Theme 1: Population and Settlement

[1.1 Population Dynamics]
Carrying capacity: number of people an area can support

Overpopulation - more people in an area than can be supported by its resources
Underpopulation - more resources available than the population can use effectively

Consequences	
Overpopulation	Underpopulation
● Levels of pollution ● Crime rates ● Unemployment or underemployment ● Levels of food and water shortages ● Pressure on services such as hospitals and schools ● Lack of houses	● Fewer people pay taxes → lead to higher taxes ● Underused resources → lead to waste ● A shortage of workers ● Lower levels of exports and production → affects the wealth of an area ● Fewer customers for goods & services

Optimum population: occurs when there is a balance between the number of people and the resources/technology available
→ Highest standard of living

Population can change by:

1. Migration

- Result fo immigration(inward movement of people into a country) and emigration (outward movement of people out of a country)
- Net migration = difference between immigrants and emigrants

2. Natural population change

- Causes of rapid increase in population:
    A. Improvement in agriculture during the agricultural revolution led to higher yields and more varied diets
    B. Medicine and medical care which reduces the death rate
    C. Technology and transport, lead to a wealthier population → increasing life expectancy

⇒ decrease in death rate

High BR in LEDCs

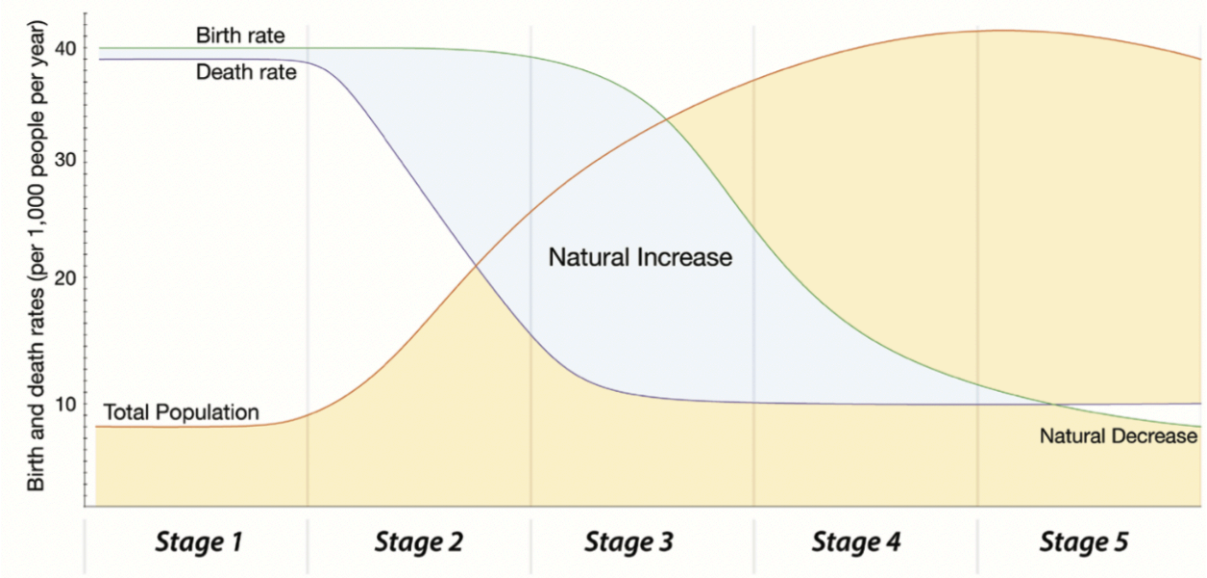
1. Lack of access to family planning and contraception
2. An increase in women surviving childbirth
3. Families continue to have large numbers of children to look after their parents in old age and to help support the family
4. The culture of having larger families which takes many years to change
5. Religious reasons

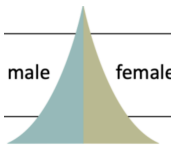
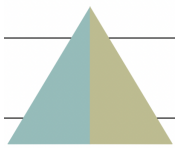
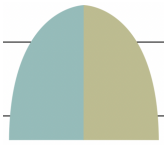
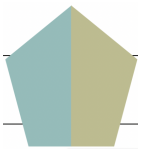
Natural change in population = BR - DR

- Natural increase = DR < BR
- Natural decrease = BR < DR

Demographic transition model

- shows how BR and DR changes over time and how this affects the overall population as the country



	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Natural Increase	Stable/ Slow Increase	Very Rapid Increase	Increase slows down	Stable / Slow Increase	Stable / Slow Decrease
BR	High	High	Falling	Low	Very Low
DR	High	Falls Rapidly	Falls more rapidly	Low	Low
					

Fertility Rate: the average number of children per woman in childbearing age

- Factors affecting Fertility

Social	Economic	Political
Infant mortality rate → more children to ensure some survive to adulthood	Cost of having children	Pronatalist policies
Education - more women are in formal employment	Lack of pensions - in LEDCs children are needed to care for elderly parents as there are no pensions	Anti-natalist policies encourage women to have fewer children which decreases the fertility rate
Religion - religious beliefs can influence how many children a woman has	Contribution to family income	

Healthcare - the availability of contraception and family planning		

DR is affected by:

1. health care/hospital/clinics/medicines
2. number of people per doctor/availability of doctors
3. food supply/diet/famine/starvation
4. water supply/quality/drought
5. sanitation/hygiene
6. diseases or examples/AIDS or HIV
7. wars
8. vaccinations
9. education about healthcare/disease
10. care for the elderly/pensions

Population density:

Population density = $\frac{total\ population}{land\ area}$

Population policies

Anti - natalist	Pro - natalist
Aim: reduce pressure on resources and improve the quality of life for the whole population	Aim: increase the population due to: - An ageing population which increases social and healthcare costs - A workforce shortage - Reduced payment of taxes due to fewer workers
China One - child policy ● Fines for having more than one child ● Increased access to contraceptives and family planning education ● Posters and adverts to promote the advantages of only having one child ● Better employment opportunities for those with only one child ● No payment for education or healthcare for second children ● Promoting late marriages	France ● Discounts on public transport for families with three or more children ● Increased paid maternity leave ● Better mortgage deals ● Tax allowances ● Free childcare from 3 to school age ● Cash incentives for mothers who stay at home to care for children ● Subsidised holidays
Impacts ● Affecting the male/female ratio due to the preference for male children ● There are over 30 million more men under 20 than women under 20 ● Decrease in population growth rate ● An ageing population	

[1.2 Migration]
Migration: movement of people across an official boundary

Voluntary	Involuntary
Free choice of movement - Mostly economic reason - For better standard of living	Forced to move - Natural hazards - Refugees & asylum seekers
Urban - rural migration	Rural - Urban
- Common in MEDCs - Living is cheaper and more attractive in less industrial areas	- Common in developing nations - Seek work in cities (where new industries and employment opportunities are developing) - Often urbanisation
Internal	International
when people move to a different place within the same country	involves the crossing of a country's border

Push factors

1. war, political and religious persecution
2. unemployment and low wages
3. poor standard of living (poor healthcare and education)
4. natural disasters eg. flood , volcanic eruptions, drought
5. Famine

Pull factors

1. economic and political stability and safety from conflict and persecution
2. better job prospects
3. better standard of living
4. good healthcare and education

페페에 자주 나오는 질문들

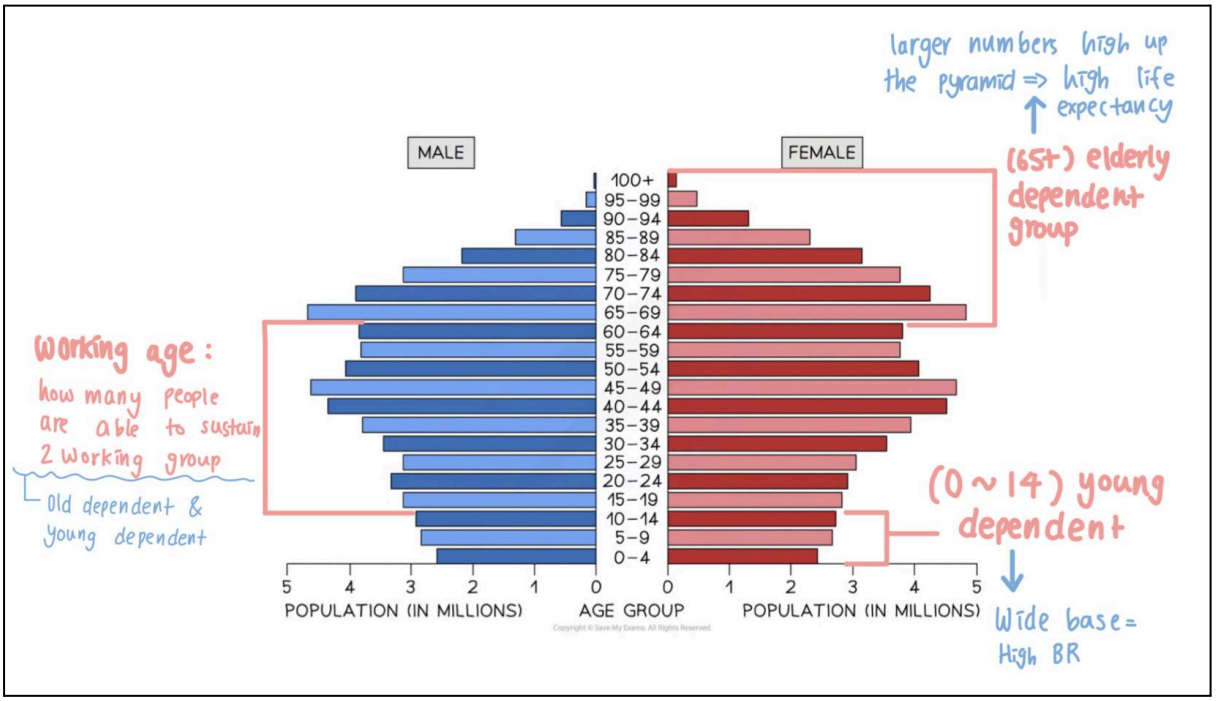
Advantages for migrants	Disadvantages for migrants
1. Better job on arrival 2. Wages may be higher in the country of origin 3. Escape from conflict 4. Better quality of life 5. A better education and jab skills 6. Wider choice of job opportunities 7. Support family in country of origin through remittances 8. Learn a new language	1. Running out of money 2. Language barriers and cultural assimilation 3. High financial cost of migration 4. Separation from family and friends 5. Problems settling into a new culture (assimilation) 6. Risk of exploitation from unscrupulous employers 7. Migration may involve hazardous travel
Advantages for country of origin	**Disadvantages for country of origin**
1. Migrants may return with new skills 2. Reduction in unemployment 3. Less pressure on public services 4. More resources available 5. Remittances are source of income and can boost local economy	1. Tax inc. due to depopulation 2. Reduction of workforce 3. less of a skilled workforce 4. Ageing pop. 5. Depopulation in rural → affects agricultural output
Advantages for country of destination	**Disadvantages for country of destination**
1. More low-wage workers 2. Job fulfilment 3. Increased diversity 4. Cultural enrichment 5. Boost to local economy	1. Job competition 2. Increased pressure on public services 3. Discrimination and racial tensions Increased pressure on natural resources 4. Overcrowding

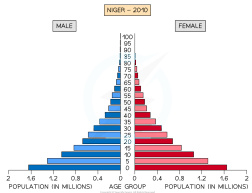
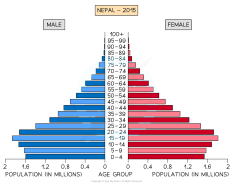
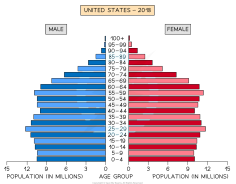
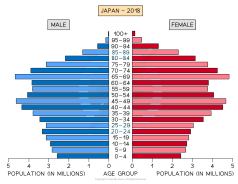
Factors preventing migration:

1. High cost of moving
2. Legal barriers, eg. VISA, passports
3. Language barriers
4. Lack of safe transport
5. Extreme weather conditions
6. Lack of temporary accommodation

[1.3 Population Structure]

Population pyramid: display the gender and age structure of a given population



			
LEDC	LEDCs/NICs	HIC	HIC
Stage 2 of DTM	Stage 3 of DTM	Stage 4 of DTM	Stage 5 of DTM
- High BR - Low life expectancy High DR but starting to decrease - High infant mortality rate - Young dependant population	- Decreasing BR - Increasing life expectancy - Decreasing DR - Decreasing infant mortality - Larger working age population	- Decreasing BR - Increasing life expectancy - Decreasing DR - Low infant mortality - Larger working age population	Narrowing base - Decreasing BR - Increasing life expectancy - DR is higher than the BR due to the ageing population - Low infant mortality - Ageing population - older dependent population

Implications of population structure:
Population issues can be identified (including: Ageing pop, Falling BR, Impacts of migration)

1) Ageing populations

- Many HICs (inc in older dependent pop)
- Implications:
    - Increased pension payment
    - Increased need for care homes
    - Increased pressure on the healthcare service and social care
- Fewer working group
    - Governments are not able to collect as much tax
    - Some areas suffer worker shortages

2) Falling BR

- Many HICs and MICs
- Implications:
    - School closures
    - Future workforce shortages

3) Migration

- Migration → imbalance in population structure
- Rapid population growth as a result of migration can lead to:
    - Increased pressure on services (healthcare and schools)
    - A shortage of housing
    - Increased traffic congestion
    - Increased water and air pollution
    - Shortage of food
    - Lack of clean water

$$Dependency\ ratio = \frac{young\ dependents + old\ dependents}{working\ population}\ X\ 100$$

[1.4 Population Density and Distribution]

Population distribution: way in which the global population is spread across the world
Population density: dividing the total population by the total area

Physical Factors	Human Factors
Climate ● Lower in colder regions and tropical deserts ● Extremes of temp create a harsh living env.	Economic ● More people live where there are more jobs ● Number of jobs is affected by infrastructure and capital (the money available)
Water supply ● Settlements are usually located near a water supply ● If water is difficult to obtain → lower density	Political ● Government investment in area can improve the infrastructure which increases industry/business
Natural resources ● Minerals ● Higher population density	Social ● Better housing, education, services → more people attracted
Relief ● Mountainous areas → lower density due to difficulties in building and growing crops	Cultural ● In some cultures, larger families are valued highly
Soil quality ● Better quality, higher density ● Easier to grow crops	

[1.5 Settlements & Service Provision]

Rural(area w/ less than 10,000 people living within its boundaries)
- dispersed, hamlet, village and small market town

Urban (area w/ more than 10,000 people living within its boundaries)
- large towns, cities, conurbations and megacities

Settlement Patterns:

1) Linear
    a) Settlements in a long thin line
    b) Found in sparsely populated rural areas
    c) Along a track or road
    d) Along a river (water source)
2) Dispersed
    a) Isolated dwelling
    b) Small hamlets
    c) Agricultural land is poor and farmers need large areas of land
3) Nucleated
    a) Tightly cluster around a central feature
    b) Few buildings
    c) On an intersection of roads
    d) On a joining points of a river
    e) Reason: defence, trade, co-operative community(agriculture, water, work), floodplain

Settlement site and situation
Site - physical land that the settlement is built on
Situation - position of the settlement in relation to other features

- Wet points: good water supply
- Dry points: Away from the risk of flooding
- Nodal points: Where routes meet
- Bridging point: Cross-roads and locations of trade
- Defensive sites: Higher ground to protect and defend (castle, river meander,
- surrounded by rivers, on a hill)
- Aspect: Settlements often found in sunny side of the valley
- Shelter: away from cold prevailing winds or rain
- Resources: Important for industries

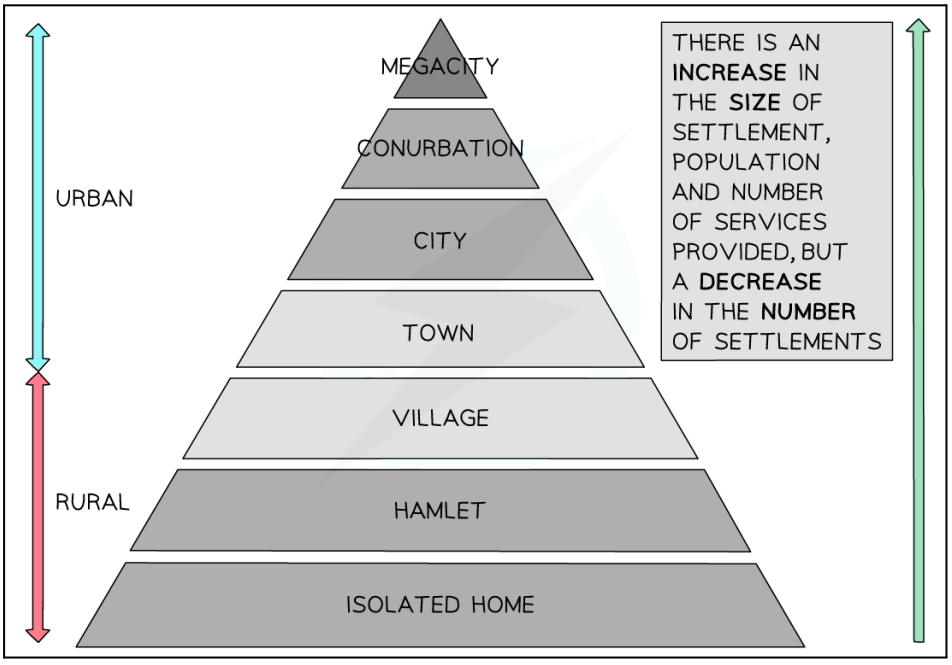
Factors for Site and situation

1. Availability of water but X suitable to build next to the river(flooding)
2. Cultivation on a flood plain(fertile soils)
3. Building on level ground, but harder to defend or get materials to
4. Accessibility → problem if the relief is too steep, as transport and commerce can be affected
5. Proximity to other places needs to be considered (for work or to get supplies)

Growth & Function of Settlements

1. Residential: main purpose is habitation
2. Market town: commerce and trade
3. Tourist resort: Main purpose is attracting tourist industry
4. Administrative: houses administrative branch or government.

Settlement hierarchy
Classified based on population size, number of services provided, number of settlements



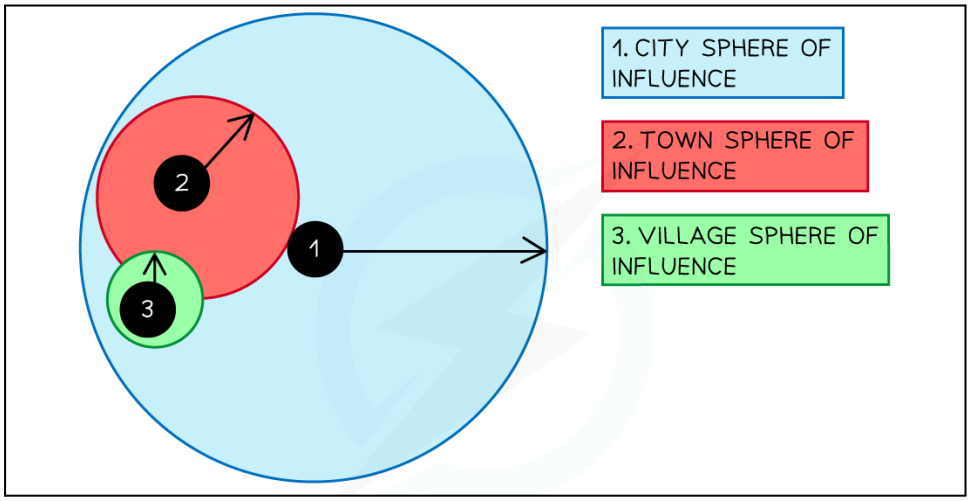
Threshold population: minimum number of people necessary before a particular good or service will be provided in the area

Low-order services: small village or hamlet (w/ small pop)
High-order services: cities and conurbations

Rural - urban fringe: edge of the city where it meets countryside

Sphere of influence

- Range that people will travel to obtain a particular service or product
- Larger the settlement, greater the influence

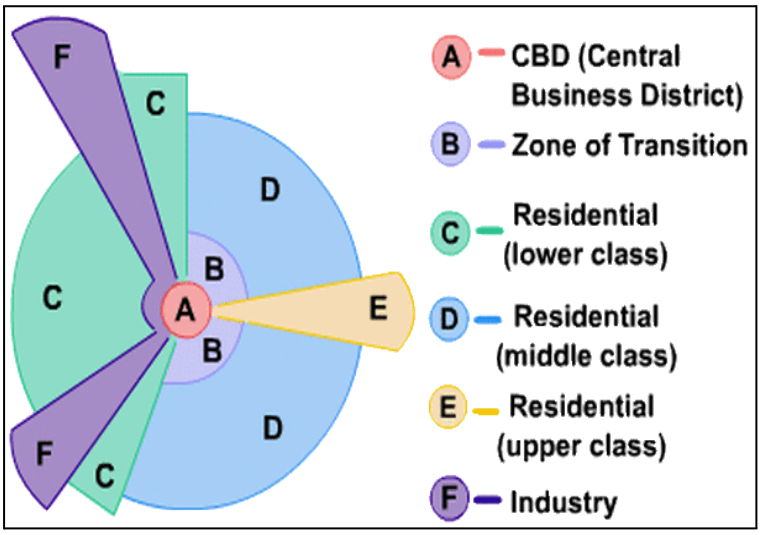


[1.6 Urban Settlements]

Urbanisation: Movement of population into urban areas
Causes:

1. Rural-urban migration due to population pressure and lack of resources in rural areas
2. Infrastructure expanding - attraction of people seeking employment
3. Better services such as healthcare
4. Secondary and tertiary industries

Land use:



Central business district (CBD)
A central core

Industrial areas
Inner-city ring

Different residential districts
Suburban ring

Outer zones of suburban expansion -
Urban fringe

Central Core	Inner city zone	Suburban zone	Urban rural fringe
- Highest land values - Competition high - Limited housings - High-order shops accessible - department stores, specialist stores - Offices, banks and financial centres - Transport centres	- Terraced houses in a grid like pattern - Originally built for factory workers - Small corner shops - Very few open space - Periods of unrest but many undergone regeneration: gentrification	- Semi-detached houses with gardens - Cul-de-sacs (dead ends) - Small shopping parades, small shops, several specialist shops - Often home for commuters who need access to CBD	- Low density, high quality modern housing - Cul-de-sacs (dead ends) - Very open spaces: used for golf courses, allotments, business parks and airports

CBD has a particular problems:
- Congestion
- Pollution
- Inequality
- Housing
- Crime
- Land-use change

Urban sprawl
: The unplanned growth of urban areas into the surrounding countryside

- Problems:
    - Loss of farmland to build new homes
    - Loss of traditional 'green spaces' - school fields, parks etc are being built on
    - Impact on ecosystems - natural and built (removal of trees increases pollution levels etc.)
    - Creates impermeable surfaces and surface run-off

Difference between land use models in MEDCs and LEDCs:
- Higher cost housing tends to be closer to the CBD in MEDCs
- Low quality housing tends to be further from the CBD in LEDCs
- Squatter settlements in LEDCs

[1.7 Urbanisation]

Factors affecting the rate of urbanisation

1. Speed of economic development
2. Rate of population growth

Cause of rapid urban growth

1. Natural increase
2. Urban pull factors
    a. Higher wages
    b. Pace and excitement
    c. Improved education and healthcare
    d. Better job opportunities
    e. Public utilities: water, gas, electricity, etc.
    f. Government support
3. Rural-urban migration
4. Rural push factors
    a. Limited healthcare and education
    b. Mechanisation of farming
    c. Lack of opportunities
    d. Lack of government support or investment
    e. Harsh and monotonous lifestyle
    f. Unreliable food supplies/famine

Counter - urbanisation

: movement of people from an urban area into the surrounding rural region

Reasons

1. Mobility and accessibility
    a. Higher personal car ownership
    b. Increase in public transport and road development → easier access to rural areas

2. Increased wealth
    a. Making housing and travel more affordable

3. Agricultural decline
    a. availability of more land for housing

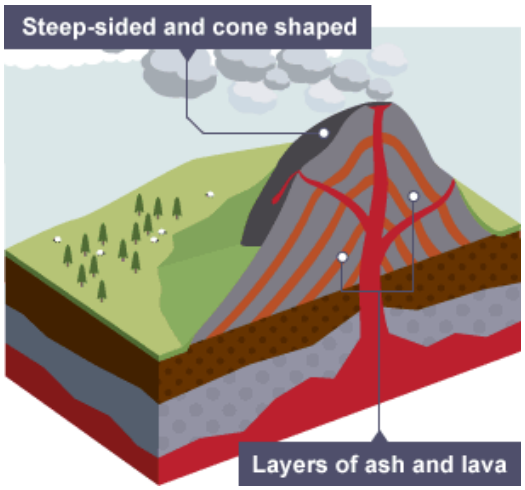
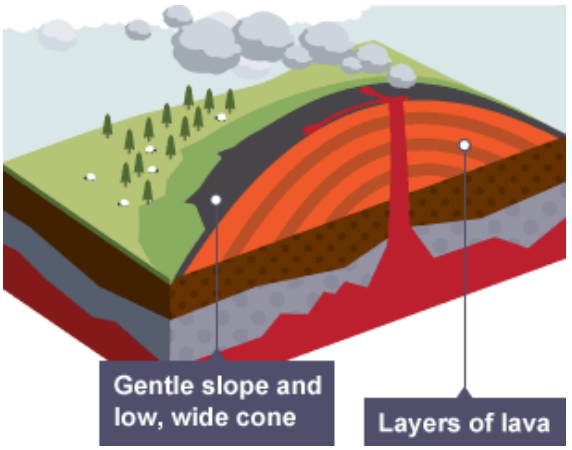
4. Green belt
    a. People need to go further out to get the rural life they are looking for

5. Second homes and early retirement

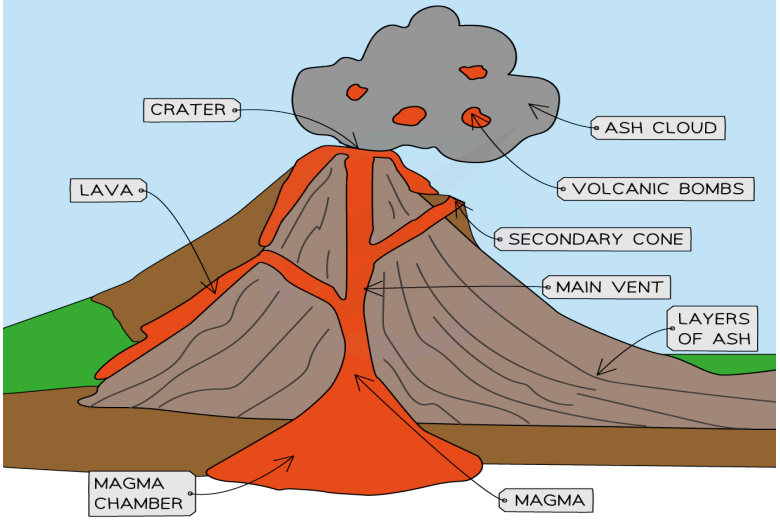
Theme 2: The Natural Environment

[2.1 Earthquake and Volcanoes]

Types of volcanoes

Composite (strato) volcano	Shield volcano
	
• Acidic lava • Steep-sided (lava doesn't flow very far) • Viscous lava • Violent eruptions • Formed from alternating layers of ash and lava • Longer period between eruptions • Tend to form on convergent (destructive) plate boundaries	• Basic lava • Gently sloping sides • Runny/thin lava • Less violent eruptions • Tend to form on divergent (constructive) plate boundaries or hot spots • Frequent eruptions

Main Features of Volcano

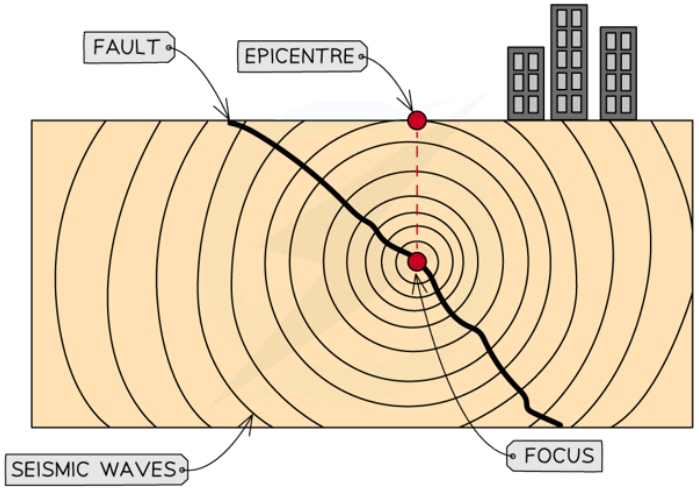


Main Features of Earthquake

Epicentre - Point on the Earth's surface directly above the focus
Focus - Point at which the earthquake starts below the Earth's surface
Magnitude - A measure of the amount of energy released during an earthquake

Earthquake Sequence

- As the tectonic plates move, they get stuck
- Pressure builds as the plates continue to try to move
- As the pressure is released as energy, plates jot free
- Energy passes through the Earth's crust as waves → earthquakes



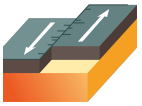
시험에 Volcano & EQ distribution 물어보면!!

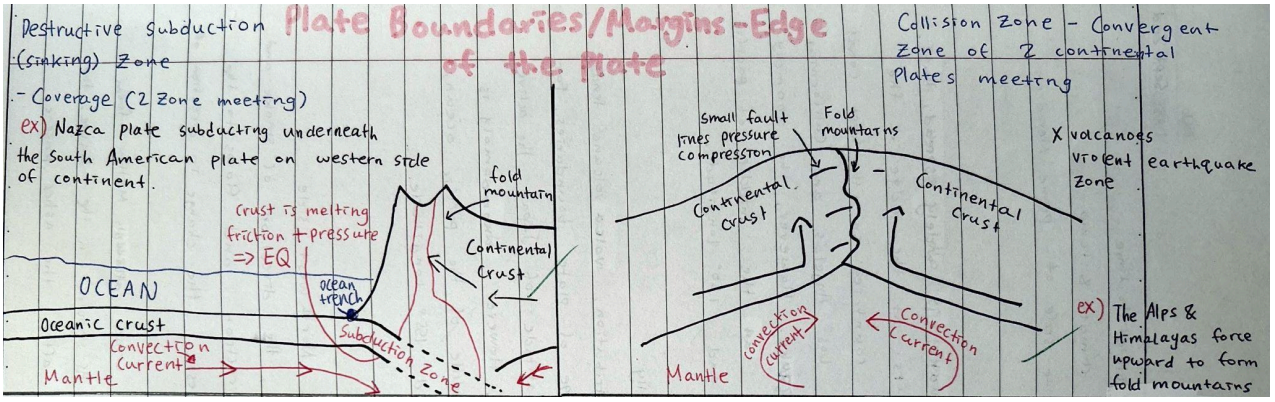
- 사진에 따라 다르겠지만 most occur along the pacific **'Ring of Fire'**

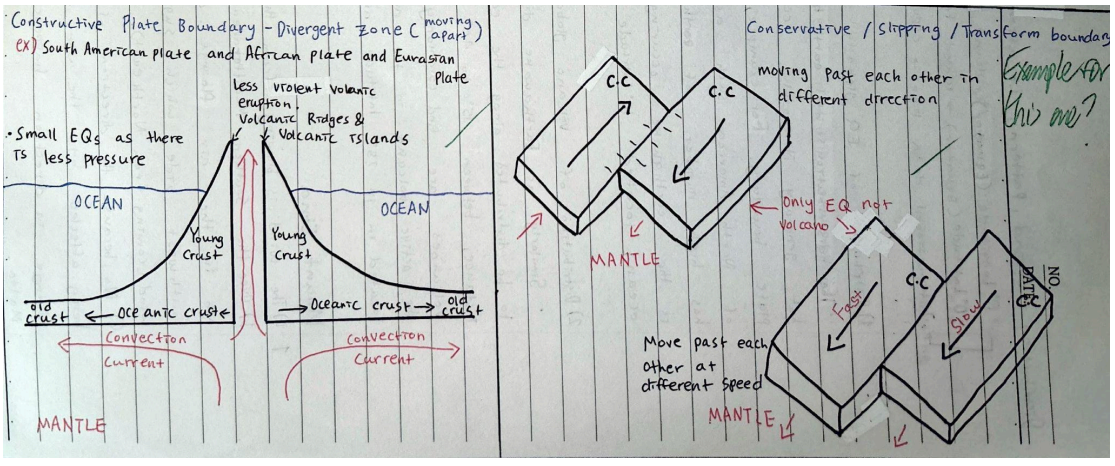
Causes of EQ and Volcanic eruption

Inner core	Approximately 1220 km Extremely dense, mostly made up of iron and nickel. High pressure
Outer core	Made of Iron and nickel in liquid form → outer core: semi molten Approximately 2300 km.
Mantle	The Earth's thickest layer - approximately 3000 km Very dense, hot and semi-solid (Fe, Mg, Si)
Crust	Solid→ Oceanic and Continental Continental crust → old and not dense as oceanic crust Oceanic crust → continually being created and destroyed as a result of plate movement where it is denser and so subducts under the continental crust

Plate boundaries - where two plates meet

Types of plate boundary	Types of crusts involved	Direction of plate movement	Tectonic activity	Features	Additional info
Destructive subduction	Oceanic + Continental	Converge	Volcano & EQ → High intensity	Fold mountains Volcanoes Ocean Trench	Oceanic crust subducted (denser)→ cause friction → friction cause heat so oceanic crust melt (magma heat) → eventually more magma → high pressure → magma escape through weak surface of earth → cooling lava and ash build up forming a composite volcanoes
Collision	2 continental	Converge	EQ → High intensity	Fold mountains	Crumples and folds create folded mountain → no space for lava to erupt → no volcanoes
Constructive	2 Oceanic	Diverge	Volcano & EQ → Low intensity	Volcanic island Volcanic ridge	Plate moves away → space between plates → magma can rise through space and solidify → forming new crust (usually form shield volcanoes)
Conservative	2 continental		EQ → High intensity	Fault line	Two plates slide past one-another → plates get stuck as they move and pressure and friction increases → earthquakes.





Effects/hazards of EQ and Volcanic Eruptions

	Primary	Secondary
EQ	- Ground Shaking - Surface rupture	- Liquefaction - Landslides - Tsunami - Fires
Volcano	- Pyroclastic flow - Lava flow - Volcanic Bombs - Lahars(mudflow) - EQ - Direct ash fall	- Landslides - Tsunami - Acid rain - Ash fallout from the atmosphere

Reason people live in areas where volcanoes erupt

1. Tourism → area for job + money due to employment activities
2. Volcanoes create fertile soil → agriculture
3. Geothermal energy → as the magma is closer to the surface the heat can be used to generate geothermal energy
4. Minerals → mining & sold (provide work for local ppl)
5. Volcanic materials can be used for construction or for sale
6. Cheaper land (due to risks living near)

How new buildings can be earthquake - proof?

1. Build deep/stronger/sturdier foundations/base
2. Reinforce/use concrete/bricks for buildings/walls/roofs
3. Use metal/steel/aluminium beams
4. Use diagonal bracing
5. Flexible building materials
6. Use dampers/shock absorbers in base of building
7. Computers controlled weights/counter balances on roof/weight on roof
8. Automatic window shutters
9. Use fire resistant materials
10. Build low building

[2.2 Rivers]

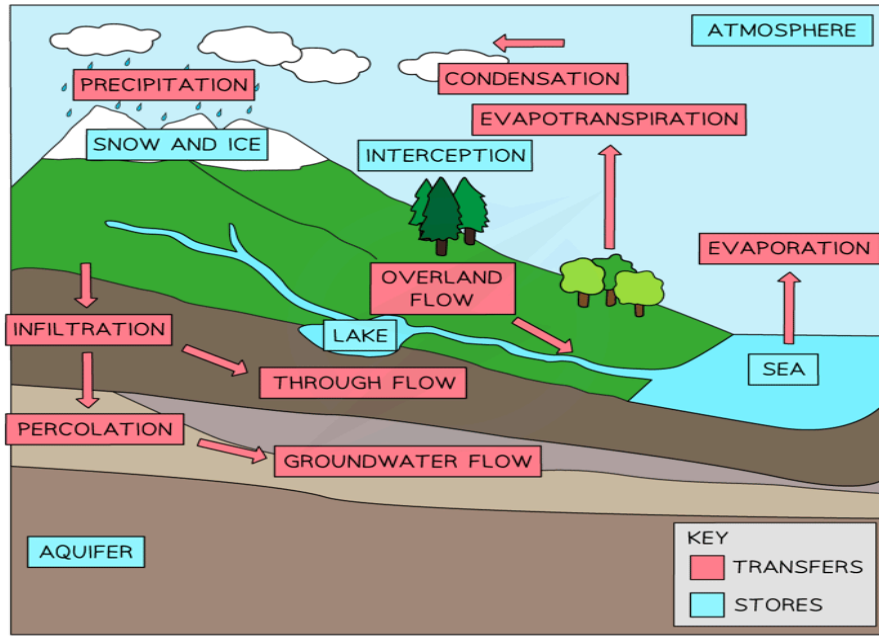
Hydrological cycle

- Only 2.5% of the water on Earth is freshwater
- 68.7% of freshwater is stored in glaciers and ice sheets and 30% is groundwater
- The remaining 1.3% of freshwater is in rivers, soil moisture, lakes and the atmosphere

→ All water is part of the hydrological cycle

Hydrological cycle = closed system

- Water is constantly recycled
- There are stores and transfers(flows)



Evaporation, Condensation, Transpiration, Evapotranspiration, Precipitation, Overland flow, Infiltration, Percolation, Through flow, Groundwater flow

- Stores are those places where water is held for a period of time
  Including:
- Water in the atmosphere in the form of water vapour or water droplets in clouds
- Surface stores such as puddles, lakes, rivers and reservoirs
- Interception is how precipitation is prevented from reaching the ground, usually by being caught on leaves or branches
- Aquifers are permeable rocks such as limestone and sandstone which can hold water
- Ice and snow
- Seas and oceans

Drainage Basin
: an area of land drained by a river and its tributaries

Features:

- Watershed (boundary between drainage basins)
- Source (where the river starts)
- Confluence (place where two or more steam/river meets)
- Tributary (A stream/river flowing into a larger river/stream)
- Mouth (where river enters sea)

- Solution
    - Rocks are slowly dissolved by the water over time

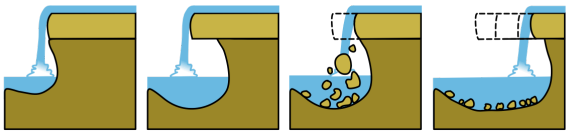
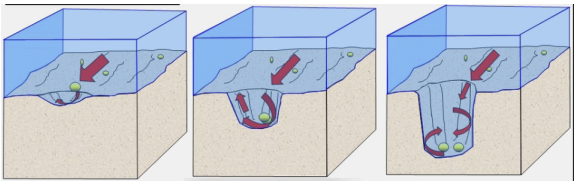
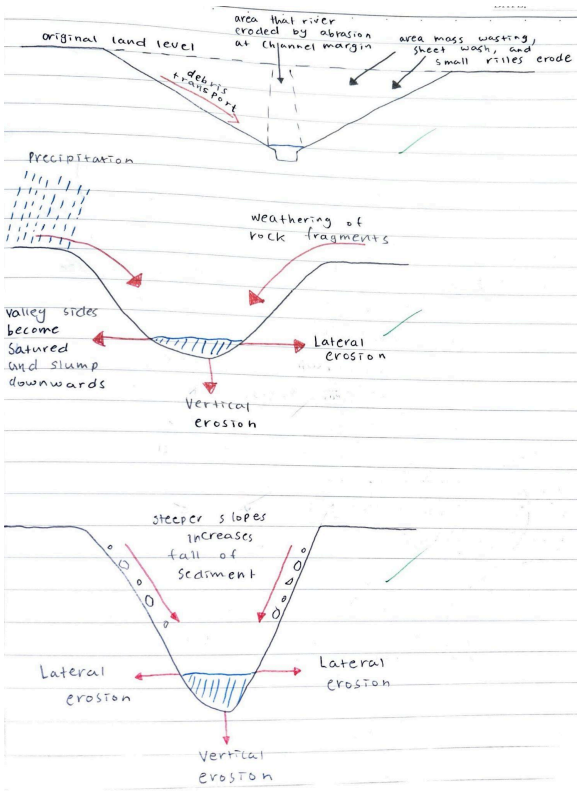
- Hydraulic Action
    - Sheer force of the river forces air into small pockets on the river bank and bed, causing them to break apart over time

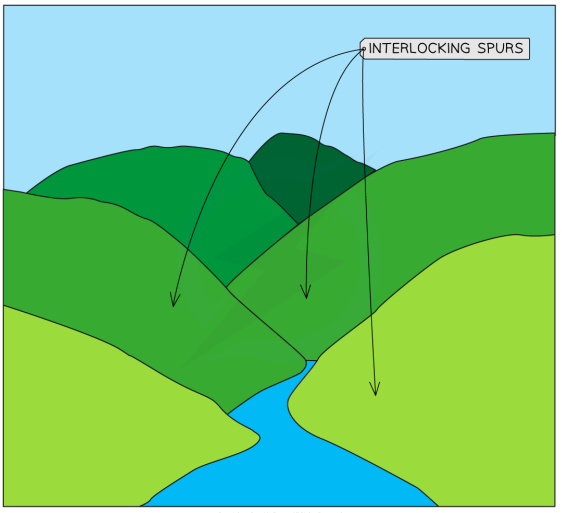
- Attrition
    - Rocks that rivers are carrying knock against one another in the current, and eventually break each other part

- Abrasion
    - Small rocks and pebbles pushed along the bed of a river by the speed and intensity of the current

Weathering: Breaking up of rocks by the action of weather, plants, animals and chemical processes

River Landforms

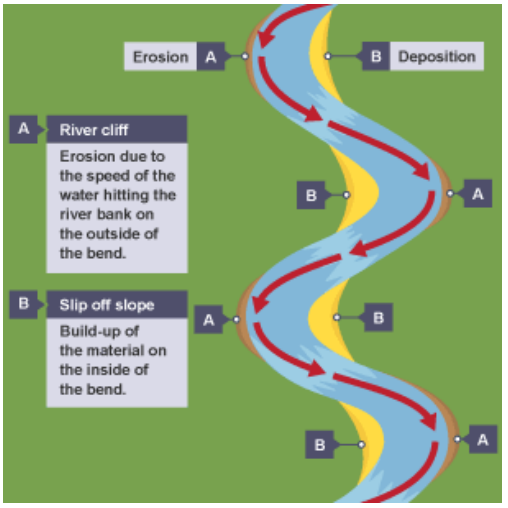
<table>
<tr><td>Waterfalls & Gorges</td><td>Pothole</td></tr>
<tr><td>
1. Hydraulic action + Abrasion
2. Soft rock erodes quicker, undercutting the hard rock and creating a plunge pool
→ development of an overhang of hard rock
3. eventually collapses
4. Overhang falls into the plunge pool increasing abrasion and making the plunge pool deeper
5. The process then begins again and the waterfall retreats upstream leaving a steep sided gorge

</td><td>
1. Formed by corrosion in river where the fast - flowing water swirls
2. Fragments of stones and pebbles carried by river whirl around, drilling circular depression into river bed
3. The flowing water keeps the fragments in motion, constantly wearing away the sides of depression
4. Gradually becomes deeper and wider → pothole

</td></tr>
<tr><td>V-shaped valleys</td><td>Interlocking spurs</td></tr>
<tr><td>


</td><td>
1. In the upper course of the river the channel starts to meander
2. Erosion happens on the outside of the bend
3. In the upland areas this forms interlocking spurs


</td></tr>
</table>

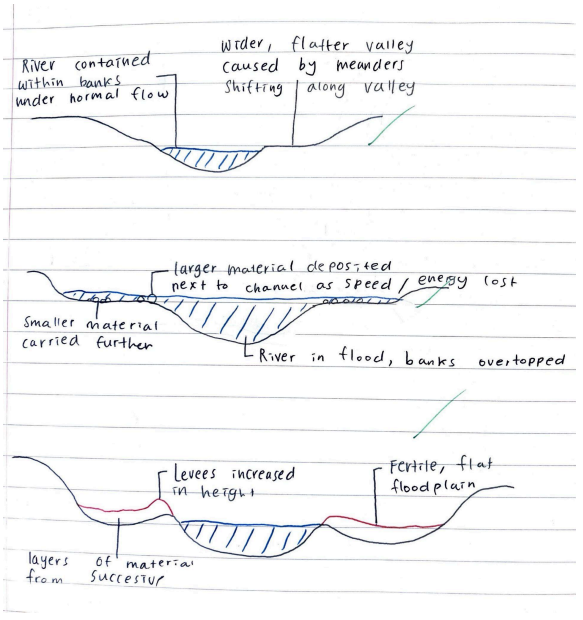
Oxbow lakes & Meander

1. Once a river enters the middle course it begins to take a more curved route. This results in variation of speed across the river channel.
2. Variation of speed across the river channel (as the river begins to take more curved route)
3. Velocity is faster on the outside bed → erosion (creating river cliff)
4. Velocity is slower on the inner bed → deposition (creating slip-off-slope)
5. Corrasion, corrosion, hydraulic action and abrasion
6. Continuation of erosion and deposition form meander
7. Over time neck of the meander narrows
8. During floods river takes shortest course through the neck
9. New deposition seals off the ends and cut-off becomes oxbow lakes
10. Evaporation and infiltration occurs so the water eventually disappears and vegetation grows



Floodplains and levees

1. Floodplains are flat expanses of land either side of the river
2. The migration of meanders leads to the formation of the floodplain
3. High discharge may cause the river to overflow the banks
4. More of the water is in contact with the land surface as the water spreads across the floodplain
5. Increased friction reduces velocity and material is deposited across the floodplain gradually increasing the floodplain height
6. The heaviest material is deposited first nearest to the river channel forming natural embankments and levees



River Hazards - Flood

: when water in river reaches bankfull discharge and then overspills across the floodplain

Causes

1. Period of heavy, torrential rain
2. Prolonged period of steady rain
3. Landslides
4. Snow and ice melt
5. Storm surges pushing water up the river channel
6. Urbanisation
7. Deforestation
8. Agriculture
9. Human induced climate change
10. Building of bridges and dams

Opportunities

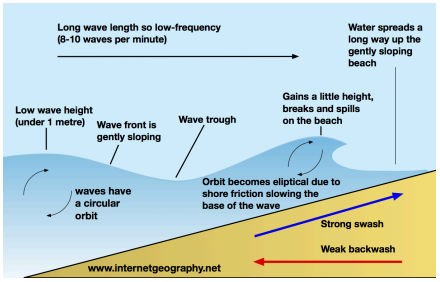
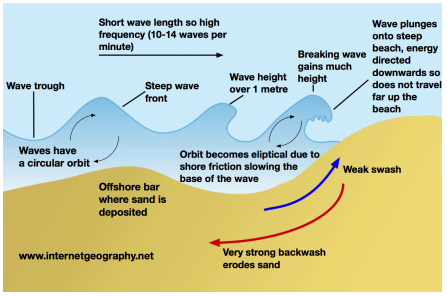
1. The silt deposited during flooding is often rich in minerals and nutrients, making it ideal for growing crops
2. Rivers are a source of food
3. The floodplains are flat land which makes the construction and building of transport networks easier
4. Water can be used to irrigate farmland
5. Leisure and tourism
6. Generating electricity
7. Transporting goods and people

Managements

Hard Engineering	Soft Engineering
1. Dams and reservoirs - Enable the amount of discharge downstream to be controlled 2. Embankments or levees - Increase the capacity of river 3. Straightened channels - River flows more quickly pass vulnerable areas 4. Flood relief channels - Reduce discharge 5. Spillways or overflow channels - Take excess water away from the main channel	1. River restoration 2. Wetland conservation - Slow the flow of the flood water 3. Catchment management plans - Assess the risk of flooding 4. Flood plain zoning - Only certain land uses are allowed on the flood plain 5. Afforestation

[2.3 Coasts]
Coast: where the land meets the sea
Waves
Fetch - distance the wind blows over a body of water without obstructions

- Larger the fetch the greater the wave height, the greater the wave height, the greater the energy of the waves

	Constructive Wave	Destructive Wave
Swash	Strong	Weak
Backwash	Weak	Strong
Wavelength	Long with low height	Short with high height
Frequency	Low	High
Energy	Low	High
		

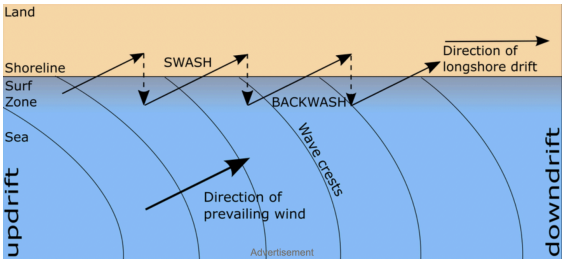
Material in the sea arrives from:

1. Eroded from cliffs
2. Transported by longshore drift along the coastline
3. Brought inland from offshore by constructive waves
4. Carried to the coastline by a river

Once in the water, the material is moves in:

1. Traction
2. Saltation
3. Suspension
4. Solution

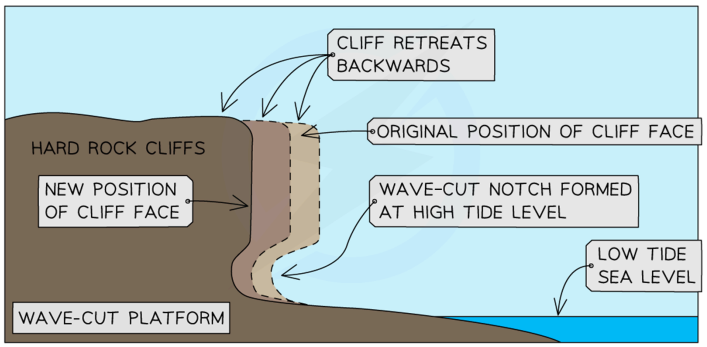
Longshore Drift



- Influenced by the prevailing wind, waves approach the beach at an angle
- As the waves break, the swash carries material up the beach at the same angle
- As the swash dies away, the backwash carries the material down the beach at right angles
- The process repeats, transporting material along the beach in a zig-zag movement

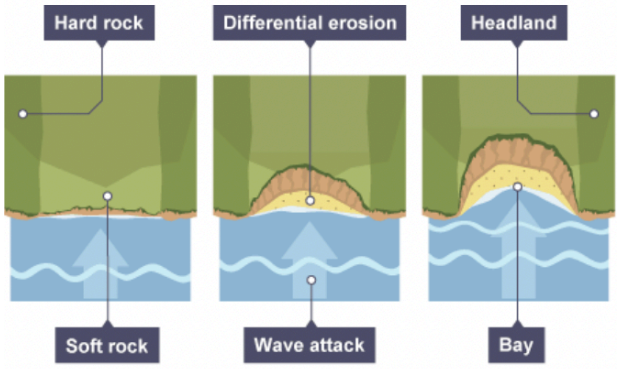
Erosional Landforms

Cliffs and wave-cut platforms



- **Abrasion, corrosion and hydraulic action** further extend the **notch** back into the cliff
- Cliff above becomes unsupported and unstable and eventually collapses
- The backwash of the waves, carries away the eroded material, leaving behind a wave-cut platform

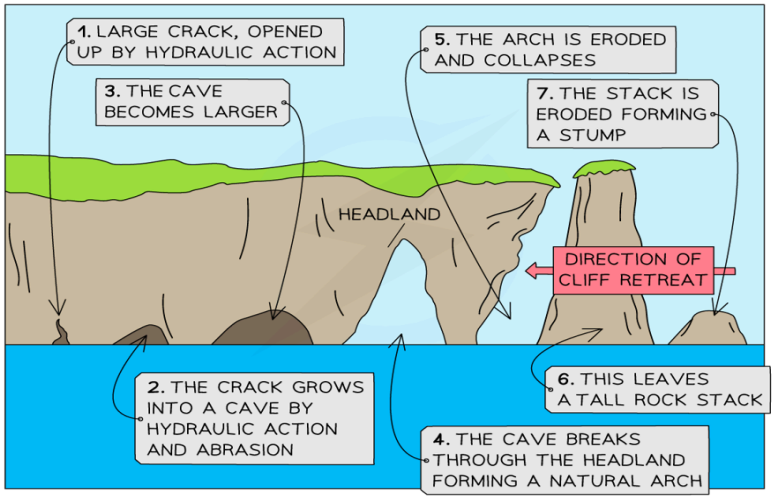
Headlands and bays



- Found in areas of alternating bands hard & soft rocks
- Perpendicular to oncoming waves (discordant coastline)

1. Less resistant rock erode back, forming a bay
2. The more resistant rock is left protruding out to sea as a headland

Caves, arches and stacks



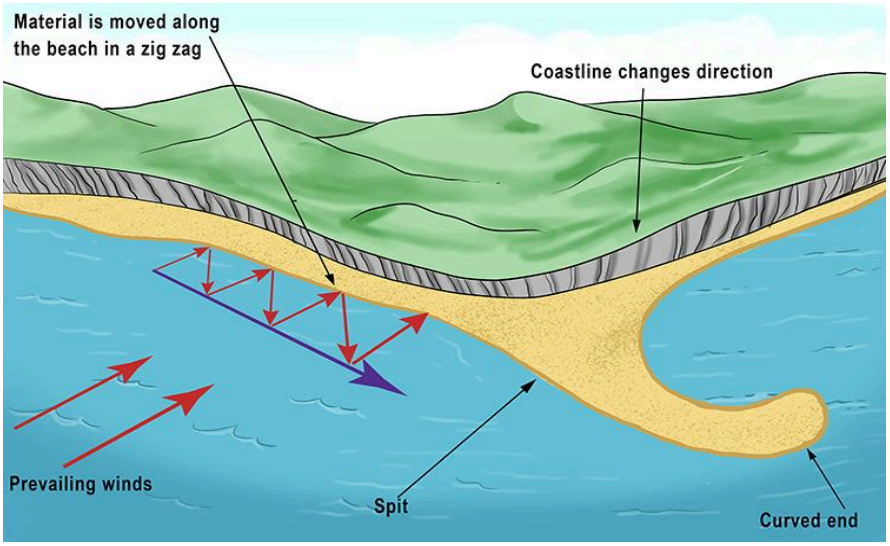
Depositional Landforms

Spit

- An extended stretch of sand
    - Occur when there is a change in the shape of the coastline

Stages of formation:

1. Sediment is transported by the action of longshore drift
2. Where the coastline changes direction, a shallow, sheltered area allows for deposition of sediment
3. Due to increased friction, more deposition
4. Eventually, a spit slowly builds up to sea level and extends in length
5. If the wind changes direction, then the wave pattern alters and results in a hooked end
6. The area behind the spit becomes sheltered
7. Silts are deposited here to form salt marshes or mud flats

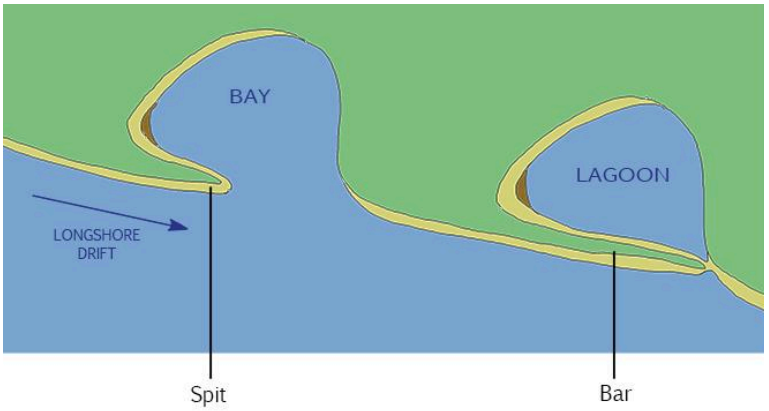


Bar

: When a spit grows across a bay, and joins two headlands together

Lagoon

- A lagoon is where a small body of water is cut off from the sea
- A lagoon may form behind a bar or tombolo
- Lagoons do not last forever and may fill with sediment and form new land



Tombolo

: A tombolo is formed when a spit joins the mainland to an island

Sand dunes

1. Onshore wind → blows the sand
2. Sand trapped by obstacle (vegetations)
3. Builds up over time
4. Vegetation colonise the land

Coral reefs

	Conditions required for development
Temperature	Grow best at 22 - 25 degree celsius (X tolerate temp below 18) - Normally grow between tropic of capricorn and tropic of cancer
Light	Need light for photosynthesis
Water	Generally found at depths of less than 25m where sunlight can penetrate
Salinity	Ned salty water to survive, ranging from 32-42% salt water

Mangrove swamps

: Trees that live on the coastline

1. They sit in water between 0.5 to 2.5 metres high
2. Range in size from small shrubs to trees over 60m high
3. Numerous tangled roots that grow above ground and form dense thickets
4. Need high levels of humidity (75 - 80%) and rainfall
5. Ideal temperature = 27° C
6. Complex root system with a filtration system to keep salt out
7. Some have snorkel that stick out of the mud to help them take in air
8. 'prop' roots or 'buttresses' to keep their trunks upright

Coastal opportunities

1. Development
    a. Homes
    b. Shops
    c. Hotels
    d. Roads
    e. Schools etc
2. Nature reserves
3. Swimming and sports
4. Industry
5. Fishing and aquaculture
6. Tourism
7. Agriculture

Hazards

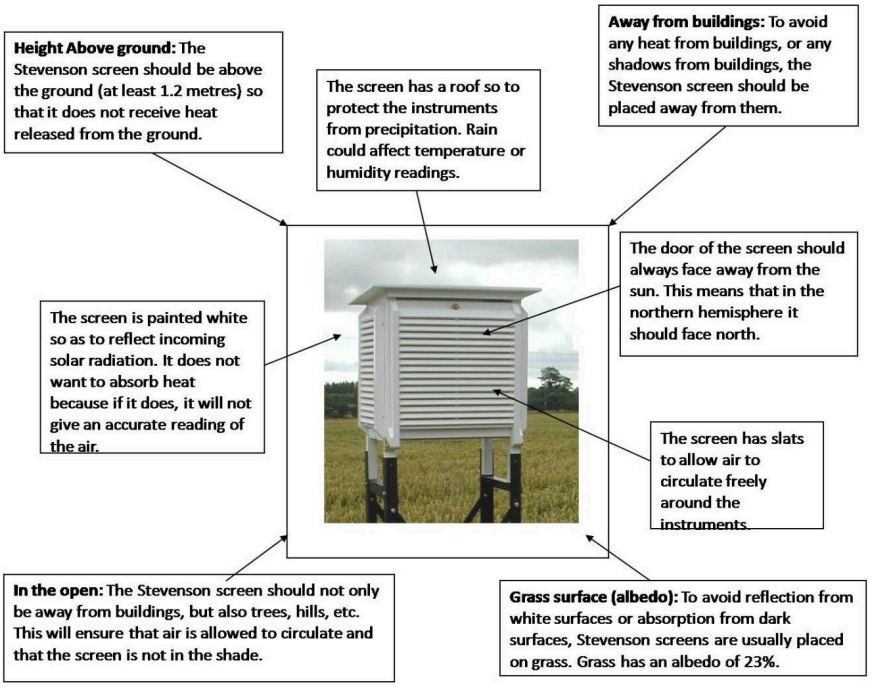
1. Urbanisation and transport
    a. Loss of habitats and biodiversity
    b. Visual pollution
    c. Lowering of ground water table
    d. Health risk
    e. Eutrophication

2. Industry
    a. Loss of habitats
    b. Water pollution
    c. Eutrophication
    d. Heat and visual pollution
    e. Decreased input of fresh water
    f. Coastal erosion
3. Agriculture
    a. Loss of habitats and species diversity
    b. Water pollution
    c. Eutrophication
    d. River channelisation
4. Fisheries and aquaculture
    a. Overfishing
    b. Litter and oil on beaches
    c. Water pollution
    d. Eutrophication
5. Tourism and recreation
    a. Loss of biodiversity and habitat
    b. Disturbance of habitats, migration patterns and landform
    c. Pollution

[2.4 Weather]

Weather Instrument

1. Stevenson screen



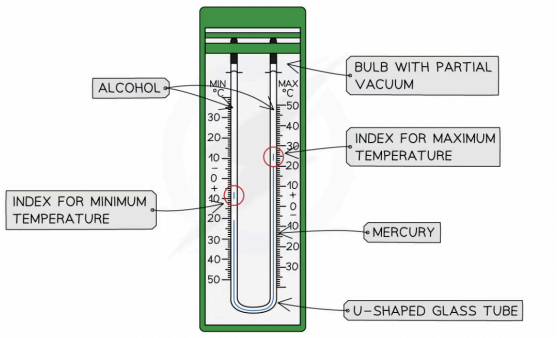
2. Wind vane

- Measures wind direction
- Direction = compass point from where the wind is blowing
- Features:
    - Broad end of the shaft catches the wind and swings in line with it
    - Arrow points to the direction
    - Compass point fixed in correct direction

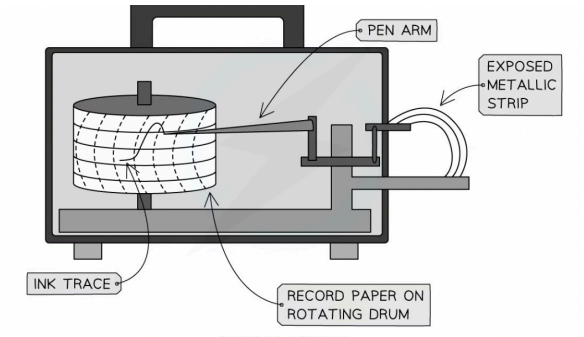
3. Anemometer & handheld digital anemometer
- Wind speed
- m/s or km/hr
- 3 or 4 cups fixed on metal arms that rotate freely on a 10m vertical shaft
- stronger the wind, the faster the cups rotate
- digital handheld anemometers need to be held into the oncoming wind and as the fan rotates, the number is shown on the screen
- placed away from buildings or trees that can interfere with air movement

4. Rain gauge
- precipitation
- mm
- At the same time each day, any water that has collected is poured into the tapered measuring cylinder
- Measuring cylinder needs to be on a flat surface

5. Thermometer & thermograph
- Temperature
- Six's thermometer → max and min temperature
    - U shaped thermometer
    - Can measure diurnal temperature range



- Thermograph
    - exposed bimetallic strip which deforms with a change in temperature
    - This change is transmitted to amplifying levers which trace a curve on a roll of graph paper
    - A vertical movement of 1 mm is equivalent to about 1°C



6. Hygrometer
- Humidity (amount of water vapour in a given volume of air)
- Wet and dry bulb thermometers used to measure relative humidity
- Relative humidity: measured by working out the difference between the wet and dry thermometer and refer to chart

7. Barometer

- Pressure
- millibars (mb)
    a. Mercury barometer
        i. hollow tube with all the air extracted
        ii. The open end is then placed in a bath of mercury
        iii. Mercury is forced up the tube by atmospheric pressure on the mercury in the bath
        iv. When the two pressures equalise, mercury will stop rising in the tube
        v. The height of the column of mercury will change with air pressure:
            1. Rising as air pressure rises
            2. Dropping as air pressure falls
    b. Aneroid barometer
        i. partly vacuumed, corrugated metal chamber inside
        ii. strong metal spring within the chamber that prevents it from collapsing
        iii. spring will expand and contract with changes in atmospheric pressure
        iv. Levers magnify these changes → a pointer moves across a calibrated scale to show atmospheric pressure at that time
    c. Barograph
        i. continuous reading of atmospheric pressure for one week
        ii. Changes in pressures are traced on a rotating cylinder by a flexible arm
        iii. The cylinder is covered by paper divided by 2-hour vertical lines

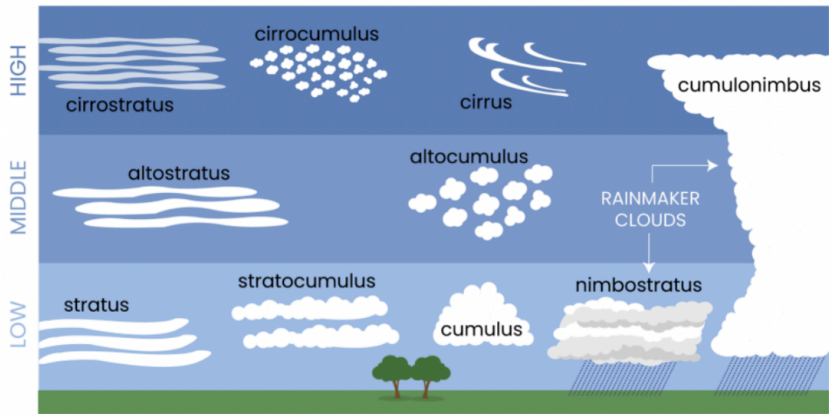
8. Campbell - stokes sunshine recorder

- Sunshine hours
- glass sphere partly surrounded by a metal frame
- Sunlight is concentrated through the sphere onto a recording card placed beneath the focal point
- The rays burn a trace on the card
- The length of the trace shows the sunshine duration at that location

9. Clouds

- Cloud cover measured in oktas (unit)
- Each okta represents one eighth of the sky covered by cloud
- 0 oktas = clear sky, 8 oktas = total coverage

Types of cloud:



[2.5 Climate and Natural vegetation]

Factors affecting climate:

1. Latitude
    a. with distance from the equator temperatures and sunshine hours decrease as solar radiation is more dispersed
2. Altitude
    a. Increases in altitude lead to decreases in temperature
3. Continentality
    a. locations further inland heat up more quickly in the summer and cool more quickly in the winter
4. Ocean currents
    a. warm and cold currents circulate in the oceans
5. Prevailing winds
    a. winds coming from warmer areas bring warmer air, increasing temperatures
    b. N → S : cold air brought
    c. S → N : warm air brought
    d. Oversea: wet
    e. Overland: dry
6. Pressure systems
    a. areas usually affected by low pressure such as the equator have rising air, condensation and cloud formation leading to more precipitation, whereas areas affected by high pressure have dry conditions due to the sinking air

Equatorial climate

- Tropic of Cancer: approximately 23.5°N of the Equator
- Tropic of Capricorn: approximately 23.5°S of the Equator

1. Hot and wet all year
2. No seasons
3. 3 large areas
4. 5-10 degrees N and S of equator
5. Amazon Basin
6. Congo Basin
7. Malaysia peninsula and the islands of SE Asia
8. The air completes the cycle and flows back towards the equator = trade wind

Hot desert climate

1. Between 15 - 30 N/S of the equator (tropical and subtropical)
2. Skies often cloudless
3. Low humidity because the sinking air has warmed
4. Offshore trade winds are dry
5. Some deserts are in a rain shadow → very little rainfall
6. High diurnal temperature range (cloudless so heat cannot be trapped)

Pressure system

- Hot deserts form between 15 - 30 degree N & S because of atmospheric pressure system

1. Air rises at the equator and when it reaches the upper atmosphere it moves north and south
2. The air cools and starts to sink
3. This creates a zone of high pressure at about 30o north and south of the equator
4. Due to the sinking air, warm air cannot rise, condense and form clouds. This results in high aridity

Tropical Rainforest Ecosystems

- Mainly found in a band between 15 north and 15 south of the equator

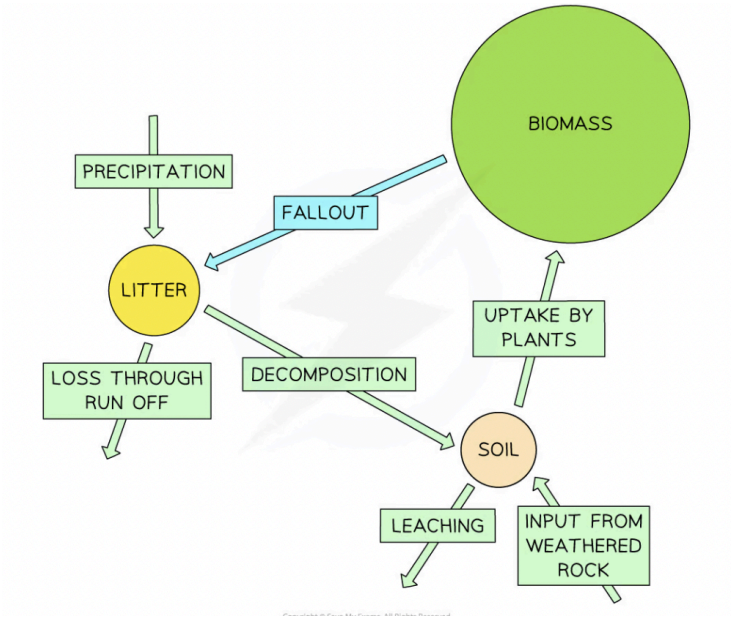
Main areas of tropical rainforest:

1. Amazon
2. Central America
3. Central Africa
4. Indo-Malaysia

Biodiversity

- contain the highest biodiversity of plants and animals on Earth
- Estimates range from over 50% to 80% of the world's plant and animal species
- One 10km^2 area can contain up to 1,500 flowering plants, 750 species of trees, 400 species of birds and 150 species of butterflies

Nutrient cycle



- Trees and plants lose their leaves all year round

- The high level of moisture and high temperatures leads to rapid decomposition and recycling of nutrients

- Plants grow quickly which leads to a rapid uptake of nutrients from the soil

⇒ Result of rapid nutrient cycle: soil X fertile

Structure of tropical rainforest

- Five distinct layers

1. Ground layer (0m)
2. Shrub layer (3-4m)
3. Canopy (30 m)
4. Emergents (45-55m)

Adaptations

Plants	Animals
Waxy leaves with drip tips - Ensure that rainwater runs off the leaf and does not remain	Sloth - algae grow in the fur of the sloth helping to camouflage it
Buttress roots - help to support the very tall trees	Toucan - large bill to reach and cut fruit from the branches of trees
Lianas - vines which use the tall trees as support to reach the sunlight	Primates - have prehensile tails to help them climb trees
Epiphytes - plants which grow on trunks and branches of trees getting nutrients from air, rain or debris accumulating around the plant	Geckos - have large, flattened toe pads with sticky scales which allow them to grip the smooth tree trunks
Straight, smooth trunks - reduce the number of epiphytes using the tree	Stick Insects - their stick and leave shapes help them to be camouflaged

Food web

1. Producers
2. Primary consumers
3. Secondary consumers
4. Tertiary consumers
5. Decomposers - break down the dead bodies of plants and animals and release them into soil

Hot Desert Characteristics

- Approximately 20% of Earth's surface covered by hot desert ecosystem including:

1. North America
2. South America
3. Africa - the Sahara
4. Middle East
5. Asia
6. Oceania

Biodiversity

- Low biodiversity
- The hot desert biome supports approximately 5000-6000 plant species, many invertebrates and up to 20 species of bird

Nutrient cycle

- The growth of plants is limited due to the extremes of temperature and lack of water
- The nutrient cycle is very slow
- Most nutrients are stored in the soil

Adaptations

Plants	Animals
Low growing - avoid water loss due to strong winds	Camels - two sets of eyelashes and nostrils which close to keep sand out of their ears and noses - store fat in their humps so they can survive for long periods without food or water
Thick stems - used to store water	Fennec Fox - large ears which help them to lose heat
Shallow roots - spread out near the surface to catch whatever rain falls	Burrowing - avoid the intense day time heat
Long roots - to reach water deep underground	Insects and reptiles have waterproof skin to reduce water loss
Small leaves or needles - the smaller surface area reduces water loss	Nocturnal - some animals hunt at night to avoid the daytime heat

Deforestation of Tropical Rainforest

Causes:

1. Hydropower - building of dams and reservoirs to provide electricity
2. Agriculture
3. Logging
4. Settlements
5. Mining
6. Road building

Impacts:

1. Monoculture which reduces biodiversity
2. Interception and infiltration decrease → reduces evapotranspiration and as a result precipitation decreases
3. Increase overland flow → soil erosion and sedimentation of rivers
4. Flood risk
5. Leaching of nutrients
6. Greenhouse effect

The majority of nutrients in the tropical rainforest are held in the biomass
When trees and vegetation are cleared by deforestation the main store of nutrients is removed

7. More jobs available in mining, forestry, agriculture
8. Increased income

Theme 3: Economic Development

[3.1 Development]
: any improvement in the standard of living of people in a specific country

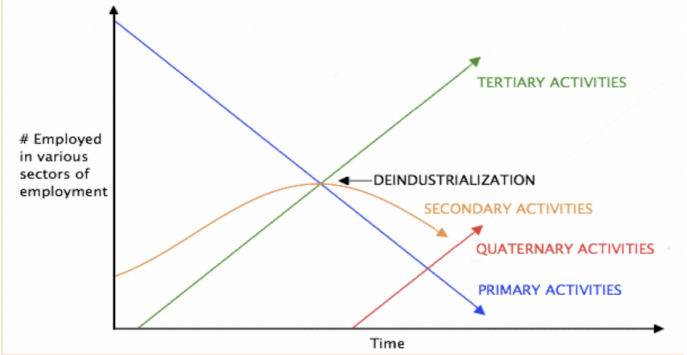
A country's level of development: how far it has grown economically, technologically and the quality of life people typically have

Quality of life
- Economic
    - Income, job security, standard of living
- Physical
    - Diet/nutrition, water supply, environmental quality, safety
- Social
    - Family/friends, education, health
- Psychological
    - Happiness, security, freedom

Stages of development
- Least developed countries → Developing countries → newly developed countries → developed countries

Economic Sectors
1) **Primary** - The growth or extraction of raw materials (E.g. mining, fishing, farming etc)
2) **Secondary** - Where materials are processed to produce a finished product (E.g. factory workers, car manufacturers, steel production etc)
3) **Tertiary** - The provision of service (E.g. nurses, lawyers, teachers etc)
4) **Quaternary** - Provision of specialist knowledge/information (E.g. research, hi-tech scientists, development etc)

How does this change of time?



LEDC
- Majority = primary sector → because most societies start of as being subsistence based
- Some basic secondary industry to construct homes and farming equipment
- Limited tertiary industry (uneducated, no free time)

NIC
- Majority tertiary
- Begin to specialise in certain agricultural/primary products + more machines

MEDC

- Low primary
- As country becomes wealthy the cost of labour become too much to make the secondary sector profitable so factories close and importance declines

⇒ deindustrialisation

- Tertiary sector expands as people are more educated w/ greater income & freetime
- Quaternary (well educated)

Indicators of Development

- Gross National Product (GNP) per capita: wealth of a country averaged per person.
- Gross Domestic Product (GDP) per capita: the total value of goods and services produced within a country in a year divided by the country's population.
- Composite indices like the Human Development Index (HDI): measure the disparities between countries.
- Birth Rate, Death Rate
- Literacy rate
- Life expectancy
- Infant Mortality

The development gap

: difference in levels of development between the least developed and most developed countries in the world

Factors affecting development

- Food and water security
- Economic
- Government
- Social
- Technological
- Cultural
- Physical geography:
    - Landlocked countries → slower development
    - Small countries → less natural and human resources
    - Countries with extreme climate → slower development
    - natural resources → water(domestic use, energy), forest(timber, habitat, rubber)

Globalisation

: Process in which the world is becoming increasingly interconnected as a result of increased trade

Causes of globalisation:

- Improvements in transportation + communications
- Freedom of trade
- Labour availability and skills

Impacts of globalisation

Positive	Negative
Economic growth	Economic Inequality
Job Creation and Employment	Job displacement and labour exploitation
Access to Goods and Services	Env Degradation
Cultural Exchange and Diversity	Cultural Homogenisation
Technological Advancements	Exploitation of Developing Countries
Access to Information and Communication	Social Disruption and Inequality
Environmental Awareness and Sustainability	Public Health Risks

TNCs (Transnational Corporations)

: Companies that operate in more than 1 country (usually in foreign countries or overseas)

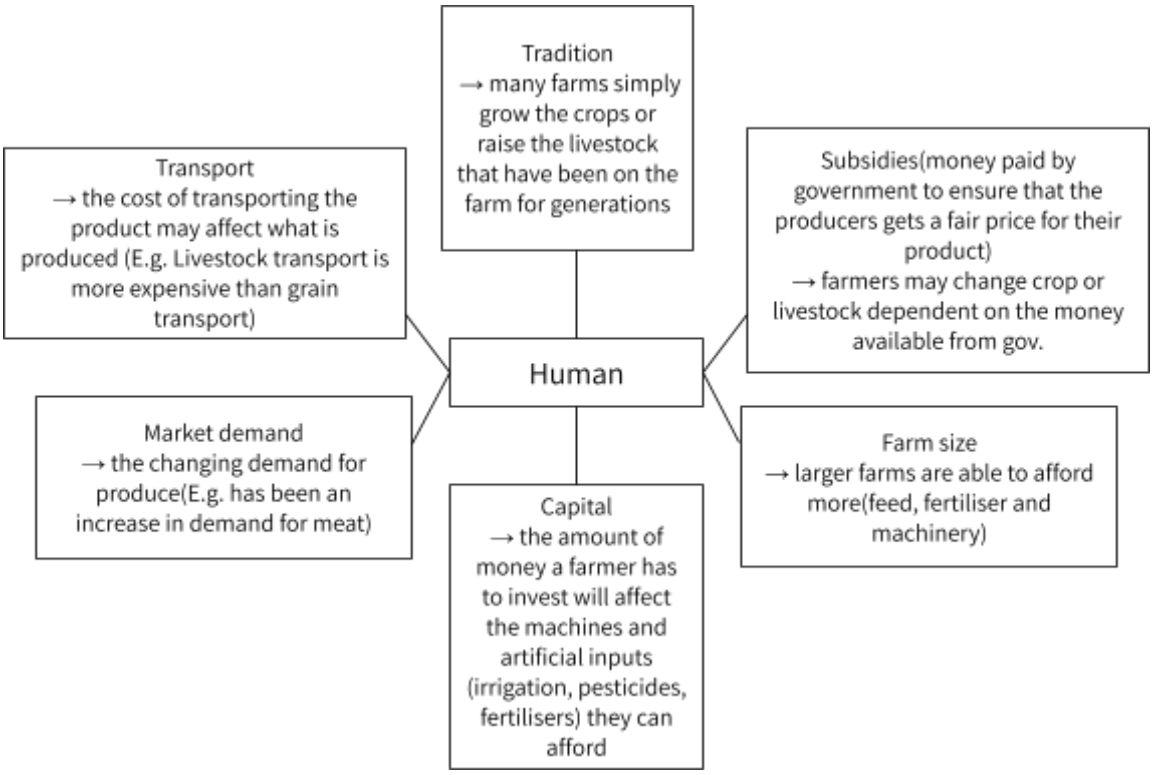
- TNCs and Countries → two main elements of the global economy

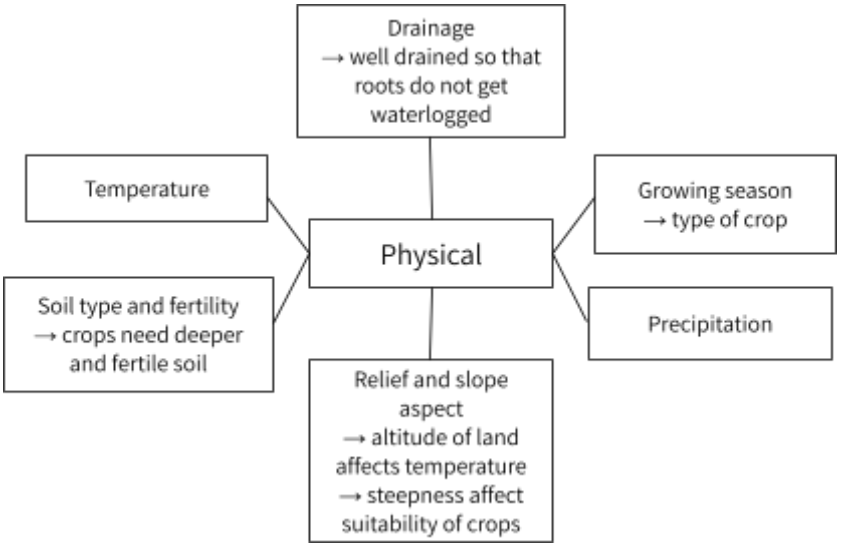
Positive	Negative
Job opportunities	Labour drain
Improvement in skills and communication	Damage to the environment
Good education, healthcare and quality of life	Cultural dilution or loss of cultural identity
Invest in infrastructure	Social mobility is limited to urban areas
Cheaper products	Profits going overseas
Greater choice of goods	Natural resources are being over-exploited
High level of income from tourism, exports, imports	Movement of people, transport ownership and loss of biodiversity increases globally
Access to vast levels of skills and resources	Daily living costs increased

[3.2 Food Production]

Farming Type

1) **Arable**(cultivation of crops) and **pastoral**(rearing livestocks)
2) **Commercial**(growing crops or raising livestocks to sell the products for profit) and **subsistence**(growing crops or raising livestocks to feed the farmer and their families)
3) **Extensive**(a farm with low inputs or yields per hectare e.g. sheep farming) and **intensive**(a farm with high inputs or yields per hectare e.g battery chicken farming)





Farming System

Inputs	Processes	Outputs
<u>Physical</u> Climate Soil Relief <u>Human</u> Subsidies Machinery Labour Pesticides Fertiliser Seeds	Ploughing Milking Sowing Sheep shearing Pest control Fertilising Harvesting Feeding	Cereal Crops Hay/Straw Milk Meat Manure Vegetables Eggs

Food Shortage
: When demand for food exceeds the supply of food, leading to undernourishment

Causes
- Urbanisation
- Deforestation
- Climate change
- Drought
- War and conflict
- Rapid population increase
- Overgrazing → reduces the integrity of the soil
- Disease → reduce yield
- Natural disaster

Effect
- Increased food price
- Undernutrition/Malnutrition
- Underdevelopment - loss of productivity
- Migration

Solution
- Food aid
- Irrigation
- GM Crops
- Fertilisers/Pesticides

[3.3 Industry]

Input: resources that need to start the process can be physical.
Processes: turning raw materials into usable things.
Outputs: product + profit or loss + waste materials

Types of Industry:

- Processing: turns raw materials into other materials used in manufacturing(metal production)
- Manufacturing: produces goods that are physically used by consumers(toys)
- Assembly: using materials and a design scheme to put together a finished product(electronics)

Industry	Input	Processes	Output	Impact
Specialised steel production	alloys such as chromium, cobalt	electric arc furnace, oxygen furnace, rolling, cutting	steel slabs, ingots, sheets, waste, slag, gases	noise, dust, air pollution, smell, water pollution
Iron production	iron ore, coke, limestone to separate iron from impurities, water, recycled scrap iron,	blast furnace to melt iron ore, coke oven, rolling into sheets, cutting into lengths	cast iron, pig iron, slag, sulphur dioxide, carbon dioxide, hydrogen sulphide, water, heat	large building, noise, air pollution, smell, water pollution, contaminated cooling water, scrubber waste, risk of fire and explosions

Factors influencing location of an industry

- Raw materials
- Transport
- Energy supply
- Labour
- Money
- Cost of land
- Government policy: restriction이 적은 곳에 inudstry를 지으려함
- Availability of market

[3.4 Tourism]
: when a person travels to another destination for more than 24 hrs but less than one year

Main attractions

1. Improved pay and leave allowances - most workers now work less than 40 hours a week and have paid annual leave
2. Improved disposable incomes - normally both partners work and this increases incoming money to the household
3. It is easier than ever to cross borders with agreements between countries
4. Transport is faster and cheaper than in the past
5. Communication - internet, social media etc. bring awareness of foreign destinations, booking of last-minute holidays etc.
6. Increase in 'built attractions' such as theme and water parks
7. Attractions such as music festivals, sporting events etc
8. Many governments have invested heavily to encourage tourism or backed international events - Olympics

Impact of Tourism

Social

Positive Impacts	Negative Impacts
Can help revive local skills and handicrafts	Loss of locally owned land
Cultural tourism values people's heritage	Tourist's behaviour can offend local people (drinking etc.)
Brings people together from all over the world	Tourist centres encourage crime, prostitution etc.
Can spread the range of social facilities for local people	Displacement of people
Major international events (Olympics) can have a positive effect locally and nationally - improved infrastructure etc.	Abuse of human rights
Develops foreign language skills	Can erode local language and traditional values
Ancient sites are brought to global attention helping to appreciate historical legacies	Loss of access to local sites - beaches, forests etc
Might encourage migration to major tourist-generating countries	Visitor congestion at key locations

Economic

Positive	Negative
Brings money into the country's economy	Money often goes to big businesses and not locally
Creates jobs for local people	Often low paid, menial, seasonal work
Brings new infrastructure to the region	Mass tourism causes congestion, pollution affecting local businesses
Provides tax revenues	Economic leakages are high
Provides employment to poorer rural areas	Money borrowed to invest in tourism can increase national debt
Can create openings for small business and support jobs in the informal sector	Large holiday resorts encourage tourists to spend most of their money in the hotel complexes, excluding the wider community

Environmental

Positive	Negative
Can increase awareness of nature conservation areas	Local environment can be bulldozed and concreted over
Money from tourism can be used to protect and repair the environment - better water supplies	Tourism creates local pollution issues - waste, littering
Tourism may help preserve key areas or species - prevention of illegal trade and exploitation of nature	Tourist activity can disturb or damage habitats and wildlife- water skiing damaging coral reefs, ivory poaching
Tourism helps fund conservation activities therefore, improving sustainable practices and environmental legislation - national parks	Increased greenhouse gas emissions from flying

[3.5 Energy]
Population growth & development = two leading causes of rising energy demand

Renewable energy

	Advantage	Disadvantage
Solar	- No greenhouse gas emissions - No air pollution - Can be small or large-scale - Can be used in most locations - Can be incorporated into building design	- Expensive to install - Only works in presence of sun - Large numbers needed to produce energy
Wind	- No greenhouse gas emissions - No air pollution - Can be small or large scale - Cheap to run - Can be on land or offshore.	- Only works in presence of wind - Visual & noise pollution - Many turbines are needed to produce the same energy as an average coal-fired power station - May affect bird migration patterns
Hydroelectric	- No greenhouse gas emissions - Controls flooding downstream - May provide water storage for irrigation and domestic use	- Large areas of land are flooded behind the dam - Dam traps sediment which can affect ecosystems downstream - Visual pollution - Settlement relocation - Expensive to build and maintain
Geothermal	- No CO2 gases - Lots of potential sites - Reliable - Can produce large amounts of energy	- Expensive - Emits sulphuric gases - High temperatures cause maintenance issues
Biomass	- Uses waste or biofuels which regrow - Available in most locations	- Air pollution - Produces greenhouse gases - Expensive
Wave	- No greenhouse gas emissions - No air pollution - Has the potential to produce large amounts of energy - Reliable	- Expensive to build and maintain - Can affect marine ecosystems - Few suitable sites

Non renewable energy

	Advantage	Disadvantage
Coal	- lasts 300yrs - Reliable and easy to produce energy from - Technology has enabled coal to be obtained more easily	- cost of production is high - produces a lot of GH gases - dangerous - open cast = visual pollution - costly to transport
Oil and Gas	- Reliable and easy to produce energy from - Efficient - it has a high energy density so produces a lot of energy per kilogram - Not as harmful to the environment as coal (gas is the least harmful) - Easy to transport via pipeline	- It lasts only 50-70yrs - oil spills release greenhouse gases - Non-renewable - they will run out - The gases released when they are burnt are greenhouse gases - Prices fluctuate rapidly
Nuclear power	- Plenty of radioactive supply as fuel - Very low amounts of greenhouse gases made - Reduces dependency on fossil fuel countries - Nuclear waste stored safely underground - Electric supply altered quickly based on demand	- Risk of nuclear accidents - Risk of nuclear plants as terrorist targets - Nuclear technology can be used to make WMDs - Remains radioactive for a long time & expensive - Uranium mining is dangerous and polluting

[3.6 Water]

- Limited resource

Uses of Water

- Agriculture: to water plants
- Industrial:
    - Heated to make steam to turn turbines
    - Cooling down reactors
- Domestic:
    - Household e.g. cooking, cleaning, drinking
    - Recreational, e.g. swimming, sports
- Environmental: preserving water in a dam

Methods of Water Supply

- Dams: barrier placed across a river made from concrete
- Reservoirs: the artificial lake that develops behind a dam
- Wells: a shaft sunk into the ground to obtain water
- Desalination:
    - Thermal: evaporation of water to remove salt
    - Reverse Osmosis: forces water through semi-permeable membrane to remove salt
- Sewage Treatment:
    - Removal of contaminants from wastewater & household sewage
    - Requires physical, chemical & biological processes to remove all the contaminants and make safe

Causes of Water Shortages

- Population Growth → inc demand
- Pollution
- Sewage
- Climate Change: melt glaciers but inaccessible
- Political
- Mismanagement

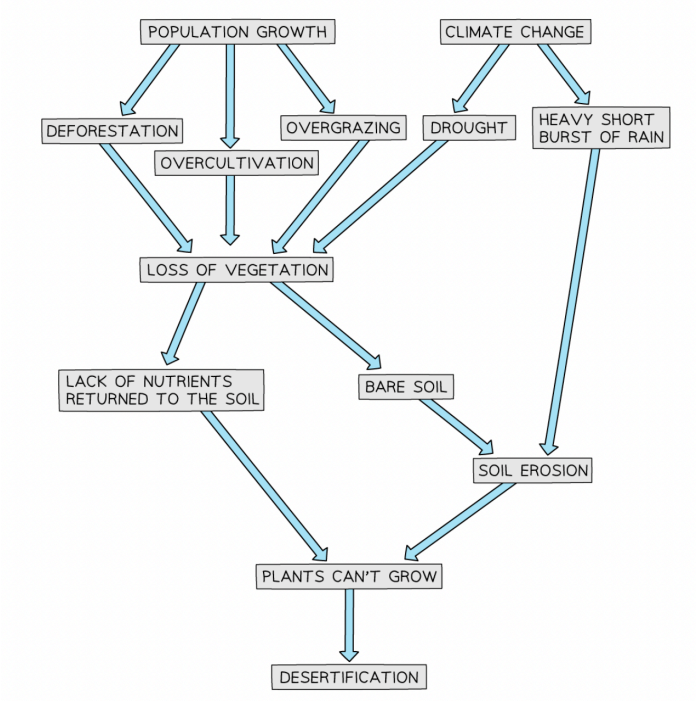
Impact of Water Shortages

- Drought: below-average supply of water over a prolonged period
- Famine: crops fail/livestock die due to water shortage
- Conflict arises when sharing a limited supply of water
- Stagnant dirty water = increased risk of diseases
- Eutrophication due to run-off

Solutions to Water Shortages

- Desalination
- Sewage Treatment
- Conservation:
    - Half-flush toilets & showering instead of bathing
    - Watering the garden at dusk to prevent evaporation
    - Collecting rainwater to use in the garden
- Water Charities:
    - Building wells to access groundwater
    - Building toilets to reduce sewage & pollution
    - Teaching appropriate farming techniques
- Irrigation Projects: use irrigation systems to redistribute water & water the land

[3.7 Environmental Risks of Economic Development]



- Soil Erosion:
    - Soil is washed away by rain because there are no tree roots to retain it
- Global Warming
- Greenhouse Effect:
    - Warms the surface & lower atmosphere
- Effects:
    - Melting poles = rising sea levels = increase in storms
    - Change in the distribution of precipitation
    - Plants and wildlife might not have time to adjust

Greenhouse gases:

1. CO2 from burning fossil fuels or wood
2. Methane from decomposing organic matter & waste
3. CFCs from aerosols, air conditioners, & refrigerators
4. Nitrogen Oxides from car exhausts & power stations

Water Pollution:

- Chemicals in fertilisers cause eutrophication
- Oil spilling into the sea
- Acid rain destroys lakes and kills animals/plants

Noise Pollution:

- Vehicles
- Machinery in industries and farms

Desertification:

- Overgrazing
- Soil erosion
- Global climate getting warmer - gets drier due to less rain
- Deforestation - fewer roots of trees to hold the soil together

Management:

1. Population policies
2. Sustainable tourism
3. Use of renewable energy
4. Afforestation

Ways of Conservation:

1. 3 Rs: reduce, reuse, recycle
2. Renewable energy
3. Use energy-efficient products
4. Restrict the use of resource
5. Use more public transport
6. The government can raise tax on petrol prices