosary originated from Mary**, who gave the rosary to St Dominic when she appeared to him in 1214.
- The Rosary has **five decades** and each decade includes: **1 Our Father, 10 Hail Marys, 1 Glory Be**.
- Whilst praying the Rosary, Catholic consider the four Mysteries. These are the **Joyful, Sorrowful, Glorious and Luminous Mysteries**.
- The **Joyful Mysteries focus on the happy times in Mary and Jesus’ life**, such as the Annunciation, the Visitation, the Nativity, the Presentation of Jesus in the Temple and the finding of the child Jesus in the Temple.

What are examples of Marian Artwork?

- Marian artwork often captures various aspects of Mary. The types are: **Mary the Madonna, with the baby or infant Jesus, Catholic beliefs** e.g. Assumption, **Characteristics of Marian apparitions** e.g. Our Lady of Lourdes, **Events in Mary’s life** e.g. The Annunciation.
- **Michelangelo’s Pieta** captures the moment when Jesus, taken down from the cross, is given to his mother Mary. She is sorrowful but is at peace, knowing her son suffered for humanity.
- **Murillo’s Immaculate Conception** captures the belief that Mary is born without sin as Mary is dressed in white which is a symbol of purity. Angels surround her, showing how she is heavenly and she is praying, showing her pious nature.
- **Our Lady of Fatima Statue** has Mary in clothes that are laden with gold, which is a symbol of divinity. She is also wearing the rosary, a way to show devotion to Mary. The crown was added later, to show her queenship.

How is Our Lady celebrated?

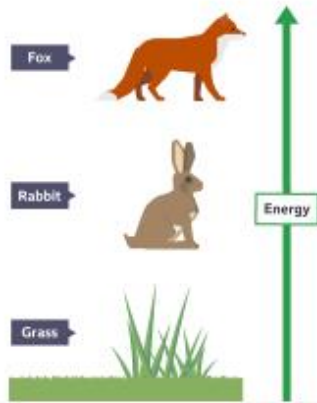
- **Lourdes** became a pilgrimage site after Bernadette Soubirous reported visions of the Virgin Mary in 1858, including the discovery of a spring believed to have healing powers.
- Catholics show devotion by **praying the Rosary, attending Mass, joining processions, and visiting the grotto where Mary appeared**.
- **Pilgrims bathe in or drink** the spring water, believing in Mary’s intercession for healing and spiritual renewal.
- Global Marian devotions: Examples include **Our Lady of Guadalupe in Mexico** (linked to national identity) and Our Lady of Fatima in Portugal (focused on prayer, repentance, and visions), showing **Mary is honoured worldwide in different ways**.

Branch 2: Women of Faith

1. Define Typology.
2. Define Protoevangelium.
3. Define Magnificat.
4. What do 'Types' hint at?
5. Give an example of a Type and an Antitype.
6. Why were women just as important as men in the Bible?
7. What did Deborah do to show women as leaders?
8. Why is the Magnificat known as the 'Song of Mary'?
9. Who does the Magnificat help Catholics to reflect on?
10. What is the Rosary?
11. How many decades does a rosary have?
12. What does Marian artwork capture?
13. Give 2 examples of Marian artwork.
14. Describe Michaelangelo's Pieta in one sentence.
15. Name two activities Catholics do on pilgrimage at Lourdes to show devotion to Mary.

Trophic levels

A food chain is a list of organisms in a habitat that shows their feeding relationship, i.e. what eats what. The organisms are joined by arrows which show the transfer of energy in food between them. The stages in food chains are called trophic levels.



A simple food chain with three trophic levels

Food chains always start with a producer. This is usually a green plant or algae that completes photosynthesis to store energy from sunlight as glucose. Grass is the producer in the **grass → rabbit → fox** food chain. Photosynthesis provides the energy for most life on Earth.

A primary consumer eats a producer. The rabbit is the primary consumer in the example food chain. This is in turn eaten by a secondary consumer, which is the fox.

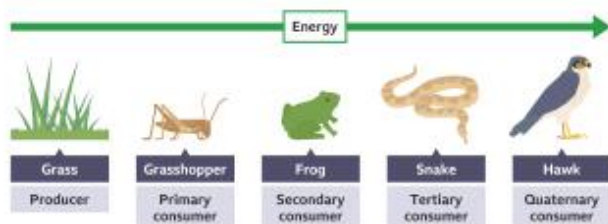
After this might be a tertiary consumer (which eats a secondary consumer) and possibly a quaternary consumer (which eats a tertiary consumer), but not in this example.

Animals that are hunted and eaten are prey, and these are consumed by predators. The final consumer at the top of the food chain is called a top (or apex) predator and is not eaten by anything else.



Nothing in this food chain eats the fox, which makes it the apex predator

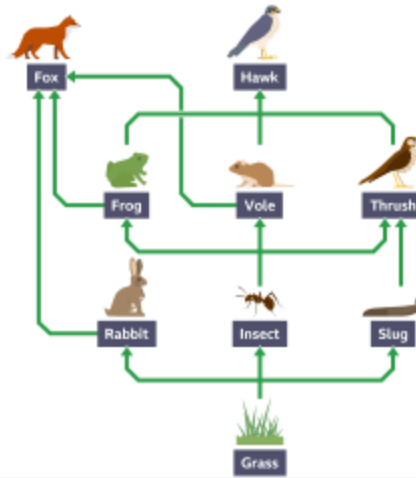
What is the final consumer in this food chain?



A food chain with five trophic levels.

Food webs

Most populations of organisms that live in a habitat usually have more than one food source. They usually consume more than one organism from the trophic level below. This means that there are almost always more than one food chain and these are interlinked into a food web.



A food web

This food web is made up of lots of food chains, including:

- grass → Insect → vole → hawk
- grass → Insect → frog → fox
- grass → Insect → vole → fox

Some organisms, like the rabbit and slug, have just one consumer. Others, like the frog and vole, have two.

Ecology

Ecology is the study of living organisms and the places that they live. An ecologist studies the number and distribution of living organisms in an ecosystem. Knowing this is essential to allowing us to protect the organisms that need help to survive.

Impact of Animals on Ecosystems: Animals shape ecosystems through vital processes like pollination, seed dispersal, nutrient cycling, and population control. They function as ecosystem engineers (e.g., beavers building dams) and climate regulators (e.g., large herbivores storing carbon). Conversely, invasive species can disrupt local food webs and degrade habitats

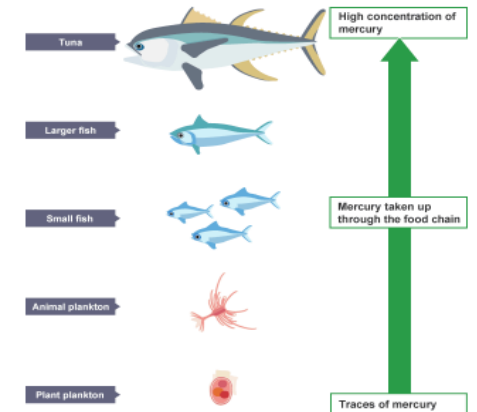
Bioaccumulation is the gradual build-up of harmful substances, such as pesticides or heavy metals, in the tissues of an organism over time because they are absorbed faster than they can be broken down or removed.

Toxic materials in the food chain

Toxic materials are poisonous. Some quickly break down into harmless substances in the environment. Others are persistent (they stay in the environment and do not break down). These substances accumulate in the food chain and damage the organisms in it, particularly in the predators at the end of the chain. This is because accumulating compounds cannot be excreted.

In the past, mercury compounds were used to make insecticides (substances that kill the insects that damage crops), and special paints that stop barnacles growing on the hulls of ships.

Unfortunately, when mercury gets into a food chain, it damages the nervous systems and reproductive systems of mammals, including humans. The diagram shows how mercury can accumulate in the food chain.



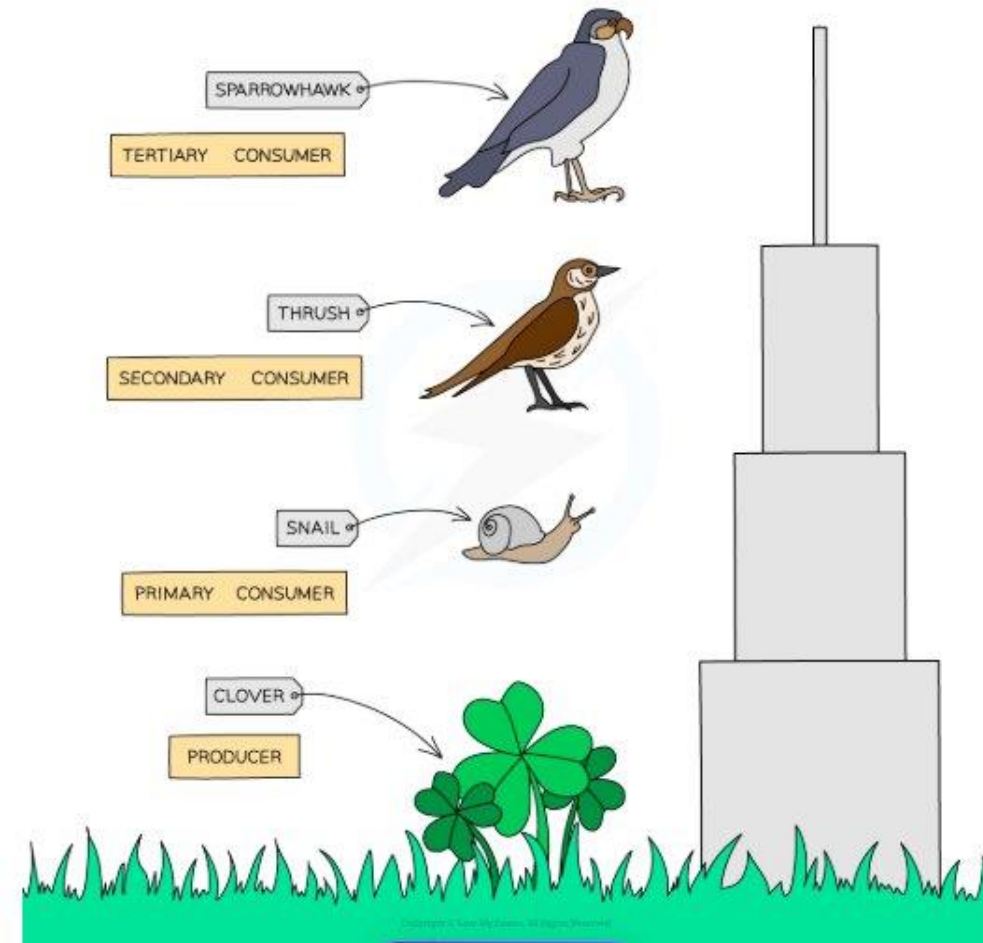
Mercury accumulates as you move up the food chain.

In the sea, tiny animals and plants called plankton absorb the mercury compounds. When the plankton are eaten by small fish, the mercury they contain stays in the fish. As the fish need to eat a lot of plankton, the concentration of mercury in them becomes higher than its concentration in the plankton.

Larger fish eat the small fish, and larger ones still (such as tuna fish) eat them. This creates a high concentration of mercury in the tuna. People eating contaminated tuna may get mercury poisoning. Mercury is now banned from many chemical products and mercury use in industry is carefully regulated.

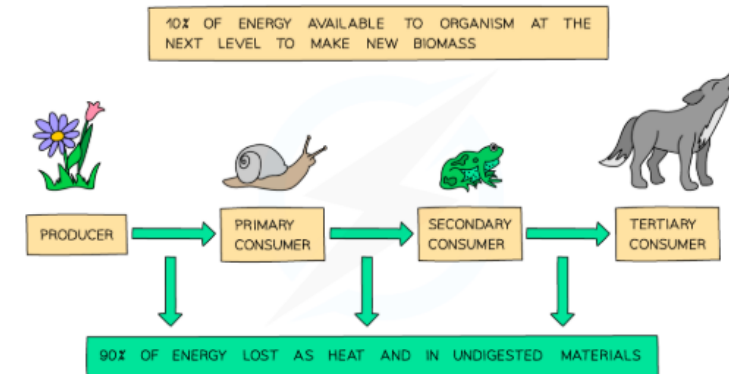
Pyramids of biomass

- A pyramid of biomass shows **how much mass the creatures at each level would have without including all the water that is in the organisms (their 'dry mass')**
- Pyramids of biomass are **always pyramid-shaped**, regardless of what the pyramid of numbers for that food chain looks like
- This is because the **mass of organisms has to decrease as you go up a food chain** – if we take our first food chain as an example, it would be impossible to have 10kg of grass feeding 50kg of voles feeding 100kg of barn owls



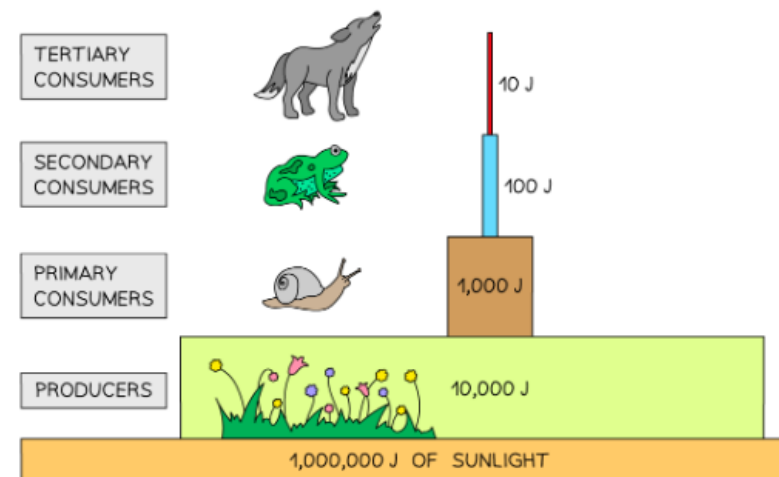
Losses of energy (leading to losses of biomass)

- Not all energy** is transferred from one trophic level to the next
- Approximately, only 10%** of the energy of each trophic level is **passed on** to the next
- This is why food chains are rarely made up of more than six trophic levels – the total amount of energy available eventually becomes too small to support another trophic level
- As some of the energy transferred is needed by higher trophic levels to **generate biomass**, the **gradual loss of energy** up the food chain means that **biomass also decreases the higher up the food chain you go**

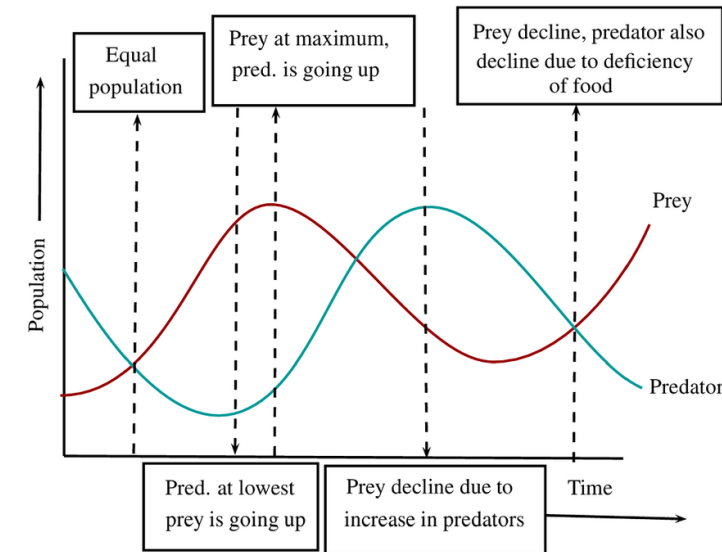


Pyramids of energy transfer

- Pyramids of energy transfer illustrate the **amount of energy contained** within the biomass of individuals within different trophic levels
- The **area** of each box represents the **quantity of energy present**
- These pyramids always have a **wide base** (due to the large amount of energy contained within the biomass of producers)
- As you move up the pyramid to higher trophic levels the quantity of energy decreases as **not all energy is transferred** to the biomass of the next trophic level (roughly only **10 %** of the energy is passed on)
- For this reason, pyramids of biomass are also **always pyramid-shaped**

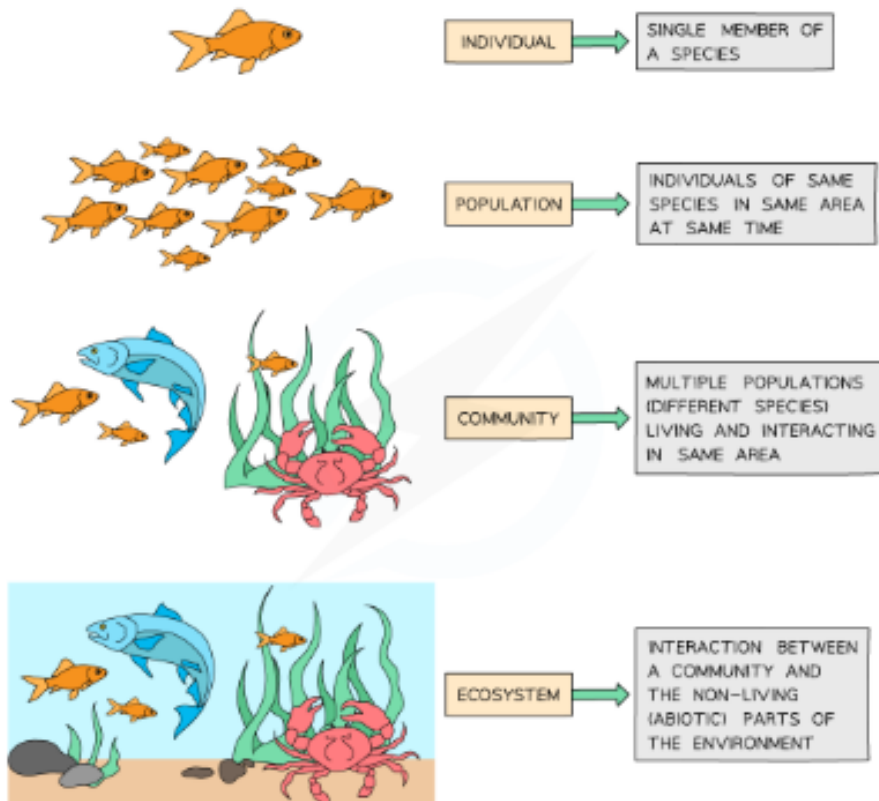


Population Changes



There are several key terms that we use when referring to the various different components of an ecosystem and their levels of organisation:

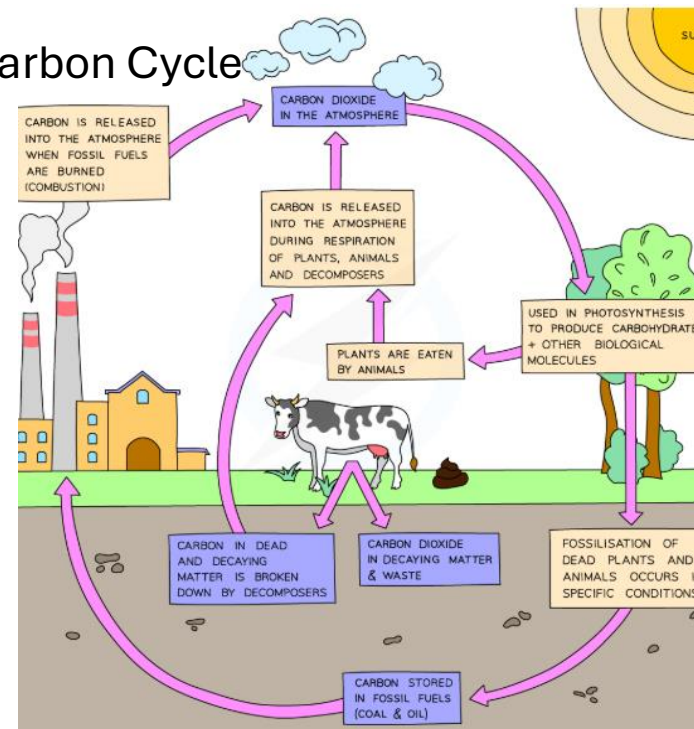
- A **population** is defined as a group of organisms of the **same species** living in the **same place** at the **same time**
- A **community** includes **all** of the **populations** living in the **same area** at the **same time**
 - Within a community, each species depends on other species for food, shelter, pollination, seed dispersal etc
 - If one species is removed it can affect the **whole community**
 - This is called **interdependence**
- A **habitat** is the place where an **organism** lives
 - E.g. badgers, deer, oak trees and ants are all species that would live in a woodland habitat
- An **ecosystem** is defined as all the **biotic factors** and all the **abiotic factors** that interact within an area at one time
 - Biotic factors includes all the **living** components such as plants and animals
 - Abiotic factors includes all the **non-living** components such as light intensity, mineral ions, water availability
 - Ecosystems can **vary greatly in size and scale**
 - A small ecosystem might be a garden pond
 - A large ecosystem might be the whole of Antarctica



ABIOTIC FACTOR	HOW ABIOTIC FACTOR AFFECTS COMMUNITY
LIGHT INTENSITY	LIGHT IS NEEDED BY PLANTS FOR PHOTOSYNTHESIS. MORE LIGHT LEADS TO AN INCREASE IN RATE OF PHOTOSYNTHESIS AND AN INCREASE IN PLANT GROWTH RATE
TEMPERATURE	AFFECTS THE RATE OF PHOTOSYNTHESIS IN PLANTS
MOISTURE LEVELS	PLANTS AND ANIMALS REQUIRE WATER TO SURVIVE
SOIL pH AND MINERAL CONTENT	DIFFERENT SPECIES OF PLANTS ARE ADAPTED TO DIFFERENT SOIL pH LEVELS AND NUTRIENT CONCENTRATION LEVELS
WIND INTENSITY AND DIRECTION	WIND SPEED AFFECTS TRANSPIRATION RATE IN PLANTS. TRANSPIRATION AFFECTS THE RATE OF PHOTOSYNTHESIS AS IT ENSURES WATER AND MINERAL IONS ARE TRANSPORTED TO THE LEAVES
CARBON DIOXIDE LEVELS FOR PLANTS	CO ₂ IS REQUIRED FOR PHOTOSYNTHESIS IN PLANTS. CO ₂ CONCENTRATION AFFECTS THE RATE OF PHOTOSYNTHESIS
OXYGEN LEVELS FOR AQUATIC ANIMALS	SOME AQUATIC ANIMALS (SUCH AS FISH) CAN ONLY SURVIVE IN WATER WITH HIGH OXYGEN CONCENTRATIONS

BIOTIC FACTOR	HOW BIOTIC FACTOR AFFECTS COMMUNITY	EXAMPLE
AVAILABILITY OF FOOD	MORE FOOD MEANS ORGANISMS HAVE A HIGHER CHANCE OF SURVIVING AND REPRODUCING. THIS MEANS THEIR POPULATIONS CAN INCREASE	RAINFOREST ECOSYSTEMS HAVE A RICH FOOD SUPPLY AND THIS ALLOWS MANY SPECIES TO LIVE THERE. DESERTS HAVE A POOR FOOD SUPPLY AND THIS ALLOWS FEWER SPECIES TO LIVE THERE
NEW PREDATORS	IN BALANCED ECOSYSTEMS, PREDATORS CATCH ENOUGH PREY TO SURVIVE BUT NOT SO MANY THAT THEY WIPE OUT THE PREY POPULATION. IF A NEW PREDATOR IS INTRODUCED TO THE ECOSYSTEM, IT MAY BECOME UNBALANCED	RED FOXES WERE INTRODUCED FOR RECREATIONAL HUNTING IN AUSTRALIA IN THE 1800S BUT HAVE SINCE CAUSED THE DECLINE OF MANY NATIVE SPECIES THAT THEY FEED ON, SUCH AS SMALL MAMMALS AND BIRDS. THIS HAS ALSO REDUCED THE FOOD SUPPLY FOR NATIVE PREDATORS
NEW PATHOGENS	IF A NEW PATHOGEN ENTERS AN ECOSYSTEM, THE POPULATIONS LIVING THERE WILL HAVE NO IMMUNITY OR RESISTANCE TO IT AND THE POPULATION MAY DECLINE OR BE WIPED OUT	CORONAVIRUS CAUSED A GLOBAL PANDEMIC AND A DECLINE IN MANY HUMAN POPULATIONS AROUND THE WORLD BECAUSE IT WAS A NEW PATHOGEN
COMPETITION	IF TWO SPECIES COMPETE FOR THE SAME RESOURCE(S) AND ONE IS BETTER ADAPTED TO TAKE ADVANTAGE OF THESE RESOURCES, THEN THAT SPECIES WILL OUTCOMPETE THE OTHER. THIS MAY CONTINUE UNTIL THERE ARE TOO FEW MEMBERS OF THE LESSER ADAPTED SPECIES TO BREED SUCCESSFULLY	NORTH AMERICAN GREY SQUIRRELS WERE INTRODUCED TO THE UK IN THE 1800S AND HAVE SINCE CAUSED THE DECLINE IN OUR NATIVE RED SQUIRREL POPULATION. GREY SQUIRRELS HAVE OUTCOMPETED RED SQUIRRELS FOR RESOURCES SUCH AS FOOD AND NEST-SITES. THEY ALSO CARRY A VIRUS (A NEW PATHOGEN) THAT RED SQUIRRELS HAVE NO RESISTANCE TO

The Carbon Cycle



Why sampling is important

To find out how many polar bears there are in the Arctic, they could all be counted individually. However, it would take a long time and the chances of actually finding them all would be quite small. To make this process easier scientists look at a smaller part of the population or its habitat to draw conclusions about the whole area. This type of scientific surveying is called sampling. Obtaining an estimate by sampling is faster, less expensive and, in most cases, gives us all of the information we need.

There are lots of different methods of sampling, but they all involve investigating living organisms in one or more habitats. This information is extremely important. It is the first step in working out which species are nearing extinction. Because of this, sampling is essential for conservation.

It is essential that any sampling does not affect the living things or their habitat.



The pangolin was discovered to be critically endangered because sampling revealed their numbers in the wild have reduced significantly

Quadrats

A quadrat is a square frame which is used in sampling. It is placed in a location and the plants or slow-moving animals inside it are counted.

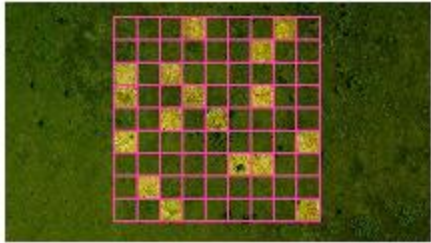
The following things can be counted within a quadrat:

- 1. The number of a single species.
- 2. The number of different species - a measure of biodiversity.
- 3. The percentage of the quadrat taken up by one species - it is much easier to do this than count all the individual blades of grass, for example.



Random sampling using quadrats

When counting the number of a single species in a habitat, if the proportion of the habitat you have sampled is known, the total number of that species in that habitat can be estimated. For example, if you counted 43 dandelions on 25% of the school field then you could estimate the whole field by multiplying 43 by four to make 172.



25% = 43

100% (43 x 4) = 172

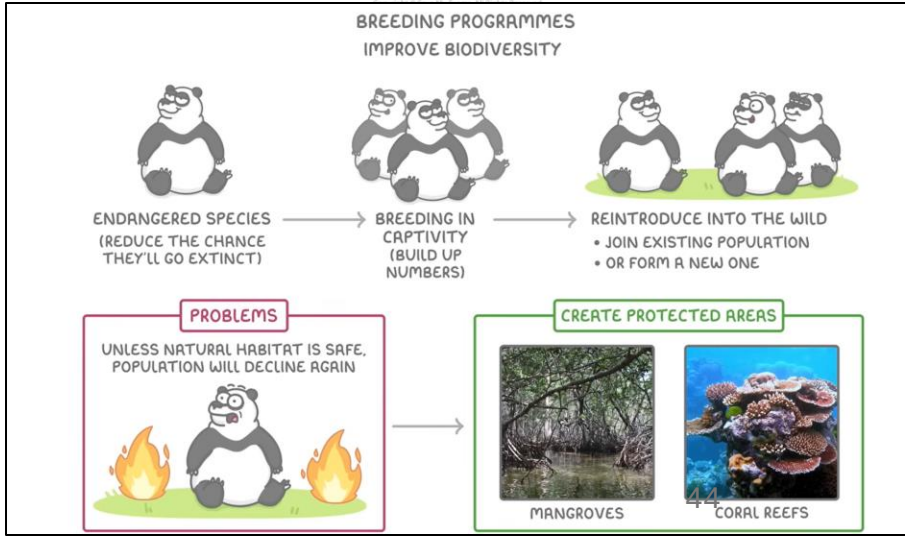
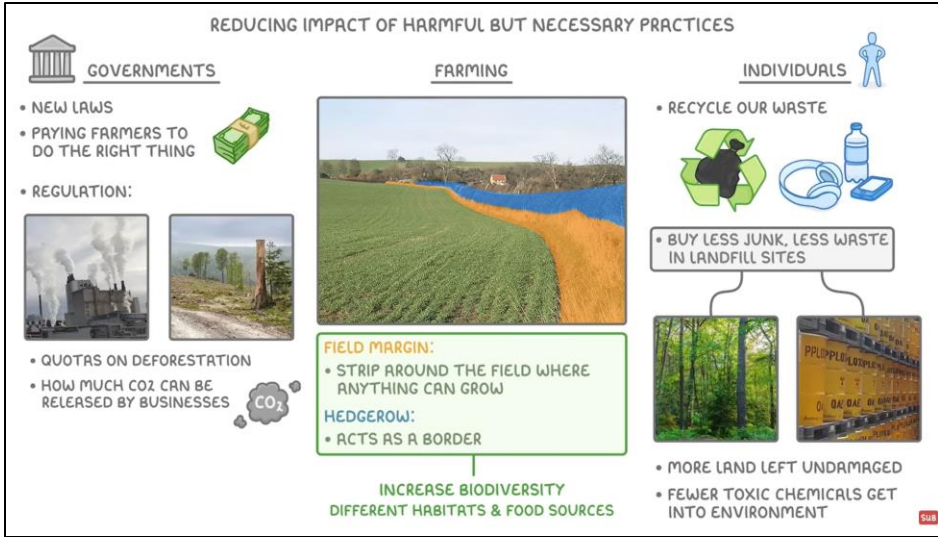
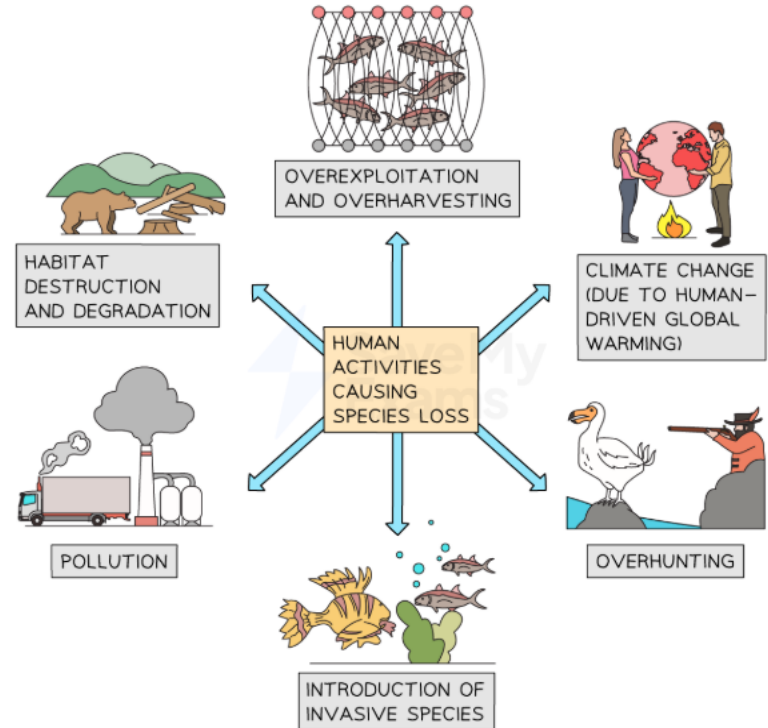
Most sampling using quadrats is random. This means it has the same chance of being placed in any position within the habitat. You cannot close your eyes, turn around a few times and throw your quadrat. This might seem random but it can't ever land at your feet or beyond your throw, so it isn't. Sampling also shouldn't harm any species - it is important to leave everything as you found it.

Sampling must not be biased - for instance, choosing to sample where there are lots of plants. Here is an example of a way sampling could be undertaken without bias.

- 1. When you have chosen a sampling area, first divide it up into a grid, for instance, having 10 x 10 divisions.
- 2. Use a suitable method to generate a pair of random coordinates on your grid. For example, you could draw numbers out of a hat.
- 3. Place the first quadrat on your grid using these coordinates.
- 4. Count and record the number of each species within this quadrat.
- 5. Repeat steps 1-4 so that you have a total of at least 10 counts. This will give you more data, which will make the results more accurate.

Threats to biodiversity

- Biodiversity is crucial for ecosystem stability, resilience and functioning
 - However, biodiversity is being negatively affected by both **direct** and **indirect** human influences



Key Questions P.41

1	What do the arrows in a food chain represent?
2	State the process that producers can do to store energy from the sun
3	Describe the difference between predators and prey
4	What is the meaning of bioaccumulation?
5	Which consumer is the third organism in a food chain?

Key Questions P.42

1	What happens to the mass of organisms further up a pyramid of biomass?
2	On average, what percentage of energy is transferred between each trophic level in a food chain from one organism to another?
3	Give two ways energy is lost between trophic levels of a food chain
4	Why is the length of a food chain limited to only four or five organisms?
5	What happens to the population of prey if the number of predators in a habitat increases? Why?

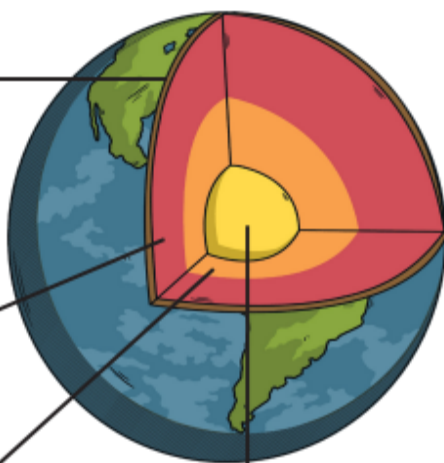
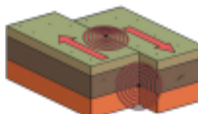
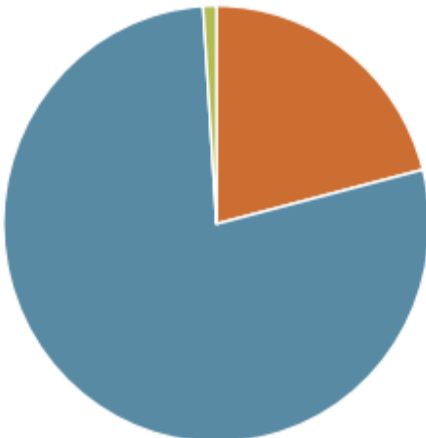
Key Questions P.43

1	Give the definition of the term 'population'
2	Give the definition of the term 'community'
3	What is a habitat? Give an example of a specific organism's habitat
4	State the meaning of the term 'biotic factor' and give an example
5	State the meaning of the term 'abiotic factor' and give an example
6	Describe how a high light intensity will affect an ecosystem
7	Give an example of one biotic factor that can affect an ecosystem
8	Give one way carbon is removed from the atmosphere
9	Explain how respiration contributes to the carbon cycle
10	Explain how combustion contributes to the carbon cycle

Key Questions P.44

1	Name the piece of equipment used when sampling populations of a non-mobile species
2	What is biodiversity?
3	State one ecosystem that has a high biodiversity
4	State one ecosystem that has a low biodiversity
5	Give three ways human actions are reducing biodiversity
6	How do hedgerows and field margins around farming fields increase biodiversity?
7	How does recycling improve biodiversity?

Earth and the Atmosphere Knowledge Organiser

Key Words		Structure of the Earth									
atmosphere	A layer of gases that surrounds the Earth.	crust The rocky surface of Earth. The rock that makes up the Earth's crust contains minerals. These minerals are often mined to produce useful materials such as metals and building materials. The crust is divided into sections called tectonic plates. mantle A semi-solid layer of molten rock called magma. The mantle is very hot and flows very slowly. When magma escapes from the mantle through the crust to the surface of the Earth, it is known as a volcanic eruption. outer core A molten mixture of iron and nickel metals. The metals flow and move around. This generates the Earth's magnetic field. inner core A solid mixture of iron and nickel metals at the centre of the Earth.  The fossil record and the shapes of the continents provide evidence that the Earth's surface has changed over time. This happens because convection currents in the mantle cause tectonic plates to move. Sudden movements caused when tectonic plates move towards or past each other cause earthquakes.  Mountain ranges can be formed when tectonic plates push each other upward.  Valleys, oceanic ridges and volcanoes can form when tectonic plates move away from each other. 									
climate change	A change in the average temperature and cycles of weather over a long period of time.										
erosion	The wearing away and transportation of material by the movement of water, wind or ice.										
igneous rock	A type of rock formed when hot, molten rock crystallises and solidifies.										
lava	Hot molten rock that flows from a volcano or cracks above the Earth's surface.										
magma	Semi-molten rock found beneath the surface of the Earth.										
metamorphic rock	A type of rock formed when other rocks undergo changes due to extreme heat and pressure.	The Atmosphere									
metamorphism	The process in which sedimentary and igneous rocks are changed by heat and pressure to become metamorphic rocks.	For the first billion years after the Earth formed, carbon dioxide was the most abundant gas in the atmosphere. Since then, the atmosphere has changed: • Water vapour in the early atmosphere condensed and formed the oceans. • Carbon dioxide dissolved in the oceans. • Plant life evolved and released oxygen into the atmosphere when they started to photosynthesise. • Animal life was then able to evolve.	The composition of the atmosphere today is: <table><tr><th></th><th>key</th></tr><tr><td>78% nitrogen</td><td></td></tr><tr><td>21% oxygen</td><td></td></tr><tr><td>1% other gases (including carbon dioxide, methane and noble gases)</td><td></td></tr></table> 		key	78% nitrogen		21% oxygen		1% other gases (including carbon dioxide, methane and noble gases)	
	key										
78% nitrogen											
21% oxygen											
1% other gases (including carbon dioxide, methane and noble gases)											
mineral	A naturally occurring element or compound.										
sedimentary rock	A type of rock formed when layers of sediments build up and become cemented together.										
weathering	The breaking up of rocks by natural forces, without major movement. There are three types: physical, biological and chemical.										

What is the outer layer of the Earth called?
What is the layer of the Earth that contains magma called?
Which two metals are found in the Earth's core?
What are caused when tectonic plates move past each other?
What are made when tectonic plates push each other upward?
What are made when tectonic plates move away from each other?
What was the most abundant gas for the first billion years in Earth's atmosphere?
How were oceans formed?
What gas makes up 78% of our current atmosphere?
What percentage of our current atmosphere is made up of oxygen?

Rocks

Rocks contain **minerals**. Many minerals are useful to us and can be **mined** from the ground.

Type of Rock	Igneous Rocks		Sedimentary Rocks		Metamorphic Rocks	
Examples	granite (intrusive) 	basalt (extrusive) 	limestone 	conglomerate 	marble 	schist 
Formation	Intrusive igneous rocks are formed when molten rock below the surface of the Earth (magma) cools and solidifies within the crust.		Extrusive igneous rocks are formed when molten rock above the surface of the Earth (lava) cools and solidifies.		Formed when rocks deep in the crust are subjected to extreme heat and pressure. This changes the composition and arrangement of minerals in the rocks. This process is called metamorphism .	
Typical Properties	large interlocking crystals hard low porosity		small crystals or grains may contain some holes medium - high porosity		may contain veins or thin bands of different coloured minerals can be hard or soft low porosity	

Weathering and Erosion

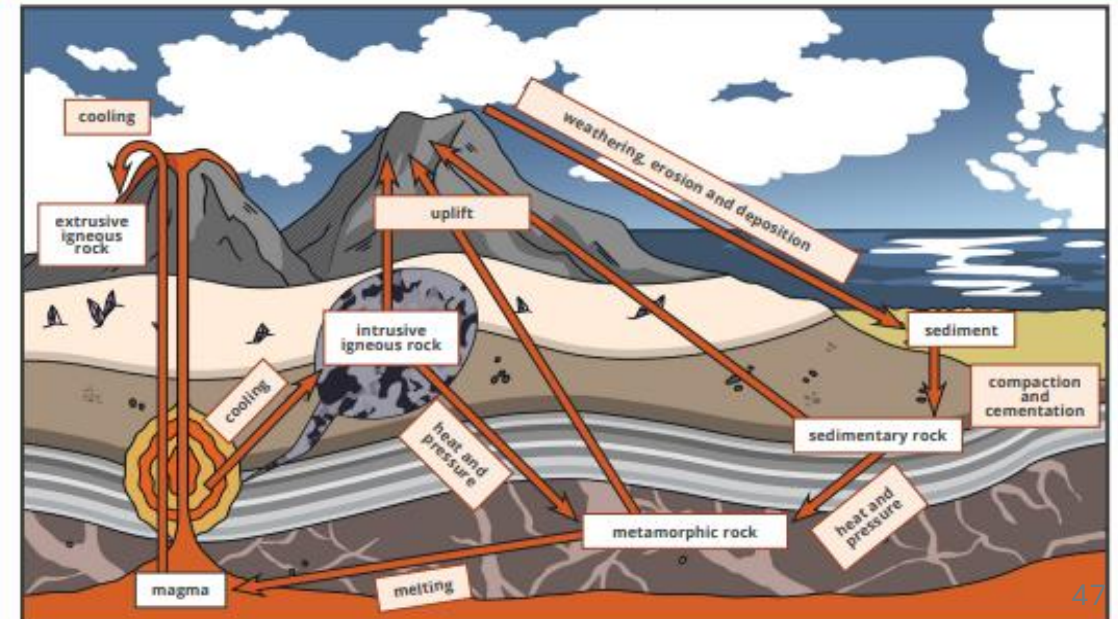
Erosion is the breaking up and movement of rocks by rivers, waves, glaciers and the wind.
Weathering is the breaking up of rocks by natural forces. There are three major types:

- **Biological weathering** - When plants and animals, including humans, wear away or cause damage to rocks. For example, tree roots forcing cracks in rocks to widen.
- **Chemical weathering** - When chemicals in acid rain or seawater react with minerals in rocks, causing them to wear away.
- **Physical weathering** - When extreme temperatures or changes in temperature cause rocks to break apart or be worn down over time. Exfoliation (onion-skin) weathering and freeze-thaw weathering are types of physical weathering.

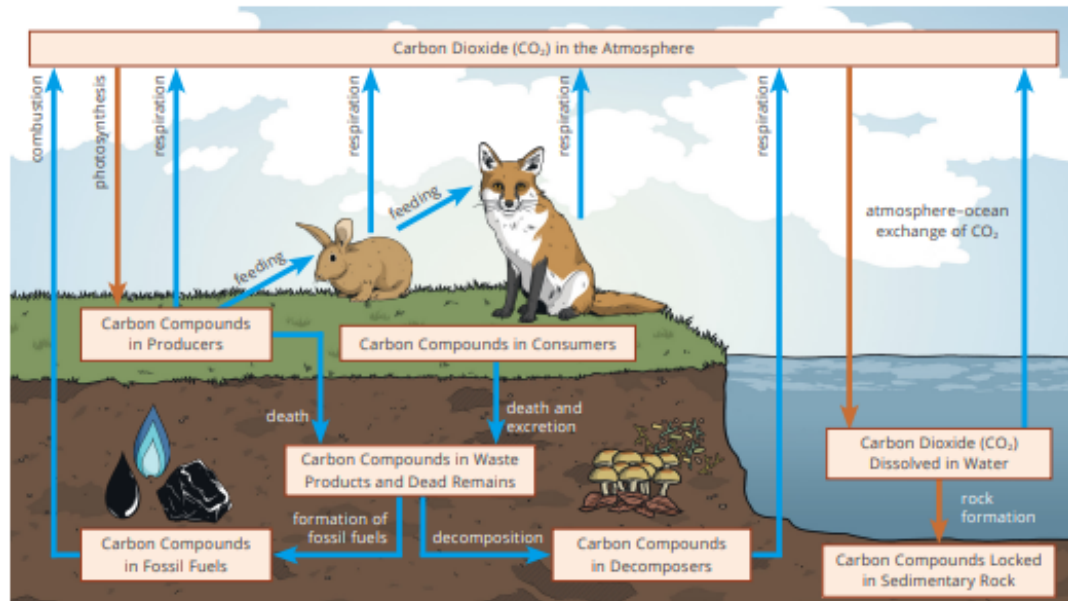
In freeze-thaw weathering, water gets into cracks. When the water freezes it expands and makes the crack bigger. The water thaws but can remain in the crack and the process is repeated.



The Rock Cycle



The Carbon Cycle



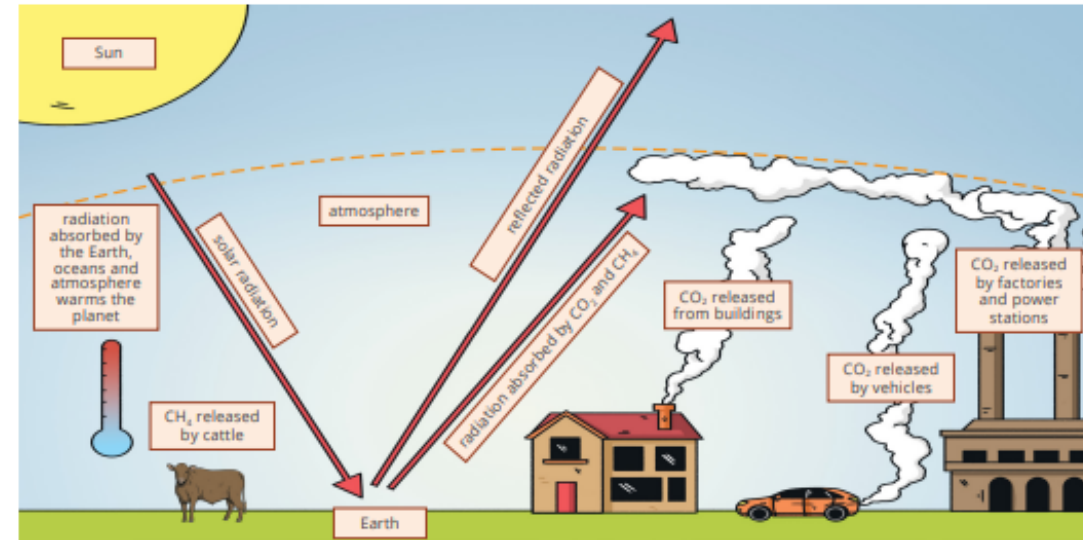
Key Words

combustion	A reaction between a substance and oxygen. The scientific word for burning.
consumer	An organism that gets its energy by eating other organisms.
decomposition	The process of breaking down a material.
excretion	The process of eliminating waste.
fossil fuel	A fuel formed over millions of years from the remains of dead plants and animals. Examples are coal, oil and natural gas.
photosynthesis	A reaction in which energy is transferred from the environment to chloroplasts in plants by light. It is represented by the equation: carbon dioxide + water → glucose + oxygen
producer	An organism at the beginning of a food chain which makes molecules. This is usually a green plant or alga.
respiration	A chemical reaction that breaks down glucose to release energy. It is represented by the equation: glucose + oxygen → carbon dioxide + water

The Greenhouse effect

Radiation from the Sun reaches the Earth's surface. Some of this radiation is reflected back into space, but some of it is absorbed by the Earth, the oceans and the atmosphere. This helps to keep our planet warm enough to sustain living creatures.

Greenhouse gases (carbon dioxide, water vapour and methane) in the atmosphere absorb reflected radiation. The more greenhouse gas there is in the atmosphere, the more radiation is absorbed. This causes the temperature of the atmosphere to increase further (**global warming**).

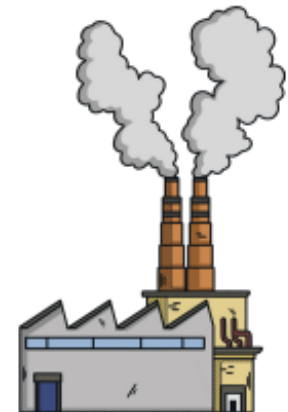


Human Impact on Earth's Climate

Natural cycles in the Earth's orbit and rotation patterns can cause changes in global temperatures and weather patterns. However, most scientists agree that human activities are causing an increase in greenhouse gases in the atmosphere and that this is accelerating **climate change**.

Human activities that increase greenhouse gas levels include:

- burning fossil fuels** - this releases carbon dioxide
- deforestation** - this reduces the absorption of carbon dioxide from the atmosphere by trees for photosynthesis
- disposing of waste in landfill sites** - this releases methane into the atmosphere
- cattle farming** - cattle release large volumes of methane



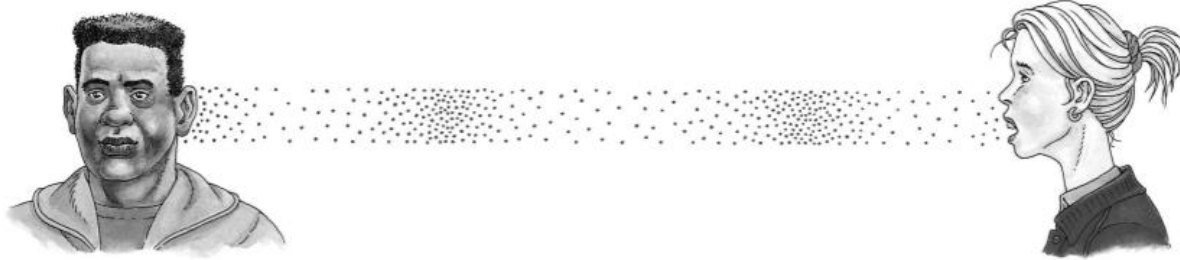
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Which two metals are found in the Earth's core?
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What was the most abundant gas for the first billion years in Earth's atmosphere?
How were oceans formed?
What gas makes up 78% of our current atmosphere?
What percentage of our current atmosphere is made up of oxygen?

Question number	Question
1	Which type of rock is produced from layers of sand and rock that build up over time?
2	Which type of rock is produced when rocks deep in the crust are subjected to extreme heat and pressure?
3	Which type of rock is produced when molten rock cools and solidifies?
4	Give an example of an igneous rock
5	Give an example of a sedimentary rock.
6	Give an example of a metamorphic rock
7	Describe biological weathering
8	Describe chemical weathering
9	Describe physical weathering
10	Which type of igneous rock is made under the surface of the rock, causing large crystals to form?

Question number	Question
1	Give a definition for combustion.
2	Give one way in which carbon dioxide is taken in from the atmosphere.
3	Give a definition for decomposition.
4	Give an example of a greenhouse gas.
5	Give the equation for photosynthesis
6	Give the equation for respiration
7	Describe what happens to the sun's radiation when it enters the atmosphere.
8	Describe one way in which humans impact the Earth's climate
9	Give a definition for excretion

Sound vibrations and waves

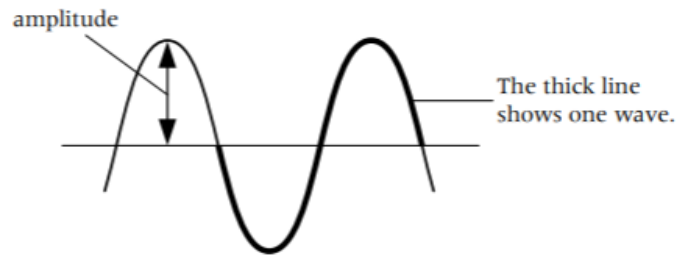
Sound is a form of **energy**. Sounds are made when things **vibrate**. The vibrations are passed on by particles in solids, liquids or gases. Sound needs a substance to pass on the vibrations, so it can travel through solids, liquids and gases but not through a **vacuum**.



The speed of sound is faster through solids than liquids, and slowest through gases. This is because the particles are very close together in solids and so the energy is more likely to be passed from one particle to the next. The sound travels in all directions because the particles move in all directions unless something stops them.

The **frequency** of a wave is the number of vibrations each second. The unit for frequency is **hertz (Hz)**. If you listen to a sound with a frequency of 100 Hz, one hundred waves reach your ear every second. High **pitched** sounds have a high frequency, and low pitched sounds have a low frequency.

The distance between the waves is called the **wavelength**. It can be measured between any point on a wave and the same point of the next wave. It is often more convenient to measure it between the top of one wave and the next.



Half the height of the wave is called the **amplitude**. The **loudness** of a sound depends on the amplitude. Louder notes have more energy and the wave has a bigger amplitude.

Sound and light

One major difference between **light** and **sound energy** is that light can travel through space (a vacuum) but sound cannot.

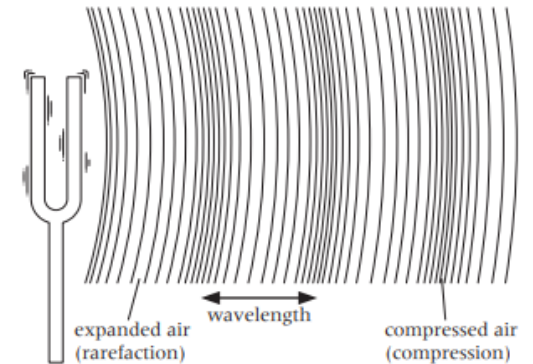
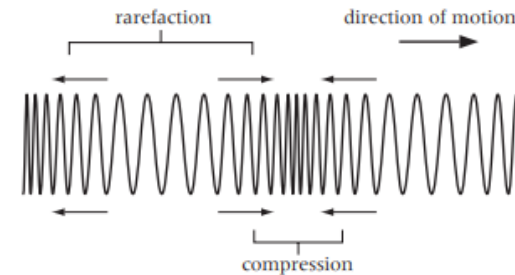
Light also travels much faster than sound. It is nearly a million times faster. Light travels at 300 million metres per second (or 300 000 km/s) and sound travels at about 330 metres per second.

Both light waves and sound waves can be reflected. We hear a reflected sound wave as an **echo**.

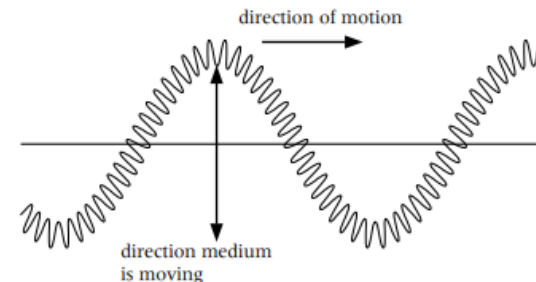
Light and sound waves are both forms of energy. There are two ways that energy can travel in waves; by **longitudinal** or **transverse** waves.

A slinky can be used to show the way that waves travel.

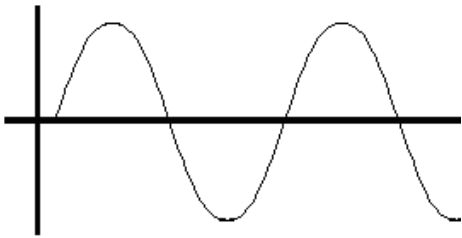
If you hold the slinky at one end and give it a short sharp push at the other, you can see a wave moving along the slinky. This is called a longitudinal wave. The vibrations are in the *same direction* as the wave. This is how sound waves move.



When a sound wave travels through air, the particles are first pushed together or **compressed** and then spread apart or **rarefied**. These areas are called **compressions** and **rarefactions**.



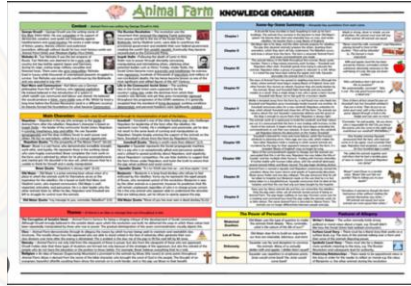
Light does not need a substance to move through, but we can use a slinky to help us to think about how light waves travel. To show a model of a light wave you need to move the slinky sideways or up and down. The vibrations are at *right angles* to the direction the wave is moving. This is called a **transverse** wave. Other examples of transverse waves are radio waves, X-rays and ultraviolet light.

Question	Answer
1. How is sound made?	
2. Does sound need particles to pass through?	
3. Does light need particles to pass through?	
4. Define the term frequency.	
5. Give the unit of frequency	
6. Define the term wavelength	
7. Define the term amplitude	
8. Label this diagram with the following keywords: • Wavelength • Amplitude	
9. Which is faster, light or sound?	
10. What is the speed of light?	

Question	Answer
1. What is the name of a reflected sound wave?	
2. What are the two types of waves?	
3. In a longitudinal wave, what is the direction of vibration?	
4. In a transverse wave, what is the direction of vibration?	
5. In a sound wave, what is it called when the particles are pushed together?	
6. In a sound wave, what is it called when the particles are spread out?	
7. Give three examples of a transverse wave.	
8. In which state of matter does sound travel the fastest?	
9. What is the frequency like in a high pitched sound?	
10. What is the speed of sound?	

REVISION STRATEGY ONE: LOOK, COVER, WRITE, CHECK

Make sure you have a copy of your knowledge organiser or your exercise book for the subject you are revising.



Step 1
Read the information carefully



Step 2
Cover the page



Step 3
Write down as much information as you can remember. Focus on ideas, key vocabulary, dates, events and people



Step 4
Check your notes against the knowledge organiser. Make any corrections and then add to your notes

REVISION STRATEGY TWO: FOLDING NOTES

Step 1

Write a page of notes on A4 paper. Focus on key ideas, vocabulary, dates, events or people.



Fold in half



Step 2

Create a mindmap summarising your notes and only including the most important information.



Fold in half



Step 3

Write a list of only the most important key words for this topic.



Fold in half



Step 4

Dual code- summarise the topic with **only** symbols, diagrams or pictures.



REVISION STRATEGY THREE: FLASHCARDS

Step 1

Read through a page of notes in your exercise book or a topic from your knowledge organiser. Write the title of this topic on one side of a card.



Step 2

On the other side of the card summarise the topic in short bullet points focusing on:

- Key words
- Dates
- Events
- People



Step 3

Use images or diagrams to summarise key ideas or concepts to help you remember.

Step 4

Revise using your flashcards!

REVISION STRATEGY FOUR: SELF QUIZZING

Research surrounding effective revision tells us that one of the most effective techniques for revision is to self-test.

Self- quizzing requires you to recall information from memory. This not only highlights what you do or don't know but also strengthens your ability to recall that information.

There are many ways to test your knowledge

- Turn over / cover the section of the knowledge organiser you are studying and write as much as you can down from memory as accurately as you can.
- Then flip over / uncover the knowledge organiser and check the accuracy of what you have written down.
- Use a different coloured pen to correct any errors and fill in any gaps.
- Make your own quizzes and tests and return to them after a few days to check how much you can remember.



Look: Identify key vocabulary and fundamental knowledge from your knowledge organiser.

Look and write: write the key words, formulae or important information in the first column.

Cover and write: cover the look and write column. Try to repeat the information in the cover and write column.

Check: check your answer. Make any corrections in the final column in green pen.



Look and write	Cover and write	Check

Look: Read the key information in the look column.

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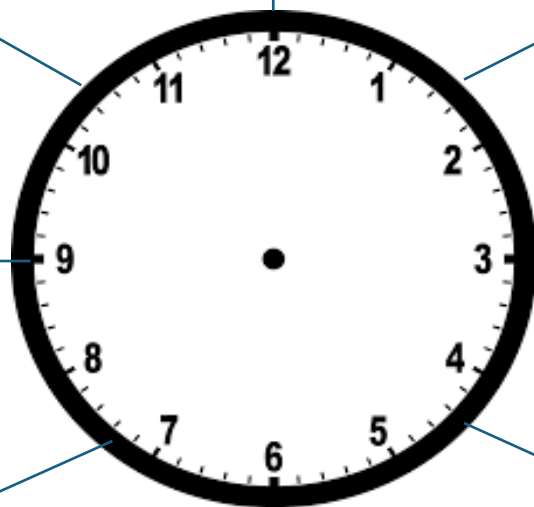
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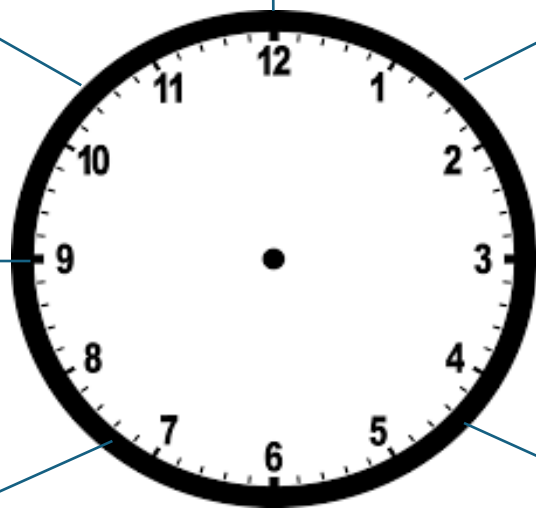
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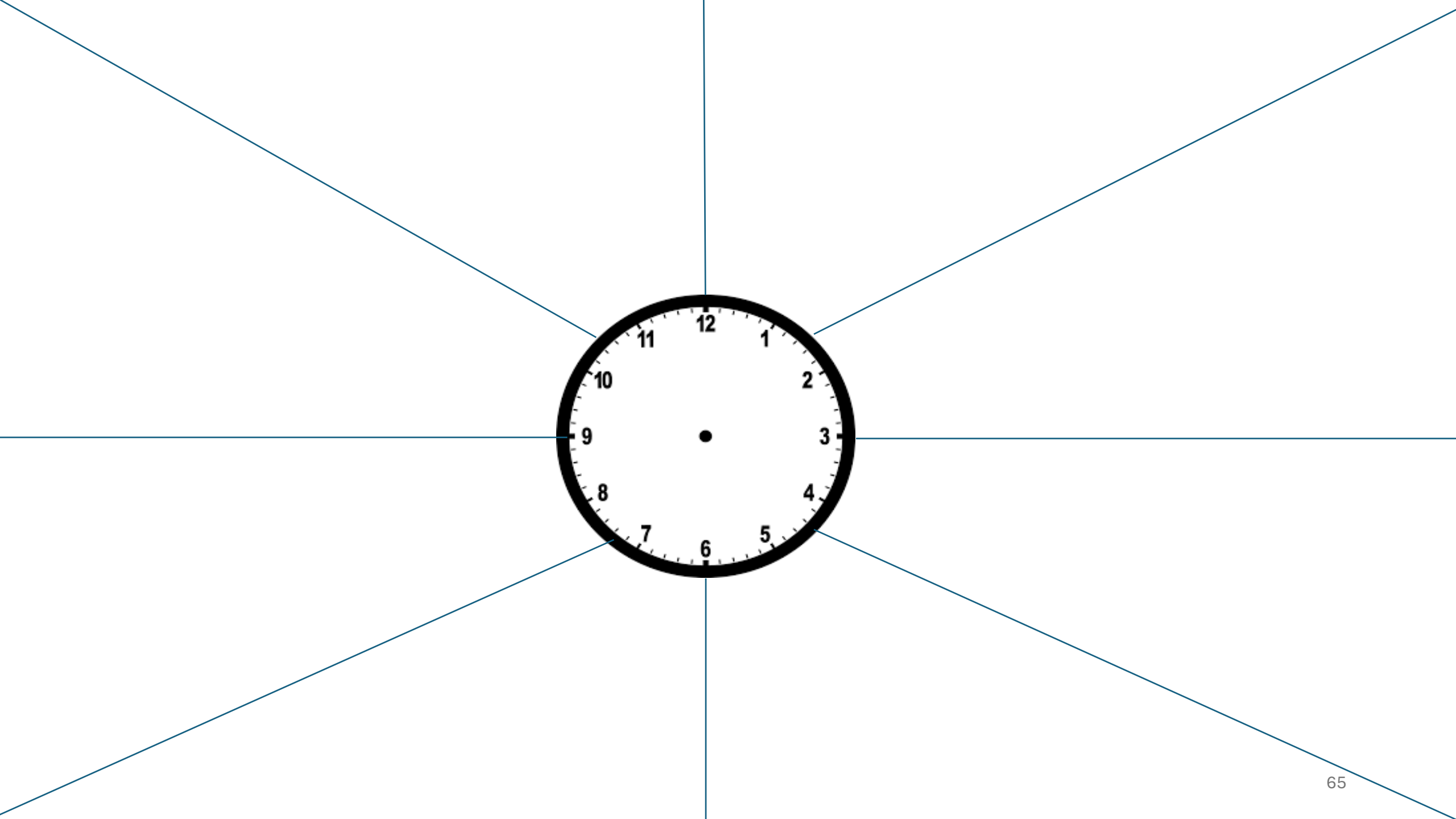
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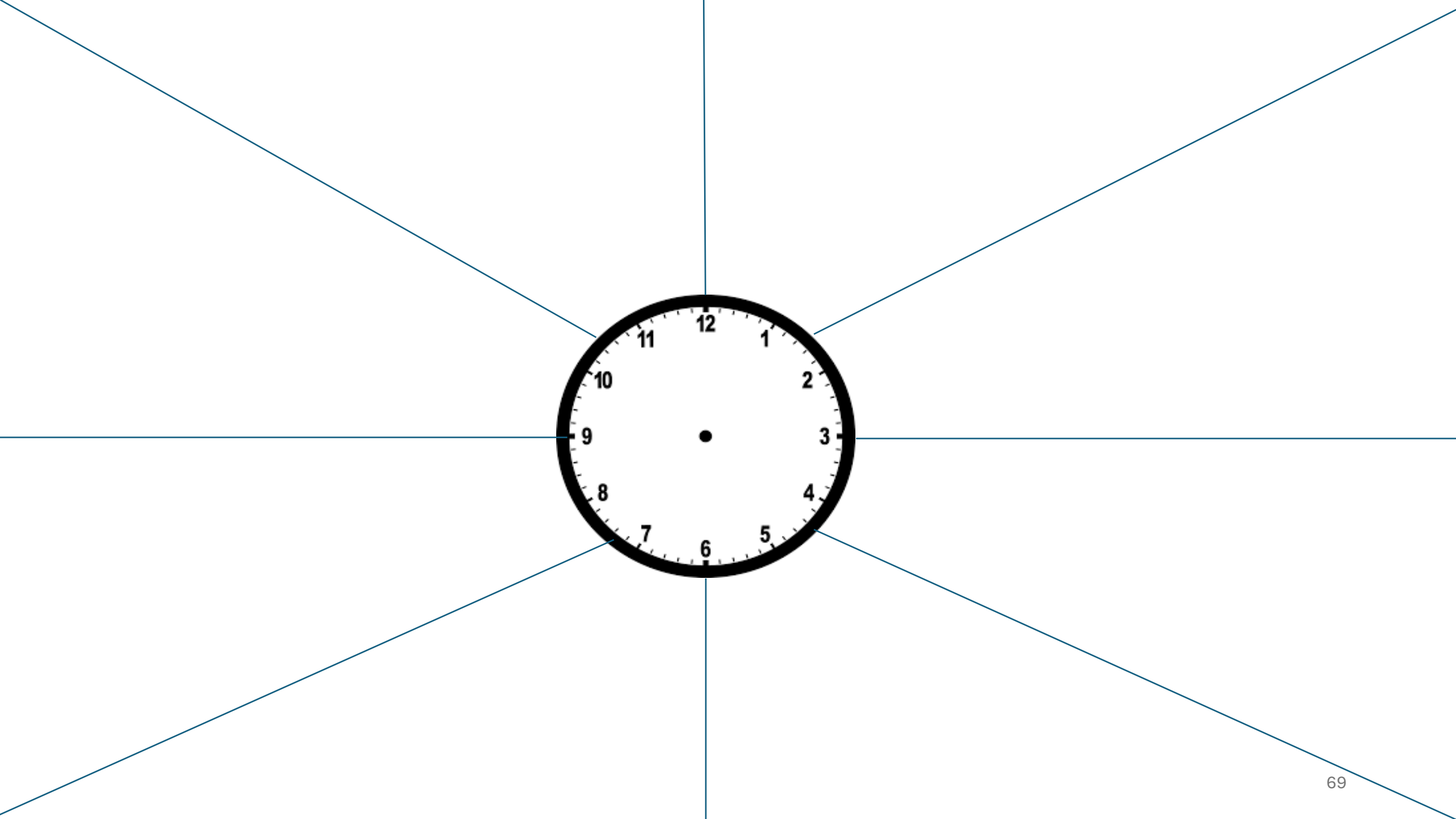
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Look

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write**

Cover and write

Check

[illegible]

