

Lossiemouth High School



Higher Geography

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Name



Exam guidance

Exam structure

Paper 1: Physical Environments and Human Environments (100 marks)

Paper 2: Global Issues and Geographical Skills (60 Marks)

Question types

There are many different question commands you could be asked:

1. **Explain/Suggest reasons**

Explain questions ask you say why or suggest reasons for the cause or impact of something. Just describing (naming or saying what something is) will not get you the mark. You must provide reasons.

In physical Geography, you should mention what processes formed a landform and explain what that process is. I.e. in the formation of a corrie, you must explain what plucking and abrasion are.

2. **Analyse**

Analysing involves identifying parts, the relationships between them, and the relationship with the whole. It can also involve drawing out or relating implications.

To gain an analysis mark you must use your knowledge and understanding/a source to identify relevant components such as a theory, argument, idea etc., and show at least one of the following:

- Links between two different things
- Similarities and contradictions
- Consistency and inconsistency
- Different views/interpretations
- Possible consequences/implications

3. **Evaluate**

You are asked to make a judgement on the success or failure, or impact of something based on criteria. You should briefly name and describe the strategy/project before giving a conclusion, providing evidence in your answer.

4. **Account for**

You must give reasons for your answer usually (but not always) using a source. These must be used and referred to in your answer. E.g. Account for the rise in global temperatures with reference to physical and human factors.

5. Discuss

You must explore your ideas about a project or the impact of a change. You should consider different views of the argument. The answer does not need to give a balanced argument but both sides should be argued. Therefore, you should give reasons for and against, or advantages and disadvantages.

Annotated diagrams

Always include diagrams where possible - If a question asks you to use to annotated diagrams, you must draw annotated diagrams, or you will lose marks. Even if it does not ask for an annotated diagram you should include one anyway. They may help you pick up an extra mark and can save time in the exam.

Structure – Splitting your diagrams into different stages can help structure your answer, e.g. before glaciation, during and after glaciation. This may also help to ensure you don't miss out anything.

Include annotations – Diagrams become meaningless if they are not annotated. It is easy to label where physical processes take place and then explain what that process is as an annotation.

Things to remember when answering questions

- Try to make each point a developed point – you must go into detail when answering questions.
 - Point – name something, make a simple statement
 - Explain – say why it happens
 - Expand / Example – give more detail
- Provide examples where possible. They can help you develop your answers.
- Know your case studies - If a question asks you to refer to named examples such as countries, you must or you will lose marks. Try to go into detail with your case studies by providing named examples or statistics.
- If tables, charts, graphs, diagrams and marks are given in the question you must refer to them in your answer, particularly in the Geographical Skills section to get full marks.

Practice questions

Topic	Question and max number of marks	Hints
Physical Atmosphere	1. Give reasons why the Earth's surface absorbs only half of the energy received. (8)	Reflection and absorption. Remember figures.
	2. Explain why there is a surplus of energy at the Equator but a deficit at the poles. (8)	Distance, tilt, albedo, solstice
	3. Explain how atmospheric circulation help redistribute energy. (8)	Winds – Hadley, Ferrell, Polar, Coriolis effect
	4. Explain how oceanic circulation help to maintain the global energy balance. (8)	How do you make a current, what do they look like, what direction do they move in, what affects them, WWD.
	5. Analyse the impact of the ITCZ on rainfall patterns in West Africa. (12)	Refer to graphs and map. cT, mT, ITCZ
	6. Compare the rainfall variations in West Africa and suggest reasons for the variations. (10)	Compare facts between cities then give reasons. cT, mT, ITCZ
Hydrosphere	7. Explain the hydrological cycle. (10)	Refer to terms
	8. Explain how human activities affect the hydrological cycle. (12)	Name activity, explain what it is, give named example. Explain how it affects hydro cycle.
	9. Explain how water moves through a drainage basin. (10)	Inputs, transfers, storage, outputs
	10. Suggest reasons for differences between rural and urban	Compare urban v rural. Refer to terms

	hydrographs. (10)	
	11. Explain the changes in discharge of a river. (8)	Describe the graph. Is it urban or rural? Give reasons why
	12. Explain the formation of a v-shaped valley. (10)	Vertical erosion, Hydraulic action, Corrasion, freeze-thaw, interlocking spurs.
	13. Explain the formation of a waterfall. (10)	Differential erosion, step created, hard rock collapses, Hydraulic action, plunge pool, Corrasion, retreats, gorge.
	14. Explain the formation of a meander. (10)	Sinuuous, pools and riffles, erosion on outside of bend, Hydraulic action, Corrasion, river cliff, helicoidal flow, river beach, meanders migrate downstream.
	15. Explain the formation of an ox-bow lake (10)	Lateral erosion. Cuts through neck. Deposition seals off old meander
Biosphere	16. Explain the formation of a podzol. (12)	Climate, soil organisms, vegetation, relief, drainage, and parent material. AO, A, B, C horizons
	17. Explain the formation of a brown earth. (12)	Climate, soil organisms, vegetation, relief, drainage, and parent material. AO, A, B, C horizons
	18. Explain the formation of a gley. (12)	Climate, soil organisms, vegetation, relief, drainage, and parent material. AO, A, B, C horizons
	19. Compare two soils. (12)	"compared to..." "whereas..."
Lithosphere Glaciation	20. Explain the formation of a corrie. (10)	North facing hollow, formation of ice, move downhill under gravity, erosion by Plucking and abrasion, corrie lip, corrie lochan. Coire Cas.
	21. Explain the formation of an arete. (10)	Same as corrie, two back to back / side by side = arete. Striding

		edge.
	22. Explain the formation of a pyramidal peak. (10)	Same as arete, three or more corries = pyramidal peak. Matterhorn.
	23. Explain the formation of a u-shaped valley. (10)	V-shaped valley with Interlocking spurs, moves under gravity, erosion by, Plucking and abrasion, erosion determined by rock type, intensity and duration, truncated spurs, ribbon loch and misfit stream. Loch Lomond.
	24. Explain the formation of terminal moraine. (10)	What is it? What is it made of? How does it form? What does it leave behind?
	25. Explain the formation of a drumlin. (10)	What are they? Lee/stoss. How are they formed? How else can they form? Basket of eggs
Lithosphere Coasts	26. Explain the formation of headlands and bays. (10)	Differential erosion (hard and soft rock), Wave refraction (waves align themselves to the shore).
	27. Explain the formation of caves, arches, stacks and stumps. (10)	Caves, Hydraulic action, Corrasion, Blowhole, Arch, Stack, Stump, Refer to named examples.
	28. Explain the formation of a wave-cut platform. (10)	Hydraulic action, Corrasion or solution, Wave cut notch, cliff collapses, cliff retreats, Refer to named example.
	29. Explain the formation of a sand spit, sand bar and tombolo. (10)	Longshore drift, How curve is created, Salt marsh, river cutting across spit, Sand bar forms with lagoon behind, Sand bar joins with island to make tombolo

Population	30. Explain how population data is gathered. (10)	Census, Visa/Immigration records, Electoral roll, NHS records, Civil registration.
	31. Explain why it is important to obtain accurate population data. (10)	Population numbers, Education, Health, Tax rate, Transport, Housing.
	32. Explain why gathering data in a developing country may be less reliable than a developed country. (10)	War, Illiteracy, Size of population, Remote areas, Languages, Something to hide.
	33. Discuss the consequences which governments may face because of an ageing population. (12)	Discuss the three parts of the population pyramid structure: Negatives and positives.
	34. Discuss the consequences which governments may face with a youthful population. (12)	Discuss the three parts of the population pyramid structure: Negatives and positives.
	35. Suggest the push and pull factors for a migration you have studied. (8)	Reasons for leaving, Reasons why somewhere else is better.
	36. Discuss the impact of international migration on the donor and / or receiving country. (12) a) Forced migration (Syria → Jordan, Lebanon and Turkey) b) Voluntary migration (Poland → UK)	Donor = country where migrants left Receiving = country where they went to
	37. For a migration you have studied explain why the migration took place (8). a) Voluntary migration (Poland → UK) b) Forced migration (Syria → Jordan, Lebanon and Turkey)	Voluntary: Poland to UK Poland - Lack of jobs, low wages, low GDP Scotland - skills shortage, higher wages, low cost flights, bright light syndrome, Polish community.

		Forced: Jordan etc – Friends already moved, porous land borders, Syria - Fear of death, cities destroyed, human rights violated, lack of healthcare, homelessness, unemployment.
Urban	<i>For a developed world city (Glasgow)</i> 38. Give reasons why it suffers from traffic congestion. (12)	More cars on road, prefer cars to public transport, commuters from suburbs, commuters converging, few bridging points, old narrow roads, more delivery vehicles, lack of parking, increased tourists.
	39. Explain the strategies used to combat traffic congestion. (12)	New roads, improvement to public transport, improvements to traffic flow.
	40. Evaluate the strategies employed to manage traffic congestion. (12)	This is successful... This is not successful... This is somewhat successful...
	41. Explain the need for housing management in the inner city. (12)	Problems with tenements – overcrowding, disease, poor sanitation, rats, low life expectancy. Problems with council estates – community destroyed, lack of services, isolated, vandalism, unemployment, people left. Problems with high rise flats – poor construction, flooding, isolated, vandalism, crime, drug dealers, squatters.
	42. Suggest the solutions to housing problems in the inner city. (12)	New towns – well planned, services, good quality housing, foreign investment, good traffic flow. Tenement renovation – electricity, sanitation, outside cleaned,

		landscaping, one-way streets to make safer. Gorbals regeneration – Crown St new tenements, well planned, private parking, new park, gardens. Athletes Village – private and council owned houses, good quality, solar panels, cheap to run, parking, disabled access, focus on health and wellbeing with Emirates, new primary school.
	43. Evaluate the solutions to housing problems in the inner city. (12)	This is successful... This is not successful... This is somewhat successful...
	<i>For a developing world city (Rio de Janeiro)</i> 44. Give reasons why it suffers from traffic congestion. (12)	Limited potential growth, public transport unreliable, insufficient subway system, overcrowded bus network.
	45. Explain the methods used to manage traffic congestion. (12)	BRT, expansion of cycle lanes, extension of subway, cable car system.
	46. Evaluate the methods used to manage traffic congestion. (12)	This is successful... This is not successful... This is somewhat successful...
	47. Discuss the problems in favelas. (12)	Poor housing and services, overcrowding and poor healthcare, crime, landslides, lack of employment.
	48. Explain the methods used to tackle problems in favelas. (12)	Self-help schemes, site and service schemes, Superblock scheme, Pacification.
	49. Evaluate the impact of methods used to tackle problems in favelas. (12)	This is successful... This is not successful... This is somewhat successful...
Rural	<i>For a semi-arid area, you have studied</i>	Socio-economic:

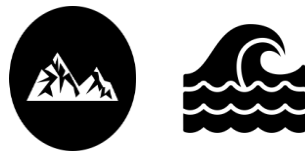
	50. a) Suggest the impact of land degradation on the people, economy and the environment. (12) b) You could be asked separately about the impact on just the people and the economy (socio-economic) (8) or just the environment. (12)	Development affected, reduced access to education, loss of crops, poverty, depopulation, traditional way of life under threat, rural to urban migration. Environmental: Loss of soil, erosion, desertification, reduced biodiversity, change in albedo, salinization.
	51. Explain the techniques used to combat land degradation. (12)	Diguettes, managing grazed areas, education, fuel efficient stoves, reducing herd sizes, afforestation, planting pits, Great green Wall.
	52. Evaluate the methods used to combat land degradation. (12)	This is successful... This is not successful... This is somewhat successful...
	53. a) Explain the conflicts which occur in a glaciated landscape. (12) b) May be split into socio-economic (8) or environmental (12)	Name the conflict. State who the conflict is between. Explain why it takes place Socio-economic = only concerned with people and businesses/money Environmental = nothing to do with money, just the environment
	54. a) Suggest solutions to the conflicts which occur in a glaciated landscape. (12)	Name the solution. Describe what it is. Say why it can help stop/reduce the conflict
	55. a) Evaluate the solutions to land use conflicts which occur in a glaciated landscape. (12)	This is successful... This is not successful... This is somewhat successful...
Development	56. Explain why only using a single indicator is not a reliable way of	

and Health	measuring a countries level of development . (8)	
	57. Why are combined indictors such as HDI more reliable to measure a countries level of development?	Problems of a single indicator and benefits of a combined
	58. Give reasons for different levels of development between developing countries (10)	CHAPTER RAT
	59. Outline the physical and human causes of malaria (8)	
	60. Describe solutions used to overcome Malaria (8)	
	61. Evaluate the effectiveness of solutions to overcome malaria (12)	This is successful... This is not successful... This is somewhat successful...
	62. Give examples of Primary Health care strategies you have studied and explain why they are suited to developing countries 10	
Climate Change	63. Physical and human causes of climate change (10)	Look at question carefully, it may ask you for both or it may ask you for just physical or just human.
	64. Explain the solutions to climate change (10)	Give local, national and global examples
	65. Explain the effectiveness of these solutions (8)	Give local, national and global examples

Physical Environments

(50 marks)

Lithosphere (Glaciation and Coasts)



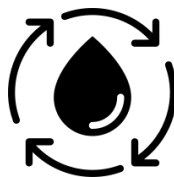
Atmosphere



Biosphere



Hydrosphere



LITHOSPHERE

Glaciation

Formation of a corrie

Snow accumulates in mountain hollows when more snow falls in winter than melts in the summer.

North/north-east facing hollows are more shaded, so snow lies longer, with accumulated snow compressed into neve and eventually into ice (a glacier).

The glacier moves due to gravity and its own weight

The glacier erodes by two ways:

Firstly, by plucking, when ice freezes onto bedrock, pulling loose rock away from the back-wall making it steeper.

Glaciers also erode by abrasion which is when the angular rock embedded in the ice grinds the hollow floor, making it deeper.

Freeze thaw weathering on the backwall supplies further abrasion material helping to further deepen the corrie. Freeze thaw is when water enters cracks, freezes in cold temperatures and widens the crack. Overtime this will continue to expand causing the crack to expand and break off.

The scree falls into the bergschrund which is large crevasse separating moving ice from ice still attached to the back wall

Rotational sliding further deepens the central part of the hollow floor as gravity causes the ice to move.

Friction causes the ice to slow down at the front edge of the corrie, allowing a lip to form, which traps water as it melts, leaving a lochan or tarn.

An example of a corrie is Coire Cas in the Cairngorms.

Formation of an arête

FORMATION OF A GLACIER

An arête is a ridge that results when two corries are formed back to back or side by side on a mountain. The ice in the corries erodes the hollows using plucking and freeze thaw.

Plucking is where the glacier ice melts and then re-freezes to rocks. This rock becomes embedded into the ice and when the ice moves downhill it tears the rock out/plucks it from the rock face and carries it downhill by gravity.

This sharp, angular peak becomes even more pronounced over time as the exposed rock is subject to freeze thaw action. Freeze thaw is when water enters cracks, freezes in cold temperatures and widens the crack. Overtime this will continue to expand causing the crack to expand and break off.

As each glacier erodes both corries on either side of the ridge, the edge becomes steeper and the ridge becomes narrower.

The ridge is jagged as it has been exposed to freeze-thaw weathering. An example is Striding Edge in the Lake District.

Formation of a pyramidal peak

FORMATION OF A GLACIER

A pyramidal peak is formed where three or more corries meet back to back. Snow collects in hollows and turns to ice forming glaciers which move downhill.

Glaciers erode backwards towards each other removing rocks by plucking and freeze thaw. Plucking is where the glacier ice melts and then re-freezes to rocks. This rock becomes embedded into the ice and when the ice moves downhill it tears the rock out/plucks it from the rock face and carries it downhill by gravity.

Freeze thaw is when water enters cracks, freezes in cold temperatures and widens the crack. Overtime this will continue to expand causing the crack to expand and break off.

Narrow ridges called arêtes separate the corries. As the glaciers erode backwards into the mountains the corries get bigger; this produces a steep-sided peak between them.

Freeze-thaw weathering erodes the top of the mountain and creates a pyramidal peak. An example of a pyramidal peak is the Matterhorn in Switzerland.

Formation of a u-shaped valley

FORMATION OF A GLACIER

Glaciers follow the existing v-shaped valleys carved by rivers before the ice age. The huge weight/volume of the glacier as it moves downhill cause processes such as plucking and abrasion to widen and deepen these valleys into U shapes.

Plucking is where the glacier ice melts and then re-freezes to rocks. This rock becomes embedded into the ice and when the ice moves downhill it tears the rock out/plucks it from the rock face and carries it downhill by gravity.

Abrasion is where the plucked rock is acting like sandpaper — rubbing and smoothing the land surface as the ice moves along.

Former interlocking spurs may be eroded by the glacier as it bulldozes downhill leaving truncated spurs and steep valley sides.

The width and shape of the resulting glacial trough will depend on the nature of the rock type and the intensity of the glacial erosion.

An example of a u-shaped valley is Glen Coe. At the end of the ice age, once glaciers have melted, misfit streams will flow down the valley.

Formation of a hanging valley

FORMATION OF GLACIER

Same process as U shaped valley. Mention Freeze thaw and plucking for steepening sides and abrasion to deepen base. Define all types of erosion!

A hanging valley is made by a tributary glacier, which eroded more slowly than the main glacier.

When it melted it was left hanging above the main valley floor and can often contain a waterfall.

An example is the hidden valley of Glencoe

Formation of a ribbon loch

FORMATION OF GLACIER

Glacier moves over layers of hard and soft rock. Soft rock erodes faster than harder rock. This is called differential erosion.

The base of the valley floor is deepened by abrasion. Abrasion is.....

Ribbon lakes can form where softer bedrock is eroded more deeply than the surrounding area and the soft rock is filled with glacier melt water.

An example is Loch Lomond

GLACIATED DEPOSITONAL FEATURES

Formation of terminal moraine

A glacier retreats as temperatures rise as the glacial moves downhill. For example, the temperature will rise by 1 degree for every 100m closer to sea level.

Terminal moraine is a ridge running across the valley and made up of glacial deposits known as till. This is unsorted/un-stratified in nature as ice deposits all sizes of sediment at the same time unlike rivers.

It is made up of angular stones due to the nature of processes that have created the rocks carried by a glacier.

As the glacier moves downhill under gravity it acts like a bulldozer, pushing sediment in front of it as it goes. On reaching lower altitudes and when temperature rises, the glacier melts, depositing the moraine at its snout.

Terminal moraine marks the furthest point that the glacier reaches. Once the ice has retreated, the terminal (or end) moraine can often form a dam, creating a ribbon lake e.g. Loch Lomond.

Formation of a drumlin

WHY A GLACIER RETREATS

Drumlins are elongated hills made up of unsorted glacial deposits/till/boulder clay.

Drumlins are formed as the glacier becomes overloaded with sediment and deposits it, streamlining the sediment as it flows over it.

If there is a small obstacle on the ground, this may act as a trigger point and till/boulder clay can build up around it.

Drumlins may be reshaped by further ice movements after being originally deposited.

The steep 'stoss' slope faces up-valley and the more gently-sloping 'lee' slope faces down-valley.

Drumlins are found in swarms or in a 'basket of eggs' topography.

Formation of an Esker

WHY A GLACIER RETREATS

Eskers are meandering ridges formed by meltwater streams in or underneath a glacier.

They are therefore made up of meltwater, sands and gravels.

The larger stones are at the base because larger stones are dropped first by flowing water due to the heavier weight.

The stones also tend to be more rounded than glacial deposits, because of the action of flowing water rounding the edges by solution, corrasion and attrition.

As the glacier melts, sub-glacial streams flow through tunnels and the load is deposited on the channel bed.

Coasts

COASTAL EROSION

Headlands and bays

Destructive waves have high energy, a short fetch and are formed in storm conditions (1). They attack the weakest point the coastline which is the crack (1)

Headland & bays are formed along concordant and discordant coastlines (1) but are most common areas with a discordant coastline where alternate bands of hard and soft rock are found at right angles to the coast (1). They are formed by differential erosion (1), where less resistant rocks erode more quickly than harder rocks (1).

(Max 2 types of erosion credited)

Hydraulic action (1) waves compress trapped air in the rocks, creating an explosive blast which weakens and loosens rock fragments (1). Abrasion (1) rock fragments thrown against the headland create a sandpaper (abrasive) action (1). Solution (1) chemicals and acid in sea water weathering limestone and chalk (1). Attrition can occur here (1) rock fragments slowly being ground down by friction from wave action into smaller and rounder pieces to form sand (1).

A headland is an area of hard rock which juts out into the sea (1) and a bay is a sheltered area of soft rock between headlands (1). An example of a Headland and Bay is Swanage Bay, Dorset (example 1 mark).

Caves, arches, stacks and stumps

Destructive waves have high energy, a short fetch and are formed in storm conditions. They attack the weakest point the coastline which is the crack

These crack can be widened and deepened by erosion to form small caves

The sea can erode by hydraulic action which is when pounding waves compress trapped air in the rocks, creating an explosive blast which weakens and loosens rock fragments.

Erosion can also take place by abrasion which is when rock fragments thrown against the headland create a sandblasting effect, wearing away the rock

Over time erosion on both sides of the headland cuts through the backwall and enlarges the cave to create an arch e.g. Durdle Door.

Vertical erosion can create a blowhole in the roof of the arch and through further erosion the arch collapses leaving a stack isolated from the headland e.g. Old Harry.

Cliffs and wave-cut platforms

Destructive waves have high energy, a short fetch and are formed in storm conditions. They attack the weakest point the coastline which is the crack.

Waves attack the coast and erode the cliffs by two main erosional processes; hydraulic action and solution.

Firstly by hydraulic action, where the force of the waves compresses the air in the cracks in rocks of the cliffs, forcing the cracks to widen and the rocks to break up.

Secondly by solution which is when waves containing salts and chemicals dissolve the rocks.

Waves mostly attack the base of the cliff which then gets worn away the fastest. The foot of the cliff is undercut and a wave-cut notch is formed.

As the waves continue to pound and erode the coast, the notch gets wider and deeper and eventually becomes unsupported. This is due to vertical erosion and hydraulic action further weakening the crack in the cliff. Hydraulic action is.....

This process continues and the cliff retreats, leaving a wave-cut platform at the base of the cliff. An example of a wave-cut platform is broadbench.

COASTAL DEPOSITION

Sandspit

Constructive waves have low energy, a long fetch and form in calm conditions. **Sand spits** are low ridges of sand or shingle slowly extend from the shore across the bay or a river estuary and are caused by longshore drift.

This lateral movement occurs when waves, driven by prevailing wind, pushes material up the beach, known as the swash.(45 degrees)

The returning backwash is dragged back by gravity down the beach at right angles.

When the coastline changes direction the waves lose energy and deposit sediment.

Material slowly builds up to appear above the water and begins to grow longer and wider. The spit develops as long as the supply of deposits is greater than the amount of erosion.

Spits form where there is a change in direction on a coastline creating a curve, which allows a sheltered area for deposition. A salt marsh often develops in the curve.

They can develop at a bay or a river estuary where the river current prevents the spit from extending right across the bay or estuary.

Spits can become permanent if the prevailing wind picks up and blows the sand inland forming sand dunes. They can be consolidated by vegetation e.g. Hurst spit.

Sand bar

Constructive waves have low energy, a long fetch and form in calm conditions. When a sand spit joins up with another headland, cutting off the bay from the sea, a **sand bar** is formed and are caused by longshore drift.

This lateral movement occurs when waves, driven by prevailing wind, push material up the beach, known as the swash.(45 degrees)

The returning backwash is dragged back by gravity down the beach at right angles.

When the coastline changes direction the waves lose energy and deposit sediment.

Material slowly builds up to appear above the water and begins to grow longer and wider.

It usually does this in the absence of any large river that might wash it away. An example of a sand bar is Chesil beach.

A sand bar can cut up off a body of water to the landward side creating a **lagoon**. The sandbar can be broken during storm conditions and destructive waves.

Tombolo

Constructive waves have low energy, a long fetch and form in calm conditions.

Along some coastlines a sand spit will grow outwards into open water and reach an island, which it will then join to the mainland.

A **Tombolo** is formed and are caused by longshore drift.

This lateral movement occurs when waves, driven by prevailing wind, push material up the beach, known as the swash.(45 degrees.

The returning backwash is dragged back by gravity down the beach at right angles.

When the coastline changes direction the waves lose energy and deposit sediment.

Material slowly builds up to appear above the water and begins to grow longer and wider.

This is called a **tombolo** and an example is St Ninians isle.

Atmosphere

- Global heat budget
- Surplus of energy in tropics but deficit at poles
- Atmospheric circulation by Ocean currents and atmospheric cells
- ITCZ

The Global Heat Budget

The global heat budget is the balance between incoming solar radiation and outgoing radiation.

Only 52% of the insolation from the sun reaches the Earth's surface. The 1005 of energy from the sun is called short wave energy. Of this 52%, only 46% is absorbed by the land and water.

Of the 48% which does not get absorbed by the Earth, a total of 23% is absorbed by water vapour, gases and dust (19%), and clouds (4%) in the atmosphere.

Reflection varies depending on the extent of cloud cover and the covering of the Earth's surface. Snow and ice covered surfaces at the poles reflect more radiation compared to darker forest areas at the tropics which absorb more incoming radiation. This is called albedo

The ability of a surface to reflect light from the sun is called the albedo affect. Of the 52% which reaches the Earth's surfaces, 6% is reflected back out into the atmosphere. This is called long wave energy.

8% is scattered by atmospheric gases and dust, and 17% is reflected by clouds.

Surplus of energy in tropics but deficit at poles (This links to the ugly diagram hand out in your jotter)

The Sun's rays have less atmosphere to pass through at the tropics, so less energy is lost through absorption and reflection by clouds, gas and dust. Therefore it is warmer at the tropics.

The Sun's angle of incidence in the sky decreases towards the poles (10°) due to the curvature of the Earth which spreads energy over a larger area. This means the insolation at the Arctic Circle is stretched and therefore weaker.

Conversely, the Sun's rays are more concentrated on tropical latitudes (90°) as the intensity of the insolation is greatest when rays strike vertically.

Albedo rates differ from the darker forest surfaces at the tropics absorbing radiation (low albedo), in contrast to the ice/snow covered polar areas reflecting radiation (high albedo) which results in heat loss through terrestrial radiation.

The tilt of the axis results in the Sun being higher in the sky between the tropics throughout the year, focusing energy.

There is no solar insolation at the winter solstices at the poles producing 24 hour darkness, whereas the tropics receive insolation throughout the year.

Atmospheric cells and associated winds

HP = High Pressure LP = Low Pressure

Hadley cell

Warm air rises at the Equator 0° (LP) and travels into the upper atmosphere to around 30° N and S, cools and sinks (HP) – this means it is thermally direct.

Air moves from the tropical high to the low pressure area at the equator creating the Hadley Cell/Trade winds.

Polar cell

Air rises at 60° N and S (LP) into the upper atmosphere where it flows to the Poles and sinks at 90° N and S (HP).

Easterly winds blow away from the high pressure at the poles, forming the Polar Cell. The Polar cell is also thermally direct as warm air rises, cools and sinks.

Ferrel cell

The ferrel cell is not a true cell but instead is created by friction created between Polar and Hadley.

The cold air from the poles meets the warmer air from the tropics, causing air to rise creating the Ferrel cell.

Air is moved from the tropical HP, toward LP at the polar front, forming the Westerlies.

Due to the Coriolis Effect winds are deflected to the right in the northern hemisphere and left in the southern hemisphere.

Warm air from the Equator is distributed to higher and cooler latitudes, and cold air from the Poles is distributed to lower and warmer latitudes

Atmospheric circulation by Ocean Currents

Describe:

Labrador current is cold and flows southwards between Canada and Greenland

Canaries is also cold flowing southwards past the west coast of Africa.

North Equatorial is warm flowing westwards from Africa to the Caribbean

Gulf stream flows north east from Caribbean towards Europe and the west of the UK

Explain:

The prevailing winds on the surface create friction (a frictional drag) with the surface water, setting up the ocean currents. For example, the equatorial current is influenced by the trade winds.

The currents set up circular loops or gyres. The Coriolis Effect caused by the Earth's rotation deflects the currents to the right in the Northern Hemisphere and to the left in the Southern Hemisphere.

Differential heating involves cold polar water (e.g. Labrador) flows towards the Equator but because cold water is denser than warm water (e.g. North Atlantic Drift), the water sinks to the ocean floor to form very slow-moving, powerful, deep-sea currents.

Ocean currents deflected off significant landmasses or continents. For example, the Equatorial current is moved north east towards Europe after being deflected by Central America.

ITCZ – Air masses

Tropical Maritime

- Source is the Atlantic Ocean/Gulf Guinea from tropical latitudes
- Winds from the SW blow across the ocean
- Hot with a small daily range in temperature
- Very high humidity 70-80%
- Rain showers, thunderstorms
- Unstable air

Tropical Continental

- Source from the Sahara Desert from tropical latitudes
- Winds from the NE trades blow across the land
- Very hot large daily range in temperature
- Dry dusty, 'harmattan winds', poor visibility
- Stable air
- Very low humidity 10-20%
- No rainfall

The ITCZ (Describe and explain rainfall pattern in west Africa)

Map Q3: West Africa

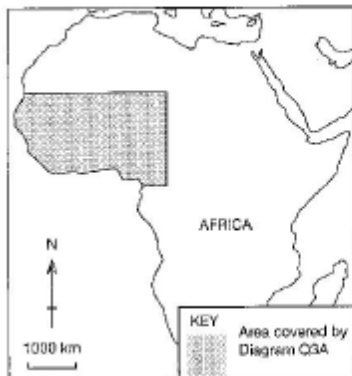


Diagram Q3A: Rainfall patterns across West Africa

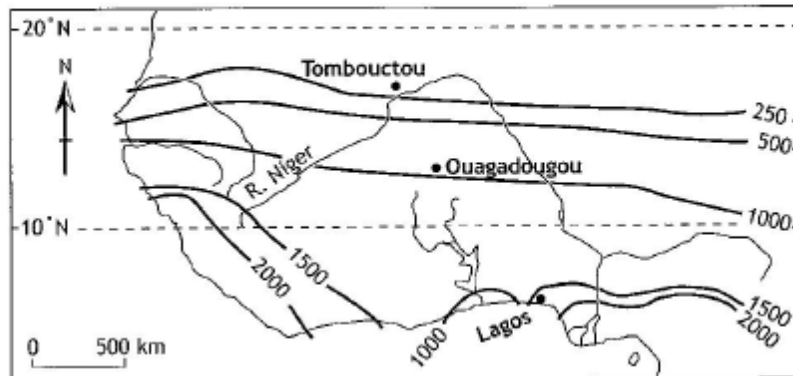
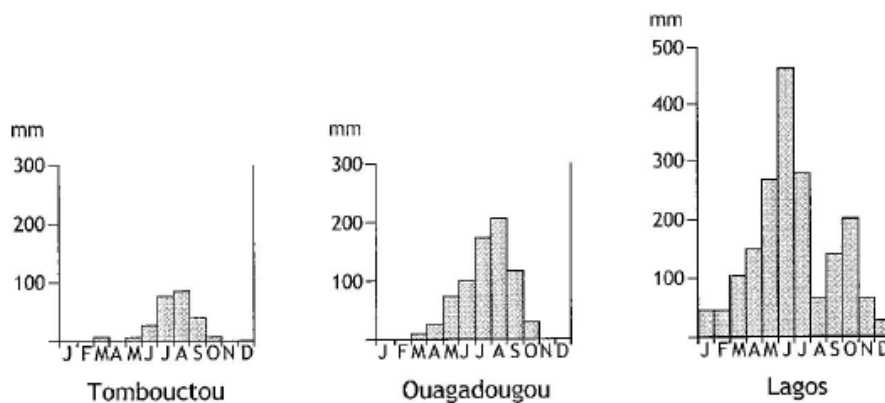


Diagram Q3B: Selected rainfall graphs for west Africa



Tombouctou has under 250mm of annual rainfall. It also has 5 dry months. It has its dry months in the winter season as this is when the ITCZ is furthest south, so the hot, dry tropical continental cT air mass comes down over the Sahara desert, blown by the Harmattan winds.

It has its wet season in the summer months between June – September. This is when the ITCZ is at its furthest north as it follows the movement of the sun overhead.

Lagos on the other hand has just over 1500mm of annual rainfall. It has two peaks of rainfall. The first is when the ITCZ is furthest north. Warm, wet weather called the tropical maritime mT air mass comes from the Gulf of Mexico bringing with it rain.

It has another peak rainfall in October when the ITCZ moves south following the movement of the sun overhead.

Ouagadougou has an annual rainfall of just under 1000mm. It has 4 dry months. It has its wet season between May – September when the ITCZ is migrating north and then south following the movement of the sun.

Biosphere

- Podzol – Explain the formation of AND draw an annotated soil profile
- Brown earth - Explain the formation of AND draw an annotated soil profile
- Gley - Explain the formation of AND draw an annotated soil profile
- You can also be asked to compare the formation of two of the soils

Podzol

The vegetation in a podzol is thin, black acidic mor humus with a pH of 3.5-4. It is produced from the slow decomposition of coniferous pine cones and needles in a cold, wet climate.

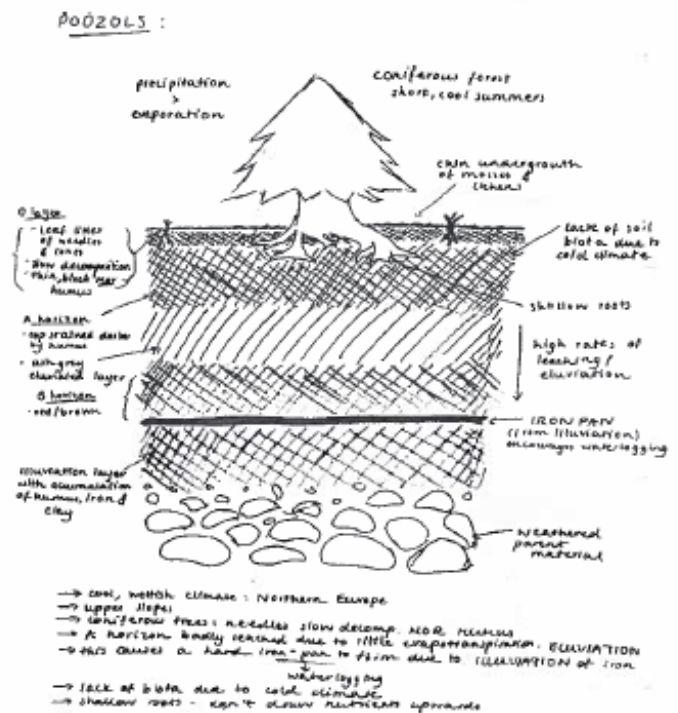
In the climate of a podzol, precipitation is greater than evaporation. This results in leaching of minerals which is the downward movement of water from the A to the B horizon. Podzolisation also takes place which is where the soil is depleted of its bases and becomes an acid.

The eluviation of minerals from the A horizon and the illuviation of minerals in the B horizon results in the formation of an iron pan in the upper B horizon. As a result of this, waterlogging can also take place in the podzol.

In addition to this, the downward leaching of minerals such as clay and iron removes the colour from the A horizon making it an ash-grey colour with a sandy texture. The B horizon is red-brown in colour with a denser texture.

Due to the cold, wet climate there are little soil organisms to mix and aerate the soil. As a result of this the horizons in a podzol are clearly defined and the AO horizon is thin.

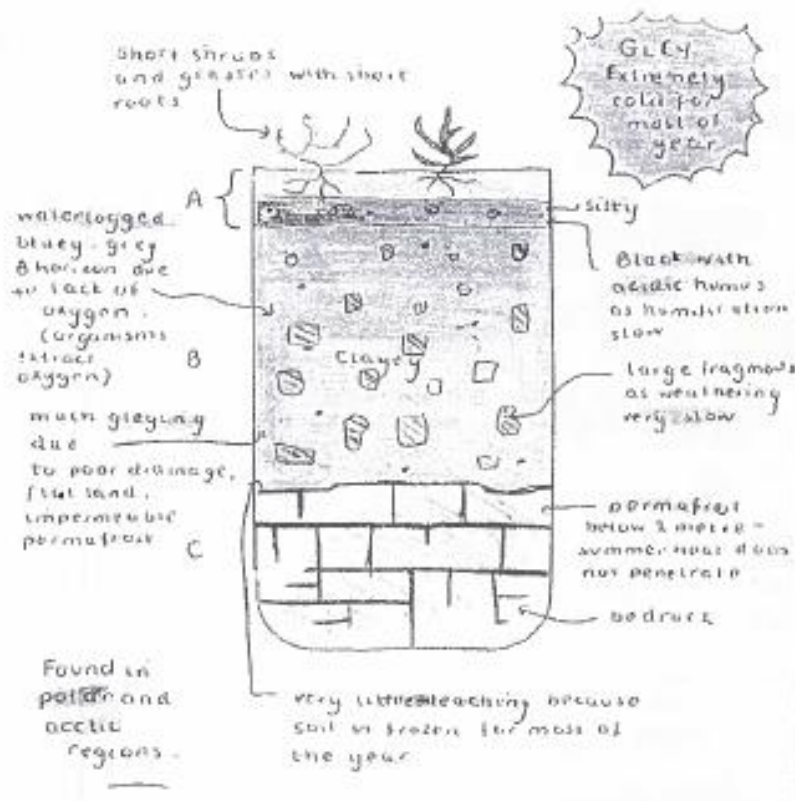
Lastly, the parent material in a podzol is made up of a mixture of weathered particle shapes and sizes of fluvial glacial rocks such as granite.



Brown earth

The vegetation in a brown earth is thick, acidic mull humus with a pH of 5-6.5. The deciduous forests provide deep leaf litter rich in nutrients which are broken down quickly by the mild climate.

The climate in a brown earth is fairly mild. When precipitation exceeds evaporation an iron pan may form which will impede draining and cause waterlogging.



When evaporation is greater than precipitation, capillary action will take place which is when minerals are transferred upwards through the soil horizons caused by evaporation loss at the surface.

The A horizon is darker brown in colour compared to the B horizon which is lighter brown in colour. This is because tree roots penetrate deep into the soil and absorb the minerals, ensuring the recycling of minerals back into the vegetation. A is also darker in colour because of the abundance of leaf litter.

Due to the mild climate there are many soil organisms found in a brown earth soil. Soil biota break down leaf litter and they also ensure the mixing of the soil, aerating it and preventing the formation of distinct horizons.

Lastly, in the C horizon there can be a range of parent materials. Hard rocks e.g. schist take longer to weather producing thinner soils, than soft rocks e.g. shale that weather quickly.

Gley

Gleys are found in cold regions such as the Tundra. These conditions mean natural vegetation is limited, providing little nutrients and leaf litter, reducing the development of gley soils.

Vegetation which is made up of shrubs and lichens, breaks down very slowly in the cold climate, resulting in a thin acidic mor humus.

Soil organisms extract limited oxygen supplies from the soil, decolouring the soil and leading to a grey/blue appearance.

Red mottling in small air pockets due to re-oxygenation of the iron in the soil due to burrowing animals/soil drying out in summer.

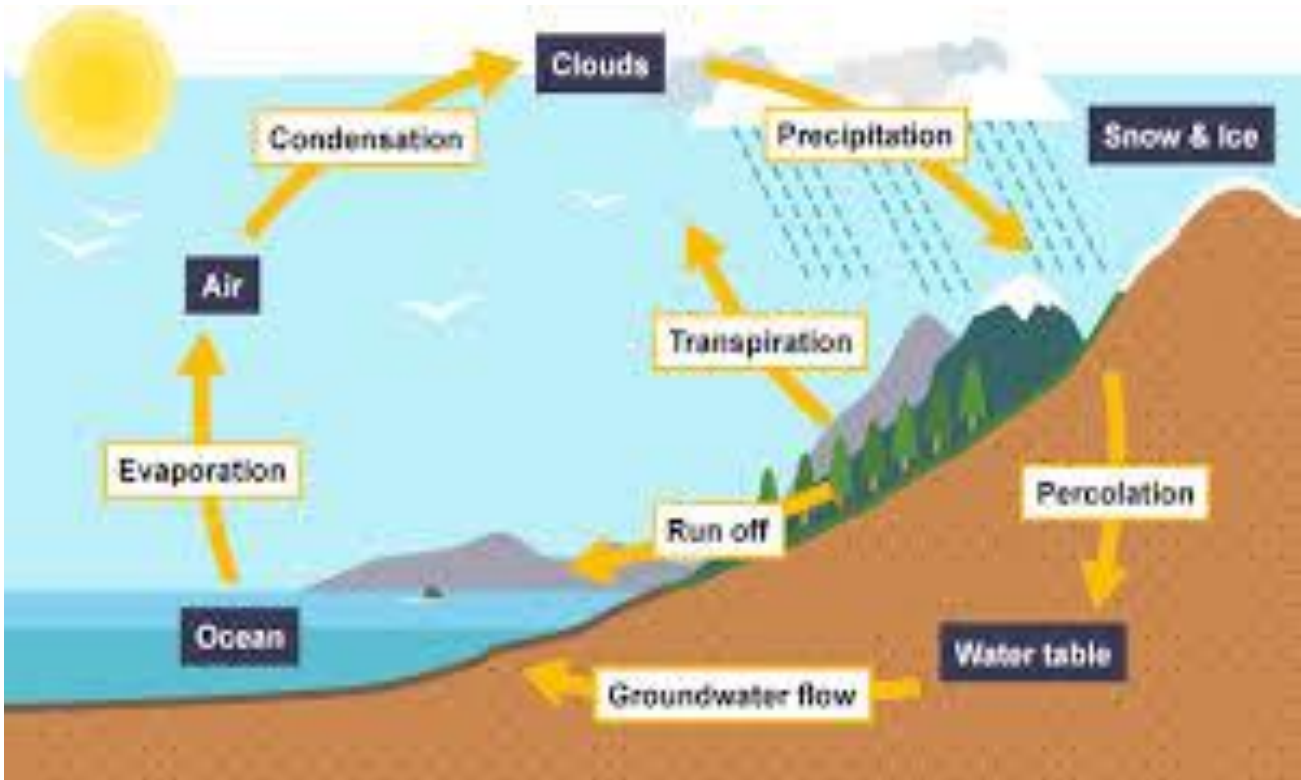
Gley soils tend to be found in flat landscapes such as plateau moorland. This results in limited surface run-off and poor drainage causing waterlogging. Permafrost exacerbates this.

Parent material is often found in the B horizon of the soil due to frost shattering. Soil heave brings this weathered material up through the soil. At times this material may breach the surface.

	PODZOL	BROWN EARTH	GLEY
HORIZONS	WELL DEFINED	LESS DISTINCT	WELL DEFINED
ACIDITY	ACIDIC	MILDLY ADCIDIC	MILDLY ACIDIC
COLOUR	A –VERY DARK B – RED/BROWN	DARK BROWN/BLACK	GREY
HUMUS	MOR	MULL	MOR
PROCESSES	LEACHING OF SOIL, DOWNWARD MOVEMENT OF IRON, AL AND HUMUS IRON PANS LIE	LESS SOIL LEACHING CAPILLARY ACTION AEROBIC CAL	ANEROBIC WATERLOGGING RED MOTTLING IRON OXIDIES
DRAINAGE	FREE DRAINING SOILS IRON PAN PREVENTS DRAINAGE –CAN CAUSE WATERLOGGING	FREE DRAINING	WATER LOGGED
NATURAL VEGETATION	CONIFERIOUS FORESTS LITTER MOSTLY PINES AND NEEDLES	DECIDUOUS FOREST PLENTY OF LEAF LITTER OAK TREES	CONIFEROUS - TUNDRA MOSSES, LICHENS AND MARSHY
BIOTA	NO Anaerobic	YES Aerobic	NO Anaerobic
CLIMATE	LOW RAINFALL	MILD	COLD
LOCATION	NORWAY OR SCOTTISH HIGHLANDS	SE ENGLAND	TUNDRA OR ALASKA

Hydrosphere

Hydrological cycle



Remember you could be asked to draw an annotated diagram of the Hydrological cycle

Explain how a balance is maintained in the Hydrological Cycle

The hydrological cycle is a closed system and is powered by the sun. Evaporation is when water changes from a liquid into a water vapour when it rises up into the atmosphere. Here it cools and condenses to form clouds.

Clouds can then be moved by the winds by a process of transportation called advection. When the clouds become saturated precipitation in the form of rain, hail, sleet or snow falls.

The precipitation falls to the ground and can enter the soil through infiltration. It then moves through the soil through the pore spaces in a process called percolation, and makes its way to the sea in a process known as throughflow.

Precipitation can also fall on the surface. It can land on trees which is known as interception, and then can fall down to the ground via the stems and trunk known as stem flow.

The precipitation can be absorbed by the plants. Some of this water is retained by the plant for photosynthesis but some of it can be released back into the atmosphere by transpiration. Lastly, precipitation can move over the surface of the land as overland flow or surface run off. It can also be stored on the surface in lakes, or it can move through rivers as channel flow.

Drainage basins (inputs, outputs, transfers (flows) and stores)

A drainage basin is an open system so water can be moved in or out of drainage basins.

The main input in a drainage basin is precipitation. This can be in the form of rain, hail, sleet or snow. The amount is determined by the intensity, the duration and the type.

One way the water is transferred is above the surface. It can transfer across the land which is called overland flow where it flows over the surface of the land. It can also flow through the rivers, known as channel flow.

It can also transfer below the ground. The water enters through infiltration and then continues to move through the soil through percolation. It then moves through the soil towards the sea or a river via throughflow.

Water can also be stored in the system above ground through vegetation. Firstly by interception which is when a water droplet lands on a leaf. Secondly, by absorption when the water is stored in the plants and roots.

Additionally, when water is stored underground it is called groundwater. This is determined by the amount of pore spaces and the rock type. The level at which the ground becomes saturated is called the water table.

Water from lakes and seas leaves the system (output) by evaporation when water vapour rises into the atmosphere. It also leaves when trees transpire water from leaves. When both of these are put together it is known as evapotranspiration.

Human factors affecting the hydrological cycle

Deforestation is the cutting down or burning of trees on a large scale e.g. Brazil Amazon rainforest. This increases the amount of run-off water, and decreases evapotranspiration, leading to decreased cloud formation.

It also decreases absorption due to less tree roots, decreases interception due to less leaves, and leads to more extreme river flows.

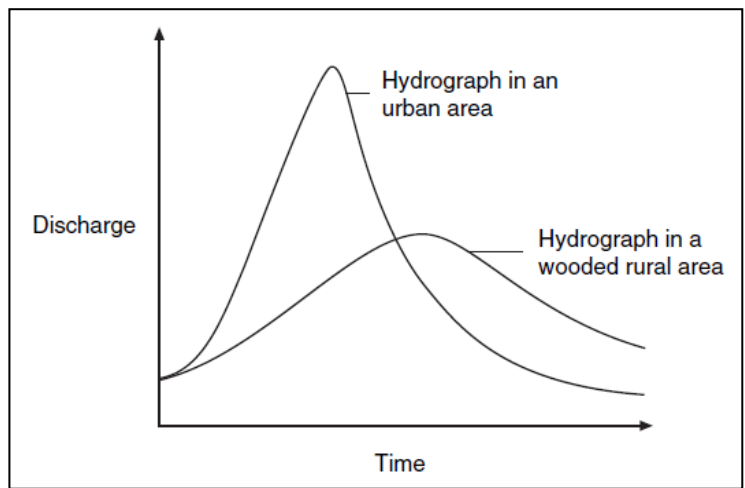
Irrigation is storing water during wet season to be used during dry season for farming e.g. India, rice farming. More water is placed in surface stores such as canals and ditches, leading to increased evaporation and evapotranspiration.

Urbanisation is the development of cities into the countryside e.g. decreasing rural/urban fringe in Glasgow. This decreases the amount of natural vegetation and replaces with impermeable surfaces and drains. It also increases surface run-off and evaporation, leading to high river levels.

Mining is digging for valuable minerals such as Bauxite in the Amazon rainforest. It results in the silting up of lakes, reservoirs and rivers due to sediment being transported as run-off, leading to reduced storage and raises river level.

Dam building and reservoirs is the storing river water e.g. Colorado River Dam, USA. Water is stored so there is decreased overland flow/channel flow, reducing throughflow and groundwater flow. This leads to reduced channel flow in river.

Additionally, there is increased evaporation, increased cloud formation, leading to changes in levels of precipitation.



Urban v Rural hydrographs

The urban hydrograph has a higher peak discharge compared to rural. This is because more water reaches the river as it travels as overland flow over impermeable surfaces such as tarmac.

The urban hydrograph has a shorter lag time compared to the rural. This is because water enters the river quicker as it is channelled through man made gutters, drains and sewers.

The rural hydrograph has a lower peak discharge compared to the rural. This is because some water gets absorbed by plants and then transpired out so not all of it reaches the river.

The rural hydrograph longer lag time. It takes longer for the water to enter the river as it infiltrates the soil, then percolates down eventually entering the river.

Also, some of it also gets intercepted and then falls to the ground, or goes down via stem flow before entering the soil and then going to the river.

Lastly, the rural hydrograph has a more gentle falling limb and takes longer to return to base level. Water will continue to go into the river via rocks and soil as throughflow so it will take longer to return to base level.

The urban hydrograph has a higher peak discharge compared to rural. This is because more water reaches the river as it travels as overland flow over impermeable surfaces such as tarmac. ✓

The urban hydrograph has a shorter lag time compared to the rural. This is because water enters the river quicker as it is channelled through man made gutters, drains and sewers. ✓

The rural hydrograph has a lower peak discharge compared to the rural. This is because some water gets absorbed by plants ✓ and then transpired out so not all of it reaches the river. ✓

The rural hydrograph has a longer lag time compared to the urban. It takes longer for the water to enter the river as it infiltrates the soil ✓, then percolates down eventually entering the river. ✓

Also, some of it also gets intercepted and then falls to the ground ✓, or goes down via stem flow before entering the soil and then going to the river. ✓

Lastly, the rural hydrograph has a more gentle falling limb compared to the urban and takes longer to return to base level. Water will continue to go into the river via rocks and soil as groundwater ✓, and then it will flow to the river as throughflow so it will take longer to return to base level. ✓

Describing hydrographs

You will be given a hydrograph which will have a bar graph for rainfall, and a line graph for river discharge.

- 1) What is the peak rainfall and how much? What is the peak river discharge and how much?
- 2) What is the basin lag time? (Time difference in number of hours between peak rainfall and peak discharge) Under 10 hours is an urban hydrograph, over 10 hours in a rural hydrograph.
- 3) Once you know what type of hydrograph you have i.e. urban or rural, give reasons why this is.

Explaining Hydrographs

Urban:

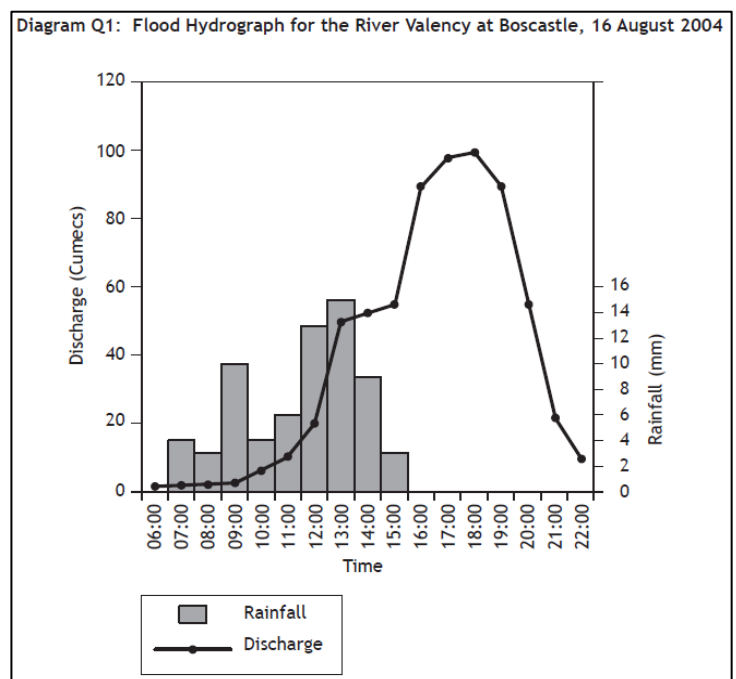
- Less infiltration due to concrete and impermeable surfaces, increased overland flow resulting in higher river levels and quick lag time.
- Enters river quickly due to being channelled by drains and sewers, resulting in quicker lag time.

Rural:

- Increased infiltration due to permeable surfaces, percolation, increased through flow resulting in lower river levels and longer lag time.
- Increased absorption and interception from trees, and therefore transpiration so lower river levels.

Other reasons:

- Steep relief means shorter lag time as gravity helps water return to the river quickly



- Gentle relief means longer lag time as water takes a longer time to reach the river
- Size and shape of basin (circular vs. elongated)
- Hard impermeable rock means more overland flow which leads to shorter lag time
- Soft permeable rock means more infiltration etc which leads to longer lag time
- Large catchment (lots of tributaries) means high peak discharge
- Small catchment (few tributaries) means low peak discharge

Explaining formation of river features

V-shaped valley

In the upper course, the river has high energy and erodes the landscape. The river flows downhill eroding the landscape vertically. The river erodes a deep notch into the landscape by hydraulic action and abrasion.

Hydraulic action is the breaking away of the river bed and banks by the sheer force of the water getting into small cracks and forcing pieces of rock to break off.

Abrasion is the wearing away of the river bed and banks by the river's load hitting against them and causing the landscape to break up.

As the river erodes downwards the sides of the valley are exposed to freeze-thaw weathering. This loosens the rocks and steepens the valley sides and aids the process of corrosion, leading to further erosion.

The river transports the rocks downstream and the channel becomes wider and deeper. This creates a v-shaped valley between interlocking spurs.

Waterfall

In the upper course, the river has high energy and erodes the landscape. A waterfall is formed by differential erosion: water flows over a layer of hard rock such as on top of a layer of softer rock, eroding the soft rock faster by the force of the running water.

Eventually the softer rock is worn away and this creates a step which the water has to flow down. The soft rock above is undercut by the river by erosion so there is nothing to support the harder rock above which collapses.

This erosion could be due to hydraulic action, the breaking away of the river bed and banks by the sheer force of the water getting into small cracks and forcing pieces of rock to break off.

The river creates a plunge pool at the bottom of this drop, where water swirls around, helping to make the plunge pool deeper. The plunge pool can be deepened by abrasion and attrition.

Abrasion, the wearing away of the river bed and banks by the river's load rubbing against them and causing the river bed to deepen. Attrition is when rocks or pebbles hit against each other or the sides of the river to become smaller and rounder.

This process is repeated over a long period of time causing the waterfall to gradually retreat upstream usually leaving a steep sided gorge.

Meander

The water in a river flows in a sinuous (swinging) way as it contains areas of deeper water (pools) and areas of shallow water (riffles), which results in areas of slower and faster water movement, causing the current to swing from side to side.

Because most of the water moves powerfully on the outside bend of the meander, the channel is deepened by hydraulic action and abrasion.

Hydraulic action is the breaking away of the river bed and banks by the sheer force of the water getting into small cracks and forcing pieces of rock to break off.

Abrasion is the wearing away of the river bed and banks by the river's load hitting against them and causing the landscape to break up.

Due to greater energy, the outside bank is undercut forming a river cliff. This widens the river and is known as lateral erosion.

This is also created by helicoidal flow which is when the river twists like a corkscrew, eroding material from the outside bend and depositing it on the inside bend.

On the inside of the meander bend a point bar (river beach/slip-off slope) is deposited as the river has less energy due to a lower speed and less efficient hydraulic action.

Continuous erosion on the outer bank and deposition on the inner bank forms a meander in the river, which then migrates downstream.

Ox-bow lake

As lateral erosion continues to occur the river's meander becomes more sinuous. The outer bank of a meander continues to be eroded laterally through processes such as hydraulic action, the neck of the meander becomes narrower.

Hydraulic action is the breaking away of the river bed and banks by the sheer force of the water getting into small cracks and forcing pieces of rock to break off.

Abrasion is the wearing away of the river bed and banks by the river's load hitting against them and causing the landscape to break up.

Eventually due to the narrowing of the neck, the two outer bends meet and the river cuts through the neck of the meander. The water now takes its shortest route rather than flowing around the bend.

Deposition gradually seals off the old meander bend forming a new straight river channel. Due to deposition the old meander bend is left isolated from the main channel as an ox-bow lake.

Over time this feature may fill up with sediment and may gradually dry up if it evaporates or drains away. Where tidal currents are strong deltas may not develop and the sediment is carried further out to sea.

Human Environments

(50 marks)

Population



Urban



Rural



Population

- Methods used by countries to gathering population data
- Problems/difficulties/challenges of gathering population data in **developing countries**
- Consequences of **ageing population** structure
- Consequences of a **youthful population** structure
- Voluntary migration (Poland to UK) Push/Pull factors and impacts on donor/host countries
- Forced migration (Syria to Turkey) Push/Pull factors and impacts on donor/host countries

Gathering population data

Countries can gather population data in a variety of ways. Firstly by a census which is a survey (questionnaire) carried out every ten years to gather population data about the number of people living in their home, their age, gender, employment, home and languages spoken. The census is a legal requirement and people can be fined if they do not return it.

Secondly, civil registrations of births, marriages and deaths keep an up to date count of the population. Parents of new children must register a birth at their local registry office.

In addition to this, some countries carry out sample surveys. This is similar to a census but might focus on one area, such as a certain local authority. Scottish Household Survey is a continuous survey, based on a random sample of the population, which is cheaper than carrying out a full census

In China, National Population Surveys have been conducted annually, with 1% of the population being asked to complete the form.

Moreover, Immigration/Government records gather information on migration from visa or Borders Agency. Tourists have to apply for a visa when visiting some countries and passports can be scanned when entering and exiting a country.

Lastly, data from electoral roll and NHS records allows population data to be updated in between census collection.

Reasons why it is difficult to carry out a census in Developing Countries

Points may include:

- countries with many official languages have to translate their census forms (1 mark)
- countries have to employ enumerators who can speak multiple languages. (1 mark)
Nigeria has six major languages and hundreds of unofficial languages (1 mark)
- low literacy levels - people are unable to complete the forms (1 mark)
- size of the population - the sheer size of some populations makes it very difficult to conduct a census (1 mark)
- inaccessibility makes some areas very difficult to reach within the time frame. (1 mark) For example, Indonesia has many islands spread over a large area (1 mark)
- conflict can make it too dangerous for enumerators to enter (1 mark)
- data can quickly become out-of-date due to the high death rate (1 mark)
- cost - in developing countries, there may be higher priorities for spending, such as health care (1 mark)
- many people in developing countries may be living in shanty towns so have no official address (1 mark)
- ethnic tensions and internal political rivalries may lead to inaccuracies (1 mark)
for example, northern Nigeria was reported to have inflated its population figures to secure increased political representation (1 mark)
- illegal immigrants wish to avoid detection, (1 mark) for example Burmese migrants in Thailand (1 mark)
- Nomadic people may be missed or counted twice as they cross international borders. (1 mark)

Consequences of an ageing population

The increase in elderly will lead to an increased cost of pensions to the government (1 mark) and increased tax contributions for the economically active population (1 mark)

In-migration may need to be encouraged (1 mark) which may lead to tension between different cultures and or ethnic groups (1 mark)

The retirement age may need to be increased (1 mark) and more services for older people provided, such as care homes (1 mark)

There may be a lower unemployment rate in the future (1 mark) however a decrease in the economically active population may lead to a skills gap (1 mark)

Citizens may be encouraged to invest in private healthcare schemes and/or pensions (1 mark)•the falling birth rate may lead to a decline in demand for services for children such as schools (1 mark)

There will be an increased strain/costs on the Health Service to meet the needs of the ageing population (1 mark) for example more hip-replacements or heart medication (1 mark)

There may also be more demands placed on adult children to care for elderly parents (1 mark)

There may be an increase in robots doing the jobs of people. (1 mark)

Consequences of a youthful population

There are many consequences of a youthful population. Firstly, countries will struggle to meet financial obligations in relation to the growing demand for childcare services such as midwives and education, removing finance from other priority areas of development.

The government needs to build more schools and hospitals to cope with the high demand of young people.

The government of some developing countries do not have the money to build enough facilities, so people suffer from poor services resulting in inadequate healthcare.

Therefore, many children may not receive an education, lowering literacy rates and hindering development in countries with a rapidly growing population.

A rapidly growing population will put pressure on resources such as housing. Many residents may end of living in shanty towns with poor levels of sanitation, leading to rapid spread of disease such as cholera

In addition to this, population may outstrip resources and countries may face issues relating to land degradation if land is over-cultivated or not left fallow to recover nutrients.

Moreover, as children reach adulthood, countries may struggle to provide enough employment, leading to unemployment and poverty. Families may not be able to afford essentials such as food and water.

Lastly however, countries may be able to use the young population to attract inward investment, leading to job prospects and investments in infrastructure, benefitting all residents.

Voluntary migration (Poland to UK)

Push factors

Many Polish people have moved to Scotland in search of employment as unemployment rates in the last 10 years have been consistently higher in Poland . In 2004 unemployment was at 18.9%

Average wages are higher in the UK than Poland (Poland only around £3 per hour).

Poles often leave skilled jobs in Poland to work in the service sector in Scotland, where they can earn more money in jobs that require lower levels of qualification.

Pull factors

There were also higher wages of £6 per hour on average and some people could earn up to five times more than they would back in Poland.

When Poland joined the EU in 2004, many moved for quality of life decisions, including amenities, services, and bright lights such as entertainment facilities in large cities such as Glasgow.

There is a well-established Polish community in Scotland, which makes transition into a new country easier and provides informal support to migrants.

When Poland joined the EU in 2004, Poles were able to move freely to Scotland making it easier as there was not a complicated visa process.

Also, there are many cheap flights between Scotland and Poland with airlines like Ryanair making it a simple and low-cost journey.

Impacts on donor

Unemployment has fallen dramatically as there is less pressure on jobs. (18.9% in 2004 → 2.9% in 2020) ✓

Approx. £3bn billion is sent from the UK to relatives in Poland every year, which helps them and boosts the local economy. ✓

Less pressure is put on the Polish economy and local services such as education, housing and healthcare, as there are fewer resources required ✓

As the majority of the migrants to leave are of child rearing age, the birth rate is lowered so population growth rates will slow. ✓

When Polish immigrants decided to return home, they can speak English; this makes them more desirable to employers in Poland. ✓

The majority of emigrants are of working age, leaving some settlements where the majority of people are children and old people, so the community dies out if a lot of old people are left. ✓

Families are divided and the death rate increases as those left behind are old. ✓

More males emigrate than females, resulting in a gender imbalance. ✓

Lots of highly educated and well qualified people left Poland. This is referred to as a brain drain ✓ and leaves fewer working age and well qualified people in the donor country, leading to a skills shortage. ✓

Family members who remain in the country become dependent on remittances being sent home by migrant workers so if the migrant does not get a job the family back home will struggle to survive. ✓

Impacts on receiving (host)

Polish is the second most commonly used language in Scotland and the UK and Polish culture helps enrich the cultural diversity of Scotland. ✓

Polish migrants have brought with them new customs, food, drink and music. ✓

Migrant workers contribute to National Insurance which helps cope with the ageing population. ✓

The government also receives tax from migrant workers who are doing jobs that British people do not want to do due to low wages and unsociable hours. ✓

This has increased the working population and reduced labour shortages. ✓

Many migrants have brought with them required skills and are perceived as hard workers. ✓

Example - Many migrants are working in the NHS or construction industry. ✓

Polish people do not have the same workers' rights as British people and therefore are able to work long hours for little pay, which is attractive to British employers. ✓

Many are also employed on zero-hour contracts which is a big advantage to employers as they do not need to commit to full time contracts and only use workers when they need to. ✓

Emergence of the informal economy – many workers do not contribute to tax. ✓

Immigrants are often blamed for undercutting wages as they are willing to work for lower wages and for longer hours. ✓ This can lead to exploitation. ✓

Poorer communities resent incomers for taking entry level jobs resulting in stagnant low paid workers ✓.

Polish immigrants may become the target of frustration caused by higher unemployment rates (Xenophobia). ✓ This can lead to segregation, tensions and racism. ✓

Overcrowding in schools due to sudden increase in the roll puts pressure on school resources and teachers as new Polish pupils may require additional support. ✓

Some GP surgeries and hospitals initially found it difficult to understand the Polish patients due to the language barrier and many translators had to be hired. ✓

Rents and housing prices increase as demand for housing rises. ✓

Those who are unable to find work are often forced into homeless shelters

Forced migration (Syria to Turkey)

Push factors

Thousands of Syrians flee their country every day as they often decide to escape after seeing their neighbourhoods bombed or family members killed. ✓

Bombings are destroying crowded cities such as Aleppo and they are now ghost towns. ✓

Horrific human rights violations are widespread such as chemical gas attacks from nerve agents such as Sarrin gas in April 2018 causing suffocation and death. ✓

Basic necessities like food and medical care are sparse. ✓

The cost of bread has risen by 6500% in some areas and some areas are inaccessible due to blockades leaving people starving e.g. Madaya. ✓

Much of the country's infrastructure and essential services have been destroyed. ✓

58% of public hospitals are out of operation preventing people from receiving medical care. ✓

Thousands of people are unemployed leading to 70% living in extreme poverty. ✓

Pull factors

Many Syrians have family and friends already living in Jordan, Lebanon and Turkey so it is easier to make the move. ✓

Syria has porous land borders with Turkey, Lebanon and Jordan which makes it relatively easy to migrate into these countries without a passport. ✓

Impact on donor (Syria)

Once vibrant cities such as Homs and Aleppo are now ghost towns. ✓

Much of Syria's educated elite population (those who have money and connections) have fled their home in search of safety. ✓

This means those left tend to be unskilled and will struggle to rebuild the country. ✓

These cities will take years and billions of pounds to rebuild and may never be returned to what they were prior to the civil war ✓.

Farmers have fled also which has resulted in food shortages with no one to grow and tend to crops. ✓

Syria does not have enough doctors and nurses to look after the injured and the weak. ✓

A number of hospitals are out of operation so many people are not treated for medical issues. ✓
This has resulted in increased spread of disease and an increased death rate. ✓

Impacts on receiving (host)

Lebanese are being evicted because Syrians share housing with many people, and therefore afford rents that the Lebanese cannot. ✓

There is rising social tensions between cultures and nationalities. ✓

In some towns the population has doubled, putting a lot of pressure on health and education services. ✓

Space is also an issue in crowded urban centres, rents in some places have tripled since the influx of refugees. ✓

There are not enough teachers so some schools send Lebanese children home at lunchtime and then teach Syrian children for the second half of the day. ✓

Some Lebanese people say they have lost their jobs because Syrians are willing to work for less ✓.

Wages are plummeting, and families are struggling to make ends meet. ✓

Food prices have increased due to rising demand. ✓

Urban

For a developed and developing world country (**Glasgow and Mumbai**)

- Need for housing management
- Solutions to housing management
- Evaluation of housing management solutions
- Need for traffic management
- Solutions to traffic management
- Evaluation of traffic management solutions

Glasgow – need for housing management

A developed world city I have studied is Glasgow. There are many reasons for housing management which have taken place in the city. Firstly, high rise flats were built too quickly and with cheap materials meaning that there were structural issues and social problems, so many people left them and they fell into a state of disrepair e.g. Red Road flats.



Tenement flats were also unsuitable areas to live in. They were small, dark and damp and were often overcrowded – as many as 10 people per family lived in one or two rooms. This therefore led to disease such as T.B.

Due to their proximity to the factories many residents were exposed to smoke and chemicals. The houses also lacked basic amenities such as running water, it was common to find rats, and life expectancy was as low as 50 in areas such as the Gorbals.

In Modern times, more young people are moving to Glasgow in search of a job due to investment from companies such as BBC and STV and a development of housing.

There is a growing demand for the rental sector as many people cannot get on the housing ladder.

The number of privately rented properties in Glasgow (125%) is much higher than the national figure (85%).

More affordable housing is needed due to the economic downturn in 2008, with pressure being put on the greenbelt due to a demand for family homes.

Glasgow – Explain strategies/solutions to overcome housing issues

Gorbals

New homes were built for the private and public sector which had security access to reduce crime rates

They also had parking spaces and private gardens for residents for improved convenience for local people

Benchies and New Gorbals park to provide outdoor space for local people and parks for kids to play in

Local shops and services have been provided, along with a police station and health centres.

Dalmarnock/Commonwealth games

After the Commonwealth Games, the Athlete's Village homes in Dalmarnock were turned into over 700 City Legacy Homes and a care home to provide housing options for different age needs.

Sporting venues e.g. Emirates Arena (sporting venue) was also built which can be used by local people to improve health and life expectancy.

Large areas of housing in Bridgeton and Dalmarnock have been streetscaped with trees planted and areas of wasteland tidied up.

The Legacy Hub in Dalmarnock opened in October 2015 which houses a community centre, a nursery, GP surgery, dental surgery and pharmacy.

Transport links were improved to make access easier and attract industry to the area. E.g M74 extension and Dalmarnock train station

New homes and efficiency

Between 2017-2022 the city council aims to build at least 15,000 new homes as part of their housing strategy.

The local authority aims to reduce CO2 by 32% in houses to reduce climate change. This will be achieved through insulation.

Glasgow – Evaluation/effectiveness of housing management solutions

Renovating tenements has turned out to be cheaper solution and is more effective than building new council estates or high rise flats which have since been demolished e.g. Red Road and Pollok. Many areas such as Shawlands and Dennistoun are very popular with first time buyers and young professionals.

Gorbals:

Security access is effective as it helps to reduce crime and loitering in the area, increasing feelings of safety.

Local people were consulted on regeneration plans and could make suggestions of how to improve the area. They felt included and took pride in the appearance and upkeep

Putting in services for locals is effective as it creates a community spirit or have to travel long distances for necessities. The Gorbals employment hub provided training and skill development to improve employment opportunities for local people

Dalmarnock/Commonwealth Games

Regeneration of the area was effective as the Emirates Arena provides jobs as well as promoting a variety of sports in the area increasing well-being of residents

However, there was concern about the affordability of the housing and the forcing of residents out of the area which leads to loss of communities.

New homes and efficiency

Building new homes is effective as it will provide jobs and generate economic activity.

Reducing carbon emissions is effective as it helps reduce fuel poverty and makes homes more affordable to residents.

Also, residents and tenants can get grants to pay for the insulation so it will not cost them anything.

Glasgow – Causes of traffic congestion (Need for traffic management)

There has been a significant increase in the number of cars on the road as people have higher disposable incomes and can afford them.

Many people in Scotland own one car (50%) with some families owning 2 or more (20%) which increases congestion.

Many families now live in the suburbs on the outskirts of the city e.g. Bishopbriggs and therefore many people commute into the city in the morning.

25% of people who work in Glasgow live out with the city boundary

The main routes into the CBD tend to be large motorways e.g. M8 and M77 and as these link up with smaller, narrow roads in the CBD it leads to bottleneck congestion.

Commuters also tend to use roads at the same time as the school run (8.30-9am) creating rush hour traffic jams during peak times.

People tend to prefer using their own car rather than getting public transport as it's more comfortable and convenient, especially for those who work night shifts.

Public transport is also seen as unreliable, costly and sometimes lacking in particular areas further pushing people to use their own car.

There are few bridging points over the River Clyde in the CBD meaning these roads are congested with a high number of cars trying to cross over

e.g. the Kingston Bridge deals with over 170,000 cars per day.

Glasgow's CBD has a grid-iron street pattern and many narrow roads e.g. Bath street which restricts traffic flow due to the traffic lights holding up traffic at the many intersections.

Glasgow's CBD is a main shopping hub and therefore large delivery vehicles often block traffic and can damage the road due to their weight, leading to road works and more congestion.

Glasgow – Solutions to traffic congestion

The building of the M8, M77 and the M74 extension (2011) were all designed to keep through traffic away from CBD roads and increase the car capacity.

Increased number of bus lanes makes travel faster to encourage use of public transport. Bus services more frequent (every 10 mins).

Upgrading of transport termini such as Buchanan Street bus station, Subway stations, Central Station and recently Queen Street Station has enabled longer platforms and electrified lines.

Complimentary Wi-Fi is provided by ScotRail and by First buses as well as the addition of plug sockets on trains and improved seating on buses.

Park and ride schemes (e.g. Robroyston) allow people to leave their car outside the CBD and complete their journey using the Subway or train network.

New bus and taxi camera lanes (e.g. Glassford Street) now fine car users £60 for driving in these lanes at rush hour times.

Improved cycling network in Glasgow with 100 new racks added each year and more stations for Glasgow NextBikes (People Make Glasgow).

Also, traffic wardens, parking meters and double yellow lines restrict where people can park in town and instead park in multi storey car parks.

Glasgow – Evaluation/effectiveness of traffic management solutions

The M74 extension is effective as congestion has eased on the M8 – one of Britain's busiest motorways – as journeys are now around 15 mins faster.

However, the M74 extension cost £500 million and there was controversy as many homes and business were relocated.

Bus lanes are effective because it makes journey times quicker and more reliable so it may encourage car users to switch to using buses.

Improving train stations is effective because electrified lines mean faster trains can be used and extended platforms means that 8 carriage trains can be used to increase the number of passengers.

Queen St station has been upgraded to become a destination point with cafes, restaurants and shops to encourage commuters to use it.

Wifi and comfy seats is effective as these upgrades make public transport more appealing and offer commuters the chance to complete work whilst they commute.

Park and ride is effective as it has reduced the amount of cars travelling into the CBD which reduces congestion and pollution levels as well as saving commuter's money.

Cycle usage has increased each year which creates more space on the roads and also reduces pollution since cycling is an eco-friendly method of transport.

Mumbai – need for housing management

Reasons/Causes of Housing Problems in Mumbai

- **Rapid Population rise** Mumbai's population has risen from 8 million in 1971 to 21 million now. In the last 15 years Mumbai's population has increased by 5 million (population of Scotland).
- **Rapid urbanization and economic boom** Mumbai has urbanised rapidly from its origins as a fishing village to a major port/industrial centre. It is known as the "Gateway to India".
- **A high level of natural increase (high birth rates)** within Mumbai itself. **Lower death rates** and people are living longer due to improvements in health care. Longer life expectancies due to better health care.
- **In-migration** from the surrounding districts and states. Migrants come for job opportunities in the expanding industries, financial institutions and administration (**pull factors**- higher wages, more jobs, more opportunities-health care, education).
- **People are leaving the countryside** to go to the cities because life in the countryside has not improved, harvests are unreliable and there are few services, lack of food supplies, education.
- **Mass influx of migrants** from neighbouring countries Bangladesh, Afghanistan and Sri Lanka.
- **The young who migrate** go on to have children increasing population numbers further. There is better healthcare compared to the countryside so more people survive and live longer.

Squatter Camps

- People settle illegally on land they do not own or rent, along pavements and railways, roads, under bridges at the edge of the city. The authorities do not provide schools, health centres, rubbish collection
- Unsafe marshy areas prone to flooding and mosquitos or on steep hillsides that suffer mudslides.
- Squatter camps contain the poorest people. The homes are makeshift shelters made from materials cloth, plastic sheeting, supported by wooden poles. They are unstable and collapse strong winds.
- No amenities- no toilets, no water, no kitchen or electricity. High levels of disease (malaria, cholera, dysentery, typhoid) from contaminated water, flies, and vermin.

Shanty Towns Some squatter camps have grown into large slum areas called shanty towns (bustees). Mumbai's biggest slum is known as Dharavi. There are a million people crammed into one square mile in Dharavi.

Wasteland- They set up home illegally amongst waste on land that is not suitable for habitation. Dharavi slum is based around a water pipe built on an old rubbish tip. There are narrow roads with no pavements or signposts.

Flooding- In the wet monsoon season- flooding, landslides. Marshy and mosquito ridden. In July 2000, one shanty town on a steep slope collapse and killed scores of people.

Lack Sanitation- People have to go to the toilet in the street and there are open sewers with excrement everywhere. There is 1 toilet per 1440 people in Dharavi. They are badly maintained and unhygienic.

Disease- Children play amongst sewage waste and doctors deal with 4,000 cases a day of diphtheria and typhoid. 500 people share one public latrine. The nearest hospital receives 3000 cases per day of people from Dharavi with diarrhoea and disease such as typhoid. Life expectancy is only 50 years.

Rubbish - is everywhere and rats are found on the street. **Toxic wastes** - in the slum including hugely dangerous heavy metals from the wasteland.

Lack Services- such as health care, education, refuse collection, firefighting services and space for recreation. Infant mortality rates are high, 50 per 1000 compared to a national rate of 15 per 1000.

Overcrowding/poor housing- People live in very small overcrowded dwellings (e.g. 12X12ft), often with many members of their extended families. The houses are basic, makeshift shelters made of plastic sheeting, corrugated sheets. Some dwellings have brick walls and tin roofs. The houses often have no windows, asbestos roofs (which are dangerous if broken) and no planning to fit fire regulations. Electricity is irregular and unreliable it is also illegal having been tapped from the city's power lines, which is a safety and fire risk.

Water is a big problem; lack of piped water, standpipes come on at 5:30am for 2 hours as water is rationed. These standpipes are shared between many people. The famous cloth washing area also has problems, despite its social nature sewage filters into the water used for washing clothes- Dengue fever, cholera and hepatitis.

Air pollution is a huge issue the small-scale industries that burn coal to make pots- lung disease and TB.

Poverty most people earn less than £1 a day. Many turn to illegal ways of making money selling drugs, prostitution. Gangs arm themselves with weapons increasing anxiety amongst residents. Children and women who sift through the rubbish looking for valuable waste without protective clothing. They earn around a £1 a day.

High rates of crime, suicide and drug use.

No taxes paid the government loses out if people do not pay rent for the land and many workshop owners do not pay tax -this is the informal economy outside proper laws. Mumbai has less money to spend improving the city.

Poor image overcrowded, illegal, noisy area made of rough shacks and smelling of sewage is an eyesore, which puts tourists off from visiting and from big companies setting up there.

Mumbai – Solutions and effectiveness of housing issues

Dharavi Redevelopment Project

Bulldozing and Clearing large areas of slum housing people are evicted from their homes and their houses bulldozed. People were then rehoused into 14 story apartment blocks (high rise)

Each family receives a 21 square metre apartment with, sewerage and electricity. This is only available to those who have been residents since 2000. Other residents will be rehoused elsewhere in the city.

This \$2 billion redevelopment project is next to Mumbai's financial district. The scheme also includes some expensive housing with offices and shops.

Only industries that do not cause pollution will be able to locate there.

Impact

- Many people in the shanty town live above their pottery and metal, recycling workshops. The redevelopment has resulted in many pottery workshops being demolished. There will not be enough space for pottery and recycling which are the biggest employers in the shanty town. Many of the workshops such as metal working are also banned under new laws on pollution.
- Many areas that have been cleared were strong safe, low crime neighbourhoods. The communal areas, local shops/markets and the community spirit which had developed in the shanty town are at risk.
- The value of land is so high that the alternative accommodation is very small and densely populated.
- It separates communities, making people work away from where they live – not good for social cohesion.
- Only people who have lived in the slum since 2000 are being relocated.
- Many argue the ordinary people of Dharavi will not be helped. The poorest are being squeezed out by the rich. It is the well off residents of Mumbai who will get the luxury apartments / new offices.
- Many of the poorest just started to rebuild self made homes again under road bridges and next to railway lines, from the debris of the newly constructed apartments.

Self help schemes

LOCAL people design the improvements to the slum. **SELF HELP SCHEMES.** **SPARC** The society for the promotion of Area Resource Centres is a non-governmental organisation that provides residents with training, tools and materials to construct permanent accommodation. Residents provide the labour. The money saved on labour can be spent on providing basic amenities such as electricity and water. Other facilities like schools, health clinics and recreational areas are also provided.

- Residents form **self-help groups or cooperatives** with a huge range of skills to carry out many of the improvements. Use skills local people to upgrade their own homes and neighbourhood.
- They have negotiated with authorities to provide some basic **services-electricity and piped water**. Locals design their own improvements including more toilets, water supply, **building a second floor onto buildings** to create more space for the whole family.
- Some self-help schemes have tried to help the potters of Dharavi with living space at one end and a place to make the pots at the other. Each has an additional open terrace on which to make pots, which are fired in a community kiln.
- The housing has installed roof top rain water harvesting and storm water disposal pipes.
- Residents persuade authorities to give them **ownership of the land**. In some schemes residents buy the houses or pay rent. However, this means those who are unemployed or on very low pay do not benefit.
- Some self help groups have negotiated **small loans from banks**.

Effectiveness- low cost solution, sense of ownership and community spirit. Many homes upgraded with services and better materials, However, insufficient materials and growing such a fast rate to keep pace.

Site and Service Schemes

Councils provided building plots and provided breeze blocks and other materials (pipes for plumbing, stand pipes for water etc) are given as long as people updated their homes. This is an approach known as SITE and SERVICE. These give people the chance to rent or buy a piece of land. The land is connected to the city by transport links and has access to essential services such as running water and electricity. People build their own homes using money from a low-interest loan.

- Cheaper than the \$2 billion redevelopment plan
- It uses the skills of the local residents and reduces costs
- It helps local businesses
- Streets widened for emergency services, refuse collection. Some have set up shops, cafes and schools, health clinics, sport areas.
- It keeps the community together and encourages them to work together.
- It has helped improve health and reduce disease, new community facilities have helped increase sense of community and reduced crime
- Some site and service schemes lacked sufficient piped water and toilets
- Some councils provided very basic housing units and charged rent, however many of the poorest people do not have a reliable supply of money so it pushes out the poorest

Build new town Navi Mumbai

Another solution to the housing has been to build a new town outside the city's boundaries. Navi Mumbai new town is hoped to reduce the number of people living in Mumbai itself and so reduce pressure on housing in the city. Over 1 million people now live there in 20 separate but connected settlements. It is intended that Navi Mumbai will have enough jobs and services for the people and will help reduce Mumbai's problems.

Mumbai – need for traffic management

Cause Traffic Problems in Mumbai

- Rapidly rising population it has grown by 5 million in the past 15 years. Rural to urban migration.
- People in Mumbai become richer more cars are being bought. 200 cars and 300 two wheelers are added to the roads every day. Growth middle class who have cars.
- People like the convenience of their car -The Bandra Worli Sealink is a new 8 lane bridge this has increased traffic into the CBD from the suburbs due to its convenience.
- Public transport is overcrowded and dangerous-6 million people travel by train every day (3-4 times the seating capacity).
- Public transport infrastructure is out of date and unable to cope. The tram system of the early 60's was dismantled putting more pressure on other types of public transport.
- Narrow /poorly constructed roads cause traffic jams adding to the congestion. Huge number of potholes caused by heavy rain during the monsoon season. No proper drainage system leaving roads flooded.
- Geography of the area limits the development of highways it is made up of a group of 7 islands and there is a concentration of all the commercial, administration and industry in the south of Mumbai concentrating traffic flow. Bombay Island itself is narrow so there is little space for roads and railways. The CBD is at the southern tip of the island near the port. 8million commuters head there every day transport system is at saturation level.
- Parked vehicles cause congestion
- Hawkers at side of the road (street sellers with carts) and rickshaws(300,000 on the road) add to congestion) bullock carts and hand pulled rickshaws.
- Animals on the streets/road
- Lack pedestrianised areas/pavements causes people to be on the roads-congestion/ slows traffic.
- Lack of traffic control-create huge bottlenecks, road riots due to lack of signs, road markings and traffic management e.g roundabouts and lights, give way signs
- Huge number of potholes caused by heavy rain during the monsoon season. No proper drainage system leaving roads flooded.
- Poor lane discipline also interrupts the traffic flow.

Mumbai – solutions and effectiveness to traffic management problems

Mumbai Urban Transport Project (MUTP)

The project aims to improve the capacity of suburban trains by laying new track, extending platforms and changing to 12 coaches to increase the carrying capacity by 35%. New coaches are going to be better ventilated and have less noise pollution, encouraging more people to use public transport. Lines will be extended to the harbour area and other central areas. The project is upgrading power supplies which will speed up the trains.

Impact: The upgrades will encourage more people to use public transport, it will reduce overcrowding and speed up journeys and improve safety.

Mumbai Monorail

The **Mumbai Monorail** is a monorail system which the first of four lines was opened on 1 February 2014. It is the first monorail in India. It is estimated that once complete, it will have cost almost \$1 billion.

Impact: It will decrease the pressure on the roads and the rail networks by offering an alternative. It connects parts of the city that the other rail networks don't. However, fares have put some people off using it and it will only carry several hundreds of thousands per day.



Mumbai metro project

In January 2004, a master transit plan was unveiled to build a new metro system. The plan integrated a 146 kilometre-long metro system, of which 32 km would be underground. The 3 high-capacity lines, will be completed by 2021. The first section was opened in June 2014 and can carry 1.5 million passengers a day.

Impact: The system is designed to **reduce traffic congestion in the city**, and supplement the existing, but severely overcrowded Mumbai Suburban Railway network. The full impact will not be known until all 3 phases are complete in 2021. The project missed multiple deadlines because of lack of right of way, changes in design and lack of approvals from the railways. It will **reduce commutes from 21 minutes as against one hour by road**. Apart from tickets, commuters can also buy token or smart cards, and the network will have state-of-the-art security systems and escalators at the stations.

They move fast in an **environmental friendly way**.

Mumbai's first metro railway link, connects the northwestern suburb of Versova-Andheri with Ghatkopar on the northeastern fringe this has already seen a boost in property prices.

Bandra - Worli Sealink

This toll bridge was fully opened in 2010 and cost around \$300 million to build. It is an 8 lane bridge (4 in each direction) connecting the busy south of Mumbai with the suburbs. Running out of land space this road takes to the sea. Loops out over the sea to provide a fast road link.

Impact: The sea-link has significantly reduced travel time between Bandra and Worli during peak hours from 60-90 minutes to 20-30 minutes. It takes pressure off existing road system. However, the bridge has allowed increased traffic to get to the CBD and increase congestion. It has not taken cars off the road.

Car pooling

Mumbai's Regional Transport Authority has recently recommended car pooling. Using websites it encourages people to car share with others to reduce traffic. Because regulations prevent a private motorist from charging for lifts, the authorities invented a plan to encourage people to share cars by allowing each driver to receive petrol vouchers when giving a lift, irrespective of the distance.

Impact: It has been relatively successful. Many are reluctant to share with strangers but estimates say that there are around 10% less vehicles on the roads because of this scheme. It therefore reduces congestion and pollution.

BEST buses

Part of the Mumbai urban transport project (MUTP) As of 2013 the BEST runs a total of 4,680 buses ferrying 5 million passengers over 365 routes. Largest fleet of buses. Service covers the entire city and to the city limits. Smart cards speed up payment and GPS tracking of buses to monitor them in real time are enhancing customer experience.

Impact: This is affordable transport for the poor which is a key part of Mumbai's transport system. Future planning of bus lanes to allow bus priority access through the busiest parts of the city would further enhance their role in keeping the city's population moving.

Road related projects Part of the Mumbai Transport Project.

60 flyovers and elevated roads have been built in recent years. Some roads have been widened up to six lanes.

Skywalk project to encourage walking

Mumbai skywalk involves construction of a series of 36 elevated pedestrian walkways in Mumbai. 12million are using the skywalks everyday. There are advertising spaces along them which generates money for construction and maintenance costs. They are above ground so safer and free flow around the city, separating them from traffic. The skywalks are surrounded by bright yellow railings and nicknamed caterpillars. Eased navigation of pedestrians through the city.

Traffline is a digital traffic agent that allows commuters to check traffic conditions in their city , you can view real time traffic map with colour coded lines.

Rural

- Impacts of land degradation
- Solutions to land degradation
- Evaluation of solutions to land degradation
- Conflicts between land users at Loch Lomond
- Solutions/strategies to overcome land use conflicts AND their effectiveness

Impacts (effects) of land degradation in the Sahel

There are many socio-economic effects of land degradation in the Sahel. Firstly, development is affected. Due to the depletion of soil fertility, farmers are unable to graze animals. In addition to this, yields of cash crops decrease, exports fall and there is a loss of foreign currency which slows down or halts development.

Secondly, farmers struggle to pay for schooling due to a loss of income from decreased crop yields. This can decrease the literacy rate.

In addition to this, the failure of crops will result in malnutrition and possibly death due to starvation. People will be less able to fight off diseases such as kwashiorkor, and infection due to poor health. This will increase the death rate and lower the life expectancy. Around 20.2million people suffer from food shortage in the Sahel.

Moreover, disease and illness become widespread so people cannot work so have no money to buy food. They become weaker and a cycle of poverty develops.

The traditional life of the nomads is under threat as they cannot find food and water for their animals. Many are forced to settle in villages or at oases. This in turn puts pressure on the surrounding land, leading to over-cultivation. For example, in Mauritania, the proportion of nomads fell from 73% to 7%.

Lastly, people in rural areas are forced to leave the countryside and move to the cities in search of food and employment (rural-urban migration). This causes a demographic imbalance as often the males leave in search of jobs, and a loss of traditional farming techniques such as pastoral nomadism.

There are several environmental effects of land degradation in the Sahel. Firstly, soils that are exposed to the elements are eroded as topsoil is lost through wind erosion e.g. Harmattan. The soils are therefore unable to sustain crop growth and the frequency of dust storms also increases.

Secondly, rills and gullies can also be created from water erosion, eroding the land as particles of soil are washed away during heavy seasonal rains.

Additionally, vegetation is lost as pasture dries up, meaning that formally fertile land gradually turns into desert thus increasing the extent of deserts.

Furthermore, a decrease in biomass is a result of vegetation loss. The amount of organic matter from living vegetation such as leaf fall is reduced, as well as a decrease in soil organic matter and a loss of key plant and animal species. This results in an overall reduction in biodiversity.

Also, there is an increased surface albedo (the reflectiveness of a surface). With the loss of vegetation albedo increases as more incoming solar radiation is reflected back into the atmosphere. This could result in a decrease in temperature.

Lastly, salts can accumulate in the soil as a result of improper farming techniques such as irrigation. This is called salinisation and the increase in salinity can kill crops and contaminates the soil.

Solutions to land degradation in the Sahel

There are many solutions to land degradation in the Sahel. Firstly, diguettes are lines of stones laid along the contours of gently sloping farmland to catch rain water and reduce soil erosion. They allow water to seep into the soil rather than run off the land through overland flow, preventing soil from being washed away, doubling crop yield of crops such as groundnuts.

Secondly, farmers are educated to use more appropriate techniques such as terracing, strip cropping and drip irrigation. This helps avoid draining the soil of its nutrients and avoiding salinisation.

In addition to this, the development of stoves like the Jiko, which is cheap and uses approximately half the quantity of fuelwood required by an open fire, can play a part in reducing rural land degradation. If these stoves are used, the demand for fuelwood is reduced and trees will be retained for longer.

Also, planting new trees (afforestation) helps prevent soil erosion as the roots will bind the soil together and will also act as a windbreak, reducing wind erosion. E.g. Kad tree in West Africa.

Furthermore, farmers can dig a grid of planting pits (zai). Run-off water is trapped in the hole, then manure or compost is added to the hole. Termites are attracted and they dig galleries that make the infiltration of rainwater, run-off and the retention of moisture easier.

Lastly, The Great Green Wall is an initiative in the Sahel where a wall of trees is planted across Africa on the edge of the Sahara desert in order to prevent desertification. It is nearly 8000km long and stretches from the west to the east coast.

Effectiveness of solutions to land degradation in the Sahel

The solutions to land degradation in the Sahel have varying degrees of success. Firstly, digettues can be completed as part of a community project at very little cost. Charities such as Oxfam have used this method very effectively. Communities in Mali and Burkina Faso have seen crop yields increase by as much as 50%.

Secondly, farming can be expensive unless funded by charities, and are often more difficult to implement and manage, resulting in few farmers willing to change their practice, therefore it may not be effective.

Jiko stoves can be particularly effective in areas where the cost of alternative fuels such as Kerosene, are beyond the means of local people.

Afforestation has other benefits as well as reducing land degradation. Depending on the species planted trees may also provide nuts and fruit for humans and animals. The Kad tree's decaying leaf litter provides an additional source of nutrients.

Zai is a simple and effective technique which needs no equipment other than what is available on the land. Zai are usually constructed on abandoned or unused ground, so crop yields resulting from this practice bring a benefit of 100%.

The Great Green Wall has been effective because it is not simply growing trees, but growing solutions and opportunities, resilience to climate change, green jobs that provide a suitable income for African women and youth food security among others.

Land use conflicts in Loch Lomond

There are many environmental conflicts in Loch Lomond. Firstly, walkers wandering off identified paths and climbing over stone walls leading to increased footpath erosion especially on popular and easily accessible areas by roads.

Secondly, due to lack of parking at busy times tourists park on grassy verges in honeypot locations such as Luss which can lead to the erosion of fragile grass verges.

In addition to this, water sports such as jet skis and pleasure craft such as the Loch Lomond water bus can produce oil which can pollute the loch, and the waves can erode the shores.

Furthermore, increased traffic congestion on narrow rural roads and in car parks especially at peak times such as bank holidays leads to increased air and noise pollution.

Increased litter causes visual pollution and can danger wildlife or livestock if they choke on discarded plastic bags which leads to a decrease in biodiversity.

Man-made look so does not keep with natural environment as felling is unsightly and native forests are lost through erosion and development.

Lastly, modern buildings not fitting to the landscape as they often contain modern materials such as metal and glass, leading to visual pollution e.g. hotel and leisure complexes, caravan sites.

There are several socio-economic land use conflicts in Loch Lomond. Firstly, an increased number of tourist shops and facilities resulting in an increase in prices; therefore locals go elsewhere.

Secondly, an increase in holiday home ownership can push up prices forcing many local people to move away due to the high house prices, and leaving rural areas empty during off-peak times of the year.

In addition to this, trees are planted close together so it makes forest dark which doesn't encourage and support wildlife. Also few jobs are created and forestry can block walker's routes.

Lastly, walkers leave gates open, damage walls and fences and dogs scare sheep and destroy vegetation, leading to increase inconvenience and cost to the farmer.

Land use conflict solutions and their effectiveness

There are many solutions to land use conflicts in Loch Lomond and these have varying degrees of effectiveness. Firstly, National Park Authority and Rangers service work on path improvements to deal with path erosion. Surveys are carried out to monitor path erosion, and new bridges and paths are put in place to improve the ease of access and quality of walking routes for tourists.

Evaluation - The cost of new bridges and paths can be expensive so therefore it may not be possible to repair or replace all that are needed. Durable local stone is in keeping with the natural landscape and therefore does not spoil it.

Secondly, bye laws are introduced and updated regularly. Speed limits of 11km/hr have been put in place in areas of previous noise pollution such as near islands and on the edge of the loch. In other areas speed limits of 90km/hr is allowed which allows speed boat users to use their boats without disturbing locals, picnickers and fishermen.

Evaluation – The use of the loch must be monitored to ensure that speed restrictions are adhered to which may be difficult during busy peak times. Also, Park Rangers may not be able to monitor the whole loch at one time due to its size.

In addition to this, to deal with noise pollution the Park Authority can advertise honeypot areas such as Luss which provide facilities for tourists. This concentrates visitors in certain areas allowing other areas to be quiet, reducing the annoyance for locals.

Evaluation - This helps cut down on congestion and over development, and reduces the amount of noise pollution residents are experiencing from tourists.

Moreover, to combat litter posters are put up in the visitor centre and in local shops to remind visitors to recycle their litter or to take it home. Rangers also carry around with them biodegradable bags with leaflets to inform visitors, particularly at camping areas.

Evaluation - Rangers have reported that many local communities want to get involved with the litter campaign which has increased its chances of success.

Lastly, to alleviate traffic congestion, farmers have opened their fields during busy times to be used as car parks. Also, one way streets, larger visitor car parks and overflow car parks, as well as permits to separate locals from visitors have also been introduced.

Evaluation - These only alleviate the problem for a short time as they become full very quickly during busy times such as bank holidays. The fields then become damaged due to the increased number of vehicles and are therefore unusable for other farming activities.

Paper 2 – 60 marks

Development and Health /20



Climate Change /20



Map Applications /20



Development and Health

- Limitations of single indicators/ benefits of a combined indicator
- Differences in Development between developing countries - CHAPTER RANT
- Physical (environmental) and human causes of malaria
- Solutions/ strategies to overcome malaria and their effectiveness
- Explain Primary Health Care strategies and comment on their effectiveness

Limitations of single indicators/ benefits of a combined indicator

▪

Problems of using single development indicators

- 1 indicator does not give a true picture of development you need to look at both social and economic
- Average figures are unreliable as there are many variations within a country- there are variations between rich and poor e.g Saudi Arabia and oil, diamonds in Zambia average income over inflated by a small number of people
- The indicators do not account for differences between urban and rural areas, or poor favelas and rich inner city areas of Rio -city people have more access to services such as education, health, schools. Rural areas are remote e.g Amazon, Andes Peru, regional differences Brazil SE rich North/NE poor
- Use of GNP can overinflate development due to oil, it does not take into account subsistence farming or barter economies.
- A country might do well socially and not economically or vice versa e.g Jamaica from tourism
- Different ethnic and racial groups can have a higher standard of living than other groups

Advantages of using Combined Indicators:

- They give a broader more balanced view picture, not just using 1 indicator,
- HDI combines social and economic as some countries do well socially but not economically.
- They prevent overinflation of GNP due to oil.
- Indicators might be inappropriate to real quality of life in poor countries e.g number of TV sets
- Subsistence agriculture is not included in the wealth of a country.
- Averages disguise and distort internal variations e.g maybe a few immensely wealthy people but majority poverty stricken, hide rural urban contrasts,

Differences in Development between developing countries (CHAPTER RANT)

Climate Kenya has unreliable rainfall, which causes problems of drought, desertification and soil erosion. The climate means that farm land can be unproductive. The hot climate also results in disease e.g Malaria. Jamaica however has a very pleasant reliable climate that encourages tourism which has brought wealth and improved living standards/created jobs and foreign currency. Climate can result in Natural disasters which restrict development/hampers progress eg - drought in sub Saharan Africa (Burkina Faso) Extreme weather floods/hurricanes/cyclones Philippines.

Health Kenya has a high death rates, low life expectancy and high infant mortality, this is because hospitals are overcrowded and poorly resourced and there is a lack of health care in rural areas. Diseases such as Aids, malaria, cholera. There are also problems of poor living standards, poor diets and lack of clean water and sanitation. This hampers development as money has to be spent on health and not economic development. Kuwait has the highest life expectancy(76years), lowest death rates and lowest infant mortality. There is good health care system, vaccinations, good diet and food supply, clean water and sanitation.

Aid Kenya relies heavily on aid. This puts off investment and money cannot be used to set up manufacturing and develop infrastructure.

Political corruption -civil wars e.g Sudan/Rwanda/Syria, Sierra Leone or larger-scale conflicts in Iraq or Afghanistan have a negative impact on development. Widespread corruption and mismanagement have accounted for the marked decline of Zimbabwe's economy.

Trade In Kuwait oil is exported at a high price resulting in a trade surplus and manufacturing industries have been established. Kenya exports food produce -low export value and the price can fluctuate, Kenya imports manufactured goods, resulting in a trade deficit. This can lead to debt that hampers development. Brazil exports primary resources from the rainforest logging, gold, iron ore, rubber, food products, however it does have manufacturing in the SE with cars, equipment and textiles.

Newly Industrialising Countries (NICs) eg China, South Korea, are able to earn substantial amounts from steel-making, shipbuilding, car manufacturing, electrical goods, toys, clothing etc. They have been able to benefit from their population's entrepreneurial skills, low labour costs and investment.

Education Kenya has high illiteracy which will reduce development.

Relief Mountainous countries e.g Tibet, Afghanistan are poorly developed as the relief restricts communications, building and farming.

Raw materials Kenya lacks raw materials (e.g no minerals, coal/oil), whereas Brazil has many resources from the rainforest and Kuwait has oil which leads to economic development and foreign investment.

Agriculture Many parts of Kenya have subsistence farming whereas Brazil has large coffee plantations. Earn little money, price fluctuates. Bad harvests reduce income.

Transport/tourism industries are not going to set up where there is a lack of roads, ports, electrical supplies etc. Parts of Kenya are remote and inaccessible which hampers development. Tourism boosts growth of Jamaica, Sri Lanka

Location/landlocked landlocked countries such as Chad, Niger struggle to develop due to greater problems trading, lack coast for tourism.

Physical (environmental) and human causes of malaria

Physical causes:

- Temperatures 15 and 40°C , high rainfall – this makes the tropics ideal(rainforests, monsoon areas)
- The presence of the female anopheles mosquito.
- The presence of the parasite in the mosquito or a person
- Humidity of 60 per cent and over.
- Stagnant water, eg a lake or even a puddle, needed to lay larvae. Poor drainage areas.
- Areas of vegetation for shade for mosquitoes to digest blood meal in dark areas.

Human causes:

- Overcrowded settlements provide large populations for blood meals
- Large religious gatherings around rivers brings people with the parasite in their blood and mosquitoes.
- Poor sanitation in shanty towns creates water areas for the mosquito to lay eggs.
- Mining, road building and deforestation creates stagnant water which are breeding grounds.
- Use of rivers for washing, collection of water exposes people to the female mosquitoes.
- Poor farming methods leave ditches of water are left, eg padi fields. Farmers who take animals to waterholes and are not covered up get exposed to mosquitoes. Poor irrigation systems create breeding areas for mosquitoes.
- Refugees and migrant workers who have the parasite in their blood take the disease to new areas
- War interrupts spraying campaigns and treatment.
- Lack of proper health care, particularly in rural areas puts people most at risk.
- Poor levels education and literacy will mean people do not understand the cause and prevention.

Impacts of Malaria on a country

High percentage of a family's income may be spent on doctors' visits/drugs (1mark)

This reduces the amount of money which can be spend on food/education (1mark)

Breeding season of mosquitoes coincides with harvesting time (1 mark) if families can't harvest crops, this leads to malnutrition (1 mark)

High proportion of nations GDP is spent on combatting disease leaving less to spend on improving infrastructure (1 mark)

High levels of absenteeism leads to lower literacy rates (1 mark) and this can lead to a less skilled workforce in the future (1 mark)

Tourists may avoid the area reducing revenue from visitors (1 mark)

Foreign companies may not invest in the area due to an unreliable workforce.(1mark)

Solutions/ strategies to overcome malaria and their effectiveness

Treatment/Prevention of Malaria

No vaccine A vaccine to cure malaria is still in the early stages of development. The Bill and Melinda Gates Foundation was set up by the founder of Microsoft, Bill Gates, and his wife to provide funding to try to find a cure for malaria.

Antimalarial drug Chloroquin was discovered, it killed the parasite and people were cured, but the parasite has built up resistance to this drug. Other drugs include Lariam (can have side effects) and Malarone (more suitable for children). **Effectiveness**—parasites build up resistance, people do not finish course of drugs and cannot afford drug or it is too late.

New anti malaria Drug -artemisinin- derived from a Chinese herb. However still undergoing development to reduce cost and improve effectiveness

Insecticides – DDT and malathion sprayed to repel the mosquitoes. **Effectiveness**—the parasite built up resistance and they were found to be harmful to health and the environment DDT banned. Insecticide Autan is now used(DEET)

Insecticide-treated bed nets most mosquitoes bite at night provide a barrier to the mosquitoes. **Effectiveness** people do not retreat the nets with insecticide and some people cannot afford net.

Plant eucalyptus trees to soak up moisture to stop larvae breeding. **Effectiveness**—costly and time consuming to plant and grow. Not a native tree and people chop them down for firewood.

Coconuts Bti bacteria is grown in coconuts and thrown into mosquito infested ponds. The larvae eat the bacteria and their stomach linings are destroyed. **Effectiveness** this is cheap and environmentally friendly method and used by local people easily. 2/3 coconuts can control a pond for 45days. Some argue waste of a food source.

Canals can be flushed every 5-7 days to disrupt the breeding cycle however clean water is very valuable. **Effectiveness** – wasteful water and larvae can breed in a hoof print of water,

Oil spraying kerosene, gasoline and engine oil on water surfaces, suffocates mosquitoes, **Effectiveness** expensive, wasteful and a pollutant.

Better water management, sealing of water containers, improvements to irrigation systems. Draining ditches and clearing trees. **Effectiveness** mosquitoes can breed in a hoof print of water.

Spray egg white on breeding areas suffocates the larvae. **Effectiveness**—wasteful food source and left lots of egg yolks!!

Mustard seeds are put into padi fields and ponds they stick to the mosquito larva dragging it down.

Fish Guppies and carp put into padi fields to eat mosquito larvae. **Effectiveness** No risk to human life, fish provide protein for diet. Some argue upsets ecosystem of water.

Genetic engineering Scientist have genetically engineered a sterile male mosquitoes to reduce reproduction. Expensive

Rapid Diagnostic Tests (RDTs) using a dip stick and a drop of blood then people can get treatment before their symptoms get worse.

Education Primary Health care projects which involve the Community, educate people from villages to diagnose symptoms and get treatment. World Health Organisation (WHO) and Red Cross help. Kenya, Roll Back Malaria campaign and National Malaria Day teach about how to use the bed nets, insect repellent, screens on doors, windows. School activities to encourage children to cover up at dawn and dusk and not to play in waterways. Comedy dramas were aired on the radio. Due to low radio ownership in rural areas, drama groups perform a play, 'Mosquito Mask'. Publicity using T-shirts, leaflets, posters were handed out and villages ran competitions. **Effectiveness** Education - Prevention better than cure but education programmes cost money and may run into debt.

Primary Health Care strategies and their effectiveness

- The policy of Primary Health Care provides **basic, low cost help**, locals deliver it, it can reach remote communities and the focus is on **prevention**.
- PHC is a move away from city/doctor orientated hospitals (expensive large modern high tech) to **rural treatment centres** with local health workers with basic medical training, so that they can **diagnose and treat simple ailments**. Easier to employ bigger numbers and serve a wider areas and reach a greater % of the population. Traditional treatments used which suited the local culture. Mobile teams reached those who could not get there stopped infections spreading. Problems were that some rural teams unable to provide enough health care, lacked training, cooperative systems collapsed and were under funded.
- **Barefoot doctors or medical aides** give medical advice, (e.g. China) and give basic treatments. Barefoot doctors and medical aides, traditional medicines reduces costs and takes pressure off hospitals. Local people are respected. However diagnoses sometimes inaccurate, lack skills, overworked and some illiterate and could not complete paperwork.
- **Vaccination programmes** to protect polio, measles, whooping cough cholera and TB the WHO and UNICEF help fund these projects. Successful but sometimes lack funding, civil war respects programmes.
- **Preventive disease programmes** PHC gives advice on how diseases such as malaria area spread and low cost ways to reduce the disease e.g sleep under insecticide dipped bed nets, covering up water containers, filling in potholes, puddles, reducing visits to rivers and covering up at dusk. In Vietnam the Red Cross set up a malaria control programme managed by the local people to distribute 16,000 bed and they taught the villagers about soaking nets in insecticide.
- **Oral Rehydration Therapy** is one example of a cheap and effective PHC programme, it involves giving solutions of sugar, salt and water to replace lost body fluids to people with diarrhoea.
- **Traditional medicines**-Many barefoot doctors use **herbal remedies** and the use of **locally manufactured drugs** that are cheaper than those of multinational companies.
- **Health and hygiene/disease and family planning** Education girls are encouraged to have a family later, and to space the births to allow the body to recover and to breast feed longer. Train **birth attendants** to reduce infant mortality. Education on diets. **Hygiene workshops** educate on the transmission of water related diseases, preparation and storage of food, water source protection and use and the disposal of waste and personal hygiene. Teach local volunteers to teach messages in schools. **Practical demonstrations** using promotion tiles , picture books , games , puppet shows , posters. **AIDS education safe sex education and distribution contraception**.
- **Send a goat /pig/cow** e.g 2 goats in Rwanda mean milk and improve diets and more resistance to disease, surplus milk sold so people to buy more food. Herds increase and animals passed on to others. **Manure** fertilised crops and enables communities to be self sufficient. Goats then cross bred and produce better goats which can produce more milk,
- **Clean water supplies /sewage disposal** **Wateraid** a voluntary charity -Provide **simple tools**(spades , ropes)**Appropriate technology**: the hand dug well, water lifting is either by a rope or a bucket or by a basic handpump. Waterpumps have been installed which utilise **solar energy**. This type of technology is **simple and sustainable by the local people**. **Self-Help Approach** -Communities are involved in the planning, well construction and they take responsibility for well maintenance. To improve sanitation Ghana has introduced the **VIP (ventilated improved Pit) latrines** simple village toilet systems again two people in the community take responsibility. Giving out of germ killing solutions and disinfect for latrines. **Chlorination of water supplies** people taught to boil and add drops of chlorine
- Prevention rather than cure have helped improve health and life expectancy. Malawi AIDS education has helped treat and educate people making the population healthier-more economically productive, increasing life expectancy. School attendance has increased.

Climate Change

PHYSICAL AND HUMAN CAUSES OF CLIMATE CHANGE

Physical Causes	Human Causes
• <u>Changes in the tilt of the Earth:</u> the greater the tilt of the Earth towards the sun, the closer some areas are and the greater amount of energy received. There is a change every 41,000 years. • <u>Changes in rotation of Earth around the sun:</u> Over a 97,000 year cycle, the Earth's orbit stretches and affects the amount of energy received. • <u>Sun spot activity:</u> 11 year cycle of rises and falls in solar energy. If there are lots of sun spots more solar energy is being sent out from the sun. • <u>Volcanic eruptions:</u> Release gas and sulphur dioxide. This combines with water to form droplets which absorb the sun's radiation. The Earth does not receive as much insolation (e.g. Krakatoa, 1883). • <u>Ocean circulation:</u> warming and cooling of tropical areas in Pacific Ocean can affect climate and lead to flooding. Retreating ice caps release water which leads to changes in the oceanic circulation and reduces the albedo effect.	• <u>Burning of fossil fuels:</u> Factories, cars etc have burned fossil fuels which release CO² into the atmosphere which increases the 'greenhouse effect' and temperature. • <u>Deforestation:</u> CO² is released when the cleared trees are burned. There is less absorption of CO² which leads to a build-up in the atmosphere. • <u>Methane:</u> Huge numbers of cows bred for human consumption. Rice grown in large quantities in paddy fields to feed growing populations - India (Methane is produced by microbes underwater as they help to decay flooded organic matter). Humans waste in landfills decaying underground releases methane. • <u>CFCs:</u> Increasing in the atmosphere due to aerosols, fridges and air conditioning. It is released if appliances are not disposed of correctly. • <u>War:</u> Bombs create large amounts of dust which can reduce insolation and the Earth's temperatures.

LOCAL AND GLOBAL EFFECTS OF CLIMATE CHANGE

Local Effects in Scotland	• ☺ Agriculture and Forests: warming climate has potential to improve growing conditions and increase productivity (plants can grow for a longer period of time) • ☹ Pests and Disease: New conditions may allow pests and disease to spread and create new threats. This may impact on health and ecosystems if not managed. • ☹ Soils: may be altered due to changes in rainfall patterns and increased temperatures. • ☹ Environment: some species may be lost and invasive species may thrive and a degraded environment may not be able to sustain a productive land or water supply. • ☹ Water: as rainfall patterns change there may be increased competition for water. Summer droughts may become more frequent and severe causing problems for water quality and supply. • ☹ Flooding: More heavy downpours could lead to increased flood risk. This could impact on properties, business and communities. • ☹ Coasts: we can expect more coastal flooding and erosion with consequences for coastal communities and infrastructure. • People: more opportunities to be outdoors and enjoy an active lifestyle. But, it could lead to increase in skin cancers. • ☹ Cultural Heritage and Identity: threatens historic environment through coastal erosion and flooding. Rising temperatures could affect ski industry. • ☹ Energy supply: influence capacity to generate renewable energy (e.g. hydro)
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Global Effects	• Weather: some places are drier, some wetter, some warmer and some cooler. More storms, floods and droughts. Plants and animals may find it difficult to survive. • Sea Levels: higher temperatures will result in melting of sea ice (e.g. Greenland) which will flow into sea and sea levels may rise. This could cause flooding of low lying coastal settlements (e.g. Bangladesh). People will lose their homes and have their livelihoods destroyed. • Farming: affects the kind of crops that can be grown (Some grow better e.g. wheat but others e.g. maize can't cope with higher temperatures). Changes in rain affects plant growth. Some countries (e.g. Brazil) may not be able to grow enough food for their citizens. • Water: Already lack enough water for people in some places (e.g. Sahel in Africa). The Great Plains of the USA are likely to experience drier conditions whilst Scotland is likely to experience more rain. • Plants and Animals: The melting of ice caps will have an effect on the habitat and hunting ground of polar bears who will be forced into more populated areas. Plants and animals at risk of extinction if not able to cope with changes in weather. • People: Overcrowding as people move inland to avoid the risk of coastal flooding (e.g. Egypt). Diseases (e.g. malaria) could spread into areas not affected as increase in temperature allows mosquitos to breed.
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STRATEGIES TO MINIMISE THE IMPACTS OF CLIMATE CHANGE

Local/Individual Strategies	• Switch to energy saving products: (e.g. light bulbs) generate less heat and use less energy. Switch of the light when leaving a room. • Seal and Insulating homes: prevents leaks by sealing home and blocking out heat and cold. • Recycling: Saves energy and reduces pollution and emissions from manufacturing products and disposing of them (e.g. Falkirk Council) Composting food and garden waste reduces rubbish sent to landfills and reduces emissions (e.g. methane) • Use water efficiently: (e.g. when brushing teeth, dishwasher use) reduces energy needed to pump and treat water for our use. • Green power: (e.g. solar panels on the roof). It is a clean energy supply and reduces emissions. However, it can be expensive. • Transport: people encouraged to use public transport, walk or cycle to reduce fossil fuel consumption. • Education: Educate people on benefits of being energy efficient
National (Scottish) Strategies	• Government Policies (e.g. Insulation). Over 10% of Scottish homes have received financial support to fit loft insulation. Encourages the use of 'Smart Meters' to improve energy efficiency • Reducing amount of energy from coal-fired power stations which emit the most CO² (E.G. Cockerhills power station closed in 2013). Increased power generation from renewable sources and use of low carbon technologies. The UK Government is committed to creating 15% of energy by renewable sources (e.g. Whitelee Wind Farm outside Glasgow is the second largest in Europe with 2015 turbines). In 2012, 40% of Scotland's energy consumption was met by renewables. However, these can be unsightly and costly and are not able to completely replace non-renewables as a source of energy. • Scottish Government introduced a bill in 2008 committing itself to an 80% reduction in greenhouse gas emissions

	between 1990 and 2050. Between 1990 and 2012 there has been a 30% reduction, although there was a rise of almost 1% between 2011 and 2012. • £100 million funding for development of carbon capture and storage at Peterhead. It would be expected to be able to store 1 million tons of CO² annually for 10 years. • Vehicle Excise Duty (road tax) is calculated on basis of CO² emissions, with vehicles which produce less CO², charged less. 32% of all cars were in the lowest 5 bands in 2013 compared with just 1% in 2001. Since 2001 the average emissions of new cars have fallen by 29%. • Bus and cycle lanes are designated to encourage people not to use the car.
International/Global Strategies	• 2005 Kyoto Protocol is a treaty which countries sign up to in an agreement to reduce their greenhouse gas emissions by 2012. It introduced a 'carbon credits' scheme. If a country produces CO² then it must have a way of containing that CO² (e.g. planting trees). Or another country has the responsibility to offset the excess for money which it must use to promote carbon saving (e.g. wind power). This was away for countries to work together to reduce their emissions. Scotland reduced their emissions by 2012. However, USA refused to sign the agreement and were not legally bound to meet the targets. The targets were not strict enough. • The 2011 UN Climate Conference in Durban many countries agreed to second period in Kyoto Protocol from 2013 till 2020. Rich nations should move towards compensating poor nations for losses due to climate change. • The Paris agreement outlines agreements between leaders of developed and developing countries to limit climate change below a 2° rise.

Map Applications (Paper 2 – 20 marks)

20 marks (4 for map evidence). You should spend 20 mins on this question.

Questions have tended to split their structure into two parts:

- a) Discuss the advantages/disadvantages (or suitability) of the proposed site/route (10)
- b) Discuss the social, economic, environmental impacts of the proposed development on the surround area and people (10)

Most questions will also provide a brief or specification. It is important you read this and refer to it in your answer.

So, to break your structure up further:

- a) Good points x 5 approx. (advantages) AND Bad points x 5 approx. (disadvantages).

Some questions might have more good than bad or vice versa, this is ok, just ensure you get 10 points in total

- b) Remember impacts means good and bad. So you can have 6 separate paragraphs here:
Social good, social bad, economic good, economic bad, environmental good, environmental bad.

All of a sudden the 20 marks don't feel quite so daunting!

You get minimum 4 marks for back up your point with map evidence, such as:

- 6 figure grid references
- Places
- Measured distances
- Road names

You also get marks by interpreting graphs/maps/data from the sources they provide

e.g. The proposed development would bring increased traffic congestion to the area. ✓ This is support in graph 10C, which shows traffic congestion peaked on 22nd March with a value of 480 cars in the area. ✓

How to structure your sentence:

1. Refer to source – GRs, graphs, pictures, quotes etc. (max 4 marks)
2. This means that ... (1 mark)
3. Leading to... (1 mark developed point)

Example

There is a housing estate called Bridgend (47 56) ✓, which means that there is a potential customer base leading to increased profits for the business. ✓

Code	Type of Land Use	Further information to consider	In simple terms this means
H	Housing	- Prices – increase or decrease - Close by – workers/labour force/customers	- What will happen to the price of housing, will this development be a positive and cause the price to rise or a negative and will mean people do not want to live there so house prices will fall? - Are the houses close enough that those that live there can work at / be customers of the development. - How far away are the houses? Measure it and use the scale to work it out.
E	Environment (Pollution and Wildlife)	- Opposition from conservationists - Fragile ecosystems in SSSIs / Nature Reserves - Pollution – Visual / Air / Noise / Litter – impact of these - Impact on wildlife / habitats	- What are the negatives to this development? - Will it anger conservationists and will the object to it? If so, why? - Are there any SSSIs / nature reserves on the map? Will they be affect during the building of the development or after? If so in what way? - Will this development cause any pollution? - Visual pollution – is anything that is not pleasing to the eye e.g. quarry, large warehouse, electric wires, pylons etc. - Air pollution – anything in the air e.g. smoke, dust, debris etc. - Litter – any discarded item which is not natural to that area. Will this development cause additional trash in this area e.g. bottles, crisp packets etc. which could harm wildlife or livestock? - Are any forests being cut down or impacted on – these could be home to wildlife e.g. foxes, badgers, birds, mice etc. - Are any ponds, lakes, rivers being impacted on – these could be breeding grounds of fish, routes to larger water sources, habitats of water birds, voles, otters etc.
I	Industry	- Proximity to other industry e.g. forestry, quarries - Investment in the local area	- Is there other industry close by? If so, how far? Measure it. - Does this development have any connection to what is already there? Could they benefit each other? - Will this development benefit the local area through increased investment or through indirect investment when other business choose to come to that area providing jobs, increased taxes, making the area more sought-after etc.
S	Site	- Relief – flat/hilly – impact on cost - Accessibility – roads/railways/airports - Demolition – cost / compensation pay outs - Room for expansion - Impact of weather due to site being exposed - Proximity of rivers – cost of redirecting - Flood plain / marshland – cost of drainage	- Look at the contour line – is the ground flat or hilly. If it is flat then the constructions costs will be less. If it is hilly then costs will increase as time is spent levelling land and building more robust foundations. - How easy is the development site to get to by road / railway / airport? Does this cause any issues? - Does anything need to be removed from the area before construction begins? If so then costs will increase. - Do any homes / businesses need to be moved? If so, compensation claims to those affected will increase costs. - Does the site allow for future expansion for the development? - Look at the wider area, is the site exposed more exposed to the impact of weather e.g. is it on a hill, is it alone in the

		• Natural features e.g. cliffs, rivers, mountains – for activities. • Roads – width / privately owned	bottom of a large valley exposed to high winds etc. • Are there any rivers? How close are they? Measure it? Could they flood and cause damage? Does drainage need to be put in? Does the river need to be diverted/redirected? What is the impact of all of this on cost/habitat/river further downstream etc. • Are current roads large enough to allow construction and heavy good access to the development site? Are these roads privately owned and could it cause disruption to alter them?
T	Transport / Tourism	• Proximity to airports • Proximity to roads – access easier/harder • Timings to get to work – increase or decrease • Congestion – increase or decrease • Increased number of vehicles could affect road safety near schools/housing • Pollution – air/noise (see below) • Will more tourists travel to the area – what is the impact? Hotels, restaurants, cafes, shops, museums, services etc.	• How close are airports / roads? Measure it? Could this help or hinder the development? • Will locals benefit from reduced congestion and commute times? • If there is an increase in vehicle, is it near schools, park or housing? Could this cause safety concerns for young children playing or young families wanting to move into that area? • Are transport links good? What are they? Evidence from map. • Will this development lead to an increase in tourism? Will this help the local economy? What is the impact on local businesses? • Could house prices increase and local be pushed out as homes are used for holiday homes on site such as airbnb?