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GEOGRAPHY

PAPER 1 REVISION GUIDE

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Module 1

Climate & Weather

1. Mid-latitude Cyclones

Origin:

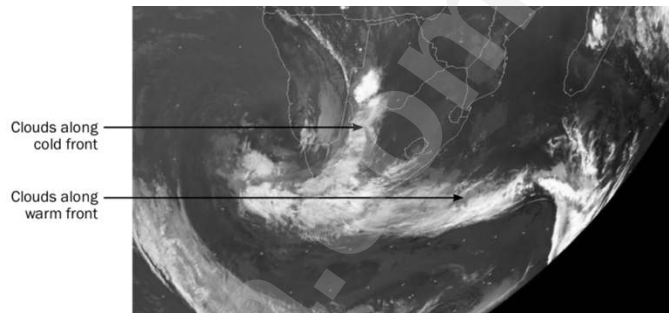
- Polar front (60° N/S)
- Cold polar easterlies meet warm westerlies and move parallel but do not mix.

Alternate names:

- Extra tropical cyclone
- frontal depression
- temperate cyclone

General characteristics:

- Forms between 30° - 60° N/S
- Moves eastward
- Has two fronts (warm and cold)
- Steered by westerlies
- Affects SA in winter



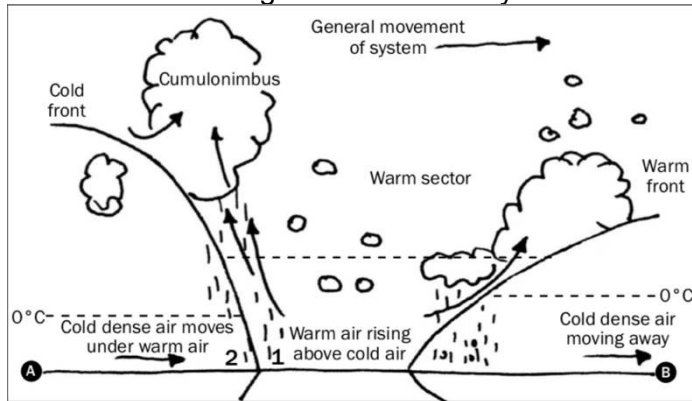
Conditions for formation:

- Frictional drag caused by difference in temperature and speed of the two air masses.
- Air masses must move opposite to each other and parallel.
- Warm subtropical air must meet cold polar air at the polar front.

Stages in formation:

- Initial:
 - Cold polar air and warm tropical air move parallel to each other but in opposite directions at the polar front.
- Wave formation:
 - Frictional drag takes place.
 - Warm air becomes uplifted.
 - Fronts begin to form as air converges to the centre low pressure.
- Mature:
 - Wave deepens.
 - Cold and warm sectors and fronts fully developed.
 - Warm air moves up steep pressure gradient of cold front to form towering cumulonimbus clouds. (heavy rain over a small area)
 - Rapid uplift of warm air to great heights and large-scale condensation.
 - Steep gradient of cold front forces warm air to rise very high
 - Warm air moves up gentle pressure gradient of warm front to form a broad band of stratus clouds. (light rain over a large area)
- Occlusion:
 - Cold front catches up to the warm front at the apex. (apex is the shortest distance between the fronts)
 - *Cold front occlusion*: warm air moves up the cold front. (cold front on the ground)
-Coldest air behind the warm front
 - *Warm front occlusion*: cold air moves up the warm front. (warm front on the ground)
-Coldest air in front of the warm front

Cross section through a mid-latitude cyclone:



Weather associated with Mid-latitude cyclones:

- Cold front weather:
 - Low air temperature
 - Thunderstorms and hail
 - Rise in air pressure
 - Low humidity
- Warm front weather:
 - Rising air temperature
 - Soft rains
 - Drop in air pressure
 - High humidity

Cyclone families:

- Mid-latitude cyclones form in groups.

Impact of mid-latitude cyclones:

- Rain:
 - ✓ Water for vineyards and deciduous fruits
 - ✗ Flooding
- Snow:
 - ✓ Tourist attraction
 - ✗ Crop damage
- Storms:
 - ✗ A threat to fishermen at sea

Precautionary and management strategies:

- Build high
- Efficient drainage systems
- Enclose livestock
- Sufficient grain
- Update weather systems
- Secure boats

2. Tropical Cyclones

Origin:

- Warm oceans
- Between 5°-25° N/S where the Coriolis force is strong enough to form a vortex.

Alternate names:

- Hurricanes
- Willy Willies
- Typhoons
- Cyclones

General Characteristics:

- Shown by circular isobars enclosing intense low pressure
- Moves westwards
- Steered by tropical easterlies
- Diameter: 300-500 km
- Follows erratic paths; unpredictable due to
 - Ocean heating and cooling differently to land
 - Varying wind direction
- Problems with erratic path:
 - Unsure of when the cyclone will reach land making it difficult to prepare
 - Insufficient time to predict
 - Cost implications of unnecessary evacuations

Conditions for formation:

- Temperature above 27°C (For high evaporation)
- Warm air rising; unstable atmospheric conditions (For convection)
- Latitude between 5°-25° N/S (Coriolis force is strong)
- Calm conditions (Wind will not allow vortex to form)
- Upper air divergence (To maintain LP centre)

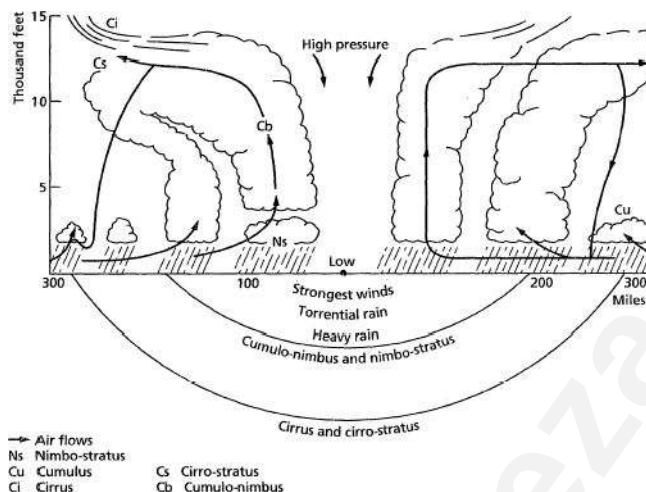
Stages in formation:

- Initial
 - Centre pressure above 1000 mb
 - Isobars far apart
 - Gale force winds
 - Cirrus and cumulous clouds
- Immature
 - Pressure drops below 1000 mb
 - Eye forms
 - Wind reaches hurricane strength
 - Diameter ± 100 km
 - Cumulonimbus clouds around the eye
- Mature
 - Centre pressure well below 1000 mb
 - Isobars very close together
 - Diameter between 300-500 km
 - *Dangerous semicircle*: effects of intense winds combine with force of cyclone moving forward (bottom left).
- Dissipating
 - Centre pressure rises above 1000 mb
 - Occurs when cyclone encounters land or moves over cold oceans
 - Downgraded to tropical depression

Factors that strengthen a cyclone:

- Steeper pressure gradient
- Large supply of moisture
- Increase in upper air divergence

Cross section through a tropical cyclone:



Weather associated with tropical cyclones:

- As storm approaches:
 - Cumulous clouds
 - rain
 - windy
 - cumulonimbus clouds
 - dangerous semicircle: torrential rain and hurricane winds
- Eye:
 - Calm
 - Cool
 - Clear

Impact of tropical cyclones: ○ Flooding ○ Storm surges ○ Crop losses ○ Transport disrupted ○ Silt in dams ○ Ecosystems disrupted ○ Interrupted electricity supply ○ Destroys informal settlements ○ Removal of fertile soil	Precautionary and management strategies: ○ Stock up water and canned food ○ Keep first aid kit ○ Keep livestock on higher ground ○ Sandbags on river banks ○ Evacuation plans ○ Early warning systems
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3. Factors influencing the weather of South Africa

Influence of the plateau

During summer:

- Kalahari high is weakly developed
- Subsidence is low
- Inversion layer forms above the escarpment
- Moist air ridging in from over the Indian ocean is carried over the plateau
- Cloud formation occurs
- Widespread rain

During winter:

- Kalahari high is well developed
- Subsidence is high
- Inversion layer forms below the escarpment
- Moist air ridging in from over the Indian ocean is prevented from reaching the plateau
- Clear weather
- Influence of position of inversion layer in winter on:

CLIMATE	ECONOMY
• No moist air reaches interior • Limited condensation • No rainfall • Drought conditions	• Limited crop cultivation • Rivers dry up • Tourism decline • Less water impacts industries

Influence of the oceans

Warm Mozambique current:

- East coast
- Raises temperatures
- High rainfall

Cold Benguella current:

- Decreases temperatures
- Dry weather

4. High pressure systems over South Africa

South Atlantic High

- West coast
- Dry, clear, stable weather conditions
- Winds that diverge are dry over the cold ocean
- Fog and mist produced

Ridging of SAH:

- In summer
- Diverts moist air from Indian Ocean onto the land
- Rain on south east coast and eastern plateau

South Indian High

- East coast
- Brings rainfall in summer
- If it lies in the path of a mid-latitude cyclone, SIH is known as blocking high
- Causes mid-latitude cyclone to move south east due to anticlockwise movement of air
- Brings more moist air over interior in summer since:
 - Inversion layer above the escarpment
 - Allows moist air to mover over the interior
 - Allows warm moist air to rise and condense
 - Intense low pressure over the interior leads to convergence
 - Unstable weather conditions as a result

Kalahari High

- On the interior
- Dominates land in winter
- Interacts with SIH to influence climate of SA differently in summer and winter

Resultant weather of high pressure cells

Moisture front: a zone between two air masses with different moisture content.

Line thunderstorms:

- Forms over the interior
- Warm and moist north-easterly winds meet.
- cold and dry south-easterly winds at moisture front
- Cold air forces warm air to rise.
- Strong condensation occurs, clouds form and thunderstorms develop

Impact of line thunderstorms:

- Torrential rain causes damage
- Soil erosion
- Gale force winds destroy infrastructure
- Fills dams

5. Low pressure systems over South Africa**Thermal low**

- Occurs in summer
- Causes convective thunderstorms over the interior
- Usually more than one over the interior

Cut-off low

- Ridging of SAH and SIH prevents the mid-latitude cyclone from moving east
- Cold front is cut off from the cyclone and extends over the land.
- Moist air is then drawn onto the land resulting in rainfall for several days

Coastal low

- Originates on the west coast
- Fog on west coast
- Unstable weather on east coast

Resultant weather of low pressure cells

Berg winds:

- Hot gusty winds that blow from interior to coast
- Air moves from Kalahari high to coastal low
- Diverging air warms at DALR

Effects of berg winds:

- Forest fires
- Livestock death
- Lethargic workers
- Respiratory problems

Precautionary measures:

- Firefighters on standby
- Fire extinguishers on hand
- Hydrate livestock
- Move livestock into shade
- Evacuation plans
- Irrigate fields to keep vegetation wet to prevent fire
- Remain indoors

6. Synoptic weather maps

Isobaric patterns

Ridge- high pressure

Trough- low pressure

Saddle- between two high pressures or two low pressures

Weather stations

wind speed and direction

temperature (air and dew point)

precipitation and cloud cover

7. Valley climate

Slope aspect:

- The direction in which a slope faces
- Slopes facing the equator are warmer since they receive direct sunlight
- Shadow zones do not receive sunlight due to blocking relief

Influence of aspect:

- Economic:
 - Farmers plant their crops on the slopes as they are above frost zone.
 - Frost will damage crops that's not frost resistant
 - Avoid planting certain crops too close to the valley floor.
 - Use valley for livestock farming.
 - Use colder valley slopes lower down for frost resistant crops.
- Settlement:
 - Warmer north facing slopes have higher value
 - Middle of slopes usually used
- Vegetation:
 - South facing- cool and moist- densely vegetated
 - North facing- warm and dry- sparsely vegetated

Katabatic winds:

- Downslope movement of air in a valley
- Slopes cool because of terrestrial radiation during night
- Cold air on slopes descends to valley floor
- Cold air forces warm air on valley floor to rise in the centre of valley
- Results in temperature inversion within the valley
- Zone of accumulated warm air midway of a slope- *thermal belt*
- When valley air cools to below dew point temperature- *radiation fog* is formed
- Influence on:
 - *Farming*:
 - citrus farms on valley floor for maturation of fruit and insect resistance
 - deciduous fruit planted on middle slope (warm), ideal for ripening
 - frost resistant crops on valley floor
 - *Settlement*:
 - Land value at middle slope is high since it is located within the thermal belt. Less money spent on heating
 - Land value on valley floor is low since winds trap pollutants here
 - *Transport*:
 - Fog may reduce driver visibility which increases the chance of vehicular accidents

Anabatic winds:

- Upslope winds
- Occurs during the day when slopes are heated causing warm air to rise
- Significance: smoke released during the day is carried away by anabatic winds

8. Urban climate

The climate in urban areas that differs from that in neighbouring rural areas as a result of urban development

Reasons for differences between urban and rural climates:

- Cloud cover:
 - More in **urban** area
 - Pollutants act as condensation nuclei
- Precipitation:
 - More in **urban** area
 - The urban area is warmer than the rural area and therefore has a lower pressure.
 - Stronger convection currents result in more condensation.
 - Air moves from the rural area (HP) to the urban area (LP) bringing in humidity.
 - Condenses around the large amount of condensation nuclei (dust particles) resulting in more rainfall
- Humidity:
 - More in **rural** area
 - More vegetation and water bodies (surface water) encourages evaporation
- Wind speed:
 - Higher in **rural** area
 - In urban areas, tall buildings obstruct air flow
- Temperature:
 - Higher in **urban** area
 - Higher population- more use of geysers, stoves, heaters and more carbon dioxide
 - Artificial substances- concrete and metal absorbs heat and glass reflects heat
 - Geometric shapes of buildings- reflects and absorbs heat
 - Urban activities- generates heat and pollution
 - Building density- less air flow to distribute heat
 - Efficient drainage- less surface water for evaporation (atmosphere remains hot)

Urban areas receive less insolation due to pollution and cloud cover.

Heat island:

- Occurs during the day
- Region of higher temperature in an urban area surrounded by lower temperatures in rural areas
- *Isotherms*: lines joining places with the same temperature
- Factors influencing heat islands:
 - Decentralisation
 - Clusters of tall buildings
 - Rivers and dams

Pollution dome:

- dominant at night
- subsiding cold air traps pollutants and compresses it over the city
- strongly developed in winter months
- can be dispersed by strong winds

Effects of heat island and pollution dome:

- Smog and fog
- Visibility reduced
- Acid rain
- Quality of life reduced
- Respiratory problems
- Global warming

Strategies to reduce the effects of heat island and pollution dome:

- Plant trees
- Rooftop gardens
- Reflective paints
- Decentralisation

Module 2

Geomorphology

1. Drainage systems in South Africa

Concepts:

- **Drainage basin:** area drained by a river and its tributaries
- **Catchment area:** upper reaches of a drainage basin which supplies a river with water
- **River system:** the main river and its tributaries
- **Tributary:** smaller streams that join the main river
- **Confluence:** point where two or more rivers join
- **Watershed:** high lying area separating two different drainage basins
- **Interfluve:** land that separates streams in the same drainage basin
- **Source:** starting point of a river
- **River mouth:** point where the river enters the sea
- **Surface runoff:** water that flows on the surface after it rains
- **Ground water:** water found *within* the earth's surface
- **Water table:** the *upper limit* of water that is found underground
 - Ways to maintain water table in urban areas:
 - Use permeable bricks to build walkways
 - More permeable surfaces like grass and cobble
 - Create buffer zones around rivers to protect vegetation
- **Base flow:** underground water that flows into a river
- **Drainage pattern:** the arrangement of streams in a drainage basin
- **Sheet flow:** water flowing downslope over land

Types of rivers:

- Permanent (perennial)
 - Flows all year
 - Associated with high rainfall areas
- Periodic (seasonal)
 - Flows only in rainy season
 - Associated with semiarid and arid areas
- Episodic
 - Flows only after heavy rain
 - Lasts for a few hours
- Exotic
 - Originates in high rainfall area but flows through dry areas

Stream ordering:

- Fingertip streams are stream order 1
- Confluence of two stream order 1 streams results in stream order 2
- Confluence of two stream order 2 streams results in stream order 3
- The system continues until the main stream is reached
- When a lower order stream meets a higher order stream, the resultant stream is the same as the higher order stream
- Effect of drought on stream order:
 - All first order streams will dry up
 - This changes stream order of subsequent streams

Types of drainage patterns:

- Dendritic
 - Resembles branches of tree; tributaries join at acute angles
 - Uniform erosion of horizontal sedimentary and massive igneous rocks
- Rectangular
 - Main stream has 90° bends and tributaries join at 90°
 - Forms on igneous rock that has many joints and faulted sedimentary rock
- Radial centrifugal
 - River flows away from a central point
 - Forms over domes or volcanoes and is associated with massive igneous rock
- Radial centripetal
 - River flows towards a central point
 - Associated with massive igneous rocks
- Deranged
 - Haphazard pattern with many lakes
 - Forms over geologically young areas
- Trellis
 - Main streams are parallel and short tributaries join at 90°
 - Folded landscape
 - Forms on rocks that have varying resistance to erosion
 - Associated with alternating hard and soft sedimentary rock
 - Found in mountainous areas
- Parallel
 - Tributary streams stretch out as if parallel
 - Occurs in areas of major faults and steeply folded bedrock

Drainage density:

- A measure of the total length of streams per unit area.

Factors affecting drainage density:

- **Vegetation**- more vegetation → lower drainage density
 - Reasons to preserve vegetation:
 - Slows down flow of water
 - Allows for infiltration
 - Maintains ground water levels
 - Plants anchor soil
 - Prevents soil erosion
 - Prevents sheet flow and flooding
- **Amount of rainfall**- more rainfall → higher drainage density
- **Gradient**- steeper gradient → higher drainage density
- **Soil moisture**- higher soil moisture → higher drainage density
- **Porosity**- higher rock porosity → lower drainage density
- **Permeability**- higher rock permeability → lower drainage density

River discharge:

- *Downslope flow of water in a river due to gravity*
- Laminar flow:
 - No obstacles
 - Low rate of erosion
 - Riverbed even
- Turbulent flow:
 - High rate of erosion
 - Obstacles present
 - Uneven riverbed
- Removal of vegetation, concreting and tarring of surfaces and dams influence stream flow
- Stormwater drainage is transferred to areas surrounding urban area

2. Fluvial processes

A: River profiles

Cross profile:

- Bank to bank
- Shows depth and width of river

Longitudinal profile:

- From source to mouth
- Shows gradient and length

Relationship of profiles with stages of river and characteristics:

- Upper course:
 - V- shaped valley
 - Turbulent flow
 - Low volume
 - Vertical erosion
 - Waterfalls and rapids
- Middle course:
 - Open V-shape (gentler slopes)
 - Less turbulent, becoming laminar
 - Volume and load increases
 - More lateral erosion
 - River begins to meander
- Lower course:
 - U- shape valley
 - Laminar flow
 - Large volume
 - Lateral erosion
 - Meanders, oxbow lakes, floodplains, braided streams, levees

B: River grading

Graded profile:

- Smooth concave profile
- Rate of erosion and deposition are equal
- Laminar flow

Ungraded profile:

- Has many obstacles
- Young river
- Turbulent flow

Interaction between erosion and deposition:

- Erosion dominates in upper course which removes obstacles
- Headward erosion of knickpoints increases steepness of slope
- Vertical erosion creates steeper gradient
- Eroded material is deposited in lower course
- Lateral erosion creates gradual gradient
- This balance creates a graded profile (concave)

Base levels of erosion:

- Temporary: features that prevent a river from further vertical erosion
- Permanent: the lowest level to which a river can erode (sea level)

C: River rejuvenation

The process whereby a river which has reached a base level, regains energy and begins to erode vertically once again

Reasons for rejuvenation:

- Uplift of land
- Increase in volume of water by river capture or high rainfall
- Drop in sea level

Features of rejuvenation (fluvial changes downstream):

- Knick point: A sharp change in slope of a river
- Terraces: old valley floor forms a terrace on either side of the river due to down cutting
- Valley in a valley: new valley is carved into old valley
- Entrenched meander: meander formed that cut a deep valley into the bedrock

Negative impact of rejuvenation on farming:

- River cuts down forming new floodplain
- Floodplain is narrower
- Less space for crop cultivation
- Decrease in yield
- Difficult to use machinery

Environmental impacts of rejuvenation:

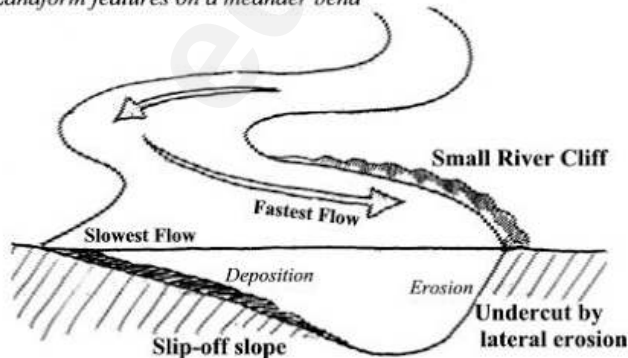
- Faster flowing rivers will cause more erosion and result in destruction of fauna and flora downstream.
- Faster flowing rivers will create more soil erosion upstream and deposition downstream.
- Faster flowing rivers will alter the biodiversity of ecosystems.

D: Fluvial landforms

Meander:

- Lower course:
 - Gentle gradient
 - Dynamic equilibrium condition
 - River weaves from side to side over floodplain
 - Lateral erosion occurs
 - Stream velocity is low
 - Material deposits unevenly
 - Uneven deposition causes stream to move from side to side

Landform features on a meander bend



- A curve or bend along the course of a river
- Outer bank → undercut slope → rapid water flow → high rate of erosion → concave
- Inner bank → slip-off slope → slower moving water → high rate of deposition → convex

Ox-bow lake:

- Form from meanders
- Meander neck becomes narrow over time
- During periods of prolonged rainfall, water flows straight, avoiding the meander
- *Meander scar*: dried up ox-bow lake due to no water supply

Braided stream:

- Seasonal river with abundant bed-load deposited in the lower course
- Gentle gradient and decreased river flow forces deposition of sand islands
- Sand islands obstruct the river's own path and branches into *distributaries*

Flood plain:

- Flat land on banks of river made up of layers of silt
- How flooding assists in maintaining floodplain and river:
 - Deposits silt on floodplain
 - Increases volume of water
 - Removes waterborne diseases
 - Unblocks river mouth
 - Maintains levees
 - Maintains and improves biodiversity

Natural levees:

- Forms on riverbanks subjected to repeated flooding
- After water recedes, a raised bank is left behind (higher than flood plain)
- *Yazoo streams*: tributaries that cannot join the main river due to the obstruction of levees

Waterfalls:

- Upper course of river
- Hard rock overlies soft rock
- The less resistant rocks erode faster than the more resistant rocks
- Plunge pool forms base of waterfall

Rapids:

- Sections of turbulent water
- Upper course
- Alternating hard and soft rock causes riverbed to become uneven resulting in turbulent flow

Delta:

- River enters the sea and deposits its load
- Sediments are kept in suspension in fresh water but flocculate in salt water
- Conditions for formation:
 - Weak ocean currents
 - Large amounts of sediment
 - Shallow river mouth

Use of landforms:

- Flood plain:
 - Fertile soil for farming
 - Flat land allows for use of machinery
 - Good water supply for farming
- Waterfalls:
 - It will attract more ecotourism adventure tourism bringing in more revenue
 - Development of holiday resorts
 - It will improve the infrastructure of the area
 - Create more employment opportunities
 - It will stimulate the growth of the local arts and crafts market in the areas
 - Development of hydro-electrical power station
 - Due to the hydro-electrical power station the local community will become less reliant on the national grid
- Rapids:
 - Tourist attraction

- Delta:
 - Fertile land for farming
 - Fishing
 - Drinking water
 - Domestic use of water
 - Tourist attraction
 - Transport

Disadvantages of landforms:

- Floodplain: difficult for construction
- Waterfalls and rapids: dangerous due to fast flowing water
- Deltas:
 - Water is dirty and polluted and attracts mosquitoes
 - Vulnerable to sea levels

E: River Capture

- Abstraction:
 - process whereby watershed changes its position due to uneven steepness on either side.
- River capture:
 - one river captures the headwater of another river thereby increasing the size of its own drainage basin.

Features:

- Captor stream:
 - River that has captured the headwater of another river
- Captured stream:
 - River that has its water diverted into another river
- Misfit stream:
 - Stream that has too little water for the valley in which it flows
- Elbow of capture:
 - Right angle bend indicating the point where one river captures the water of another
- Wind gap:
 - Dry river valley found immediately after the elbow of capture

Conditions for river capture:

- Difference in gradients of rivers
- One river must receive higher rainfall
- One river must flow down softer rock

Impact of river capture:

- Captor stream:
 - Drainage basin increases
 - Volume increases
 - Flows faster
 - Erosive ability increases
 - River could be rejuvenated
- Captured stream: opposite to captor stream

Implications of river capture:

- Captured stream:
 - Less water for agriculture
 - Hydroelectric power cannot be sustained
 - Less water for domestic and industrial use
 - Water quality will decrease
 - Aquatic organisms die resulting in disrupted food chains
- Captor stream: opposite to captured stream

Superimposed: young river forms on old landform

Antecedent: new landform found under an old river

F: Catchment and River Management

Importance:

- **Transport** of goods using rivers
- **Hydroelectric** power needs rivers
- **Ecosystems** in rivers
- **Flood** control
- **Farming** uses rivers
- **Leisure** activities in rivers
- **Sustainable** use of water from rivers
- **Tourist** attraction
- **Domestic** and industrial use of rivers

Impact of people on drainage basins:

- **Waste disposal**- pollution affects water quality
- **Wetlands**- being destroyed by human activities (farming, alienation, pollution)
- **Water transfer** schemes- affect river flow and aquatic ecosystems
- **Irrigation**- reduces water downstream
- **Dams**- affects river flow
- **Overgrazing**- removal of vegetation reduces infiltration
- **Mining**- acid level in water increases
- **Embankment**- holds back sediment which prevents delta formation
- **Afforestation**- reduces stream discharge and encourages infiltration
- **Urbanisation**- artificial substances encourage runoff
- River pollution:
 - Domestic sewage
 - Agricultural wastes (herbicides and pesticides)
 - Industrial wastes (including heated water)
- Impact of river pollution:
 - Loss of oxygen in rivers due to excessive decomposition of pollution
 - Eutrophication

Management strategies:

- **Buffer** zones
- **Awareness** campaigns
- **Recycling**
- **Fines**
- **Testing** of water quality
- **Vegetate**
- **Educate** farmers
- **Wetlands** must be conserved
- **Community** clean-ups

If catchment area is poorly managed:

- **Water** shortages
- **Polluted** water- health hazards
- **Increased** water price
- **Less** area to grow crops

Module 3

Rural & Urban Settlements

1. Study of Settlements

- Settlement: a place where people live which includes buildings, economic activities and transport networks
- Site: the exact physical land on which a settlement is placed
- Situation: the location of a settlement in relation to its surrounding area
- Rural: farmsteads, villages or hamlets where there is limited development and technology
- Urban: densely populated settlements with a lot of manmade structures and a few open spaces such as towns or cities
- Site factors:
 - Water
 - Relief
 - Soil
 - Climate
 - Accessibility
 - Tradition
 - Natural resources
- Situation factors:
 - Access to markets to sell products
 - Access to shops to purchase resources
 - Access to banks and other services
 - Saves travel time and cost

2. Rural Settlements

Influence of site and situation on rural settlements:

- Wet point settlement:
 - found where there is a shortage of water
 - located near a water source
- dry point settlement:
 - found where water is a threat
 - located on higher ground to avoid flooding
- defence:
 - located on high ground or in meander loop or between mountains
 - for safety reasons
- accessibility:
 - bridging point: located near the shallow point of a river for easy crossing
 - gateway: in gap hills

Classification of rural settlements according to pattern:

- **dispersed**
 - houses or farms are far apart or scattered and isolated
 - **advantages:**
 - ✓ farmers can experiment with new machinery
 - ✓ larger profit capability
 - ✓ privacy
 - **disadvantages:**
 - ✗ lack of social life
 - ✗ easy target for criminals
 - ✗ services far

- **nucleated**
 - houses or farms found close together
 - **advantages:**
 - ✓ ability to share equipment
 - ✓ social advantages
 - ✓ safety higher
 - **disadvantages:**
 - ✗ lack of privacy
 - ✗ small profits
 - ✗ smaller plots of land
- **linear/ ribbon**
 - houses located in a line along a road, narrow valley or river
- **planned**
 - houses are grouped around a specific feature e.g. Market
- **crossroads**
 - accessibility to transport causes settlements to develop along meeting roads
- **semi-circular**
 - settlement found along the coast
 - sea acts as a physical barrier

Classification of rural settlements according to function:

- rural areas are uni-functional
- associated with primary activities
- dispersed or nucleated
- farmsteads, hamlets or villages

Land use in rural areas:

- subsistence farming
 - farmer grows crops to meet his family's needs
 - small scale and traditional methods
 - variety of crops planted in small quantities
 - no contribution to economy
- commercial farming
 - large farms that are capital intensive
 - main purpose is to make profits
 - one main crop planted on a large scale
 - uses modern equipment and farming methods
- intensive farming
 - every available piece of land is used for farming
 - high yield per hectare
 - labour and capital intensive
- extensive farming
 - occurs over a large area
 - yield per hectare is comparatively lower
 - occurs where land is less fertile

3. Rural Settlement Issues

- rural-urban migration: movement of people from farms to urban areas
- rural depopulation: decreasing number of people that live in rural areas due to rural-urban migration

causes of rural depopulation:

- people leave rural areas because:
 - hard work, long hours and low pay
 - poor quality housing
 - basic services are far away
- people want to move to cities because of:
 - greater variety of jobs and higher pay
 - improved housing and services
 - access to basic services
 - efficient transportation
 - food security

Rural-urban migration may not increase standard of living due to:

- low wages in informal sector
- lack of employment
- lack of proper housing
- increased cost of living

Impact of rural-urban migration on service delivery in rural towns:

- Service delivery will decline as fewer people in rural areas.
- Service delivery will be slow and unreliable.
- Price of service delivery will increase as demand decreases.
- Lack of Health services due to insufficient support.
- Educational facilities will close down due to few children.
- Businesses will close down as a result of decline in customers.
- Quality of piped water will decrease due to decreased demand.
- Decline in efficient electricity supply due to decreased demand.

consequences of rural depopulation

- in rural areas:
 - basic services will close down
 - production in rural areas decreases
 - arising of ghost settlements
 - brain drain
 - resources under-utilised
- in urban areas:
 - growth of informal settlements
 - crime increases
 - traffic congestion
 - insufficient services
 - waste management uncontrollable
 - diseases spread as hygiene decreases

strategies to address rural depopulation:

- improve roads and transport facilities
- create more job opportunities through decentralisation
- improve salaries and working conditions
- improve basic services
- increase capital for farmers
- provide training courses

reasons to manage rural depopulation:

- rural areas provide food for the country
- rural areas influence GDP
- rural areas provide the country with raw materials

Social Justice Issues in Rural Areas

access to resources:

Water

- reasons for water shortages
 - low rainfall
 - few lakes
 - rivers are non-perennial
 - high evaporation
 - dams dry up
 - domestic wastage
 - pollution of clean water
- conserving water
 - farmers should use drip irrigation
 - mix fertilisers with water
 - use treated wastewater
 - use tanks to catch and store rainwater
 - use boreholes

Soil

- reasons for soil erosion
 - deforestation
 - overgrazing
 - over-cropping and monoculture
 - high rainfall
- soil management strategies
 - afforestation on steep slopes
 - terracing
 - contour ploughing
 - use of natural manure

Land reform:

- land restitution:
 - compensating people for the land they lost due to forced removals
 - compensation by money or land
- land tenure reform:
 - provides security to South Africans regarding land ownership
 - prevents unfair eviction
- land redistribution:
 - providing land to previously disadvantaged people for housing or farming

purpose of land reform:

- redresses injustice of apartheid
- promotes economic growth and alleviates poverty
- national reconciliation

challenges with land reform:

- willing buyer/seller clause delays negotiating prices
- costly
- lack of training given to new owners

Post-settlement support for land reform:

- measures to ensure productive land-use
- educational centres – training and development programmes
- more markets
- subsidise small scale farmers

4. Urban settlements

- urbanisation: process whereby an increased percentage of people live in urban areas
- urban growth: increase in the absolute number of people in urban areas
- urban expansion: the physical growth of an urban settlement
- urban sprawl: formless uncontrolled growth of urban areas
 - caused by lack of urban planning
 - can be counteracted by:
 - Proper planning of urban areas
 - Create greenbelt development around the city.
 - Creation of new towns
 - Encourage urban-rural migration
 - Improving facilities and conditions in the rural area
 - Create more vertical development e.g. flats
- rate of urbanisation: percentage by which an urban population increases
- level of urbanisation: percentage of people that live in urban areas

Classification of urban settlements (according to function):

- central places
 - provide goods and services to the surrounding rural population
- trade and transport towns (develop where transport routes meet)
 - break-of-bulk points- goods transferred from one form of transport to another
 - gap/gateway towns- originate due to physical barriers; transport routes converge
 - junction towns- located at transport junctions
- specialised towns
 - settlements with one dominant function

5. Urban Hierarchies

Urban hierarchy:

- hierarchy refers to the arrangement of settlements in an area from smallest to largest
- based on population, range and number of offered services and sphere of influence

Central place:

- refers to a settlement that provides goods and services to the surrounding rural population
- central place theory explains the relative size and spacing of settlements

Threshold population:

- the minimum number of customers needed to make a business profitable

Sphere of influence:

- the market area from where an urban settlement draws its customers
- dependent on the size and number of functions offered by the centre
- overlap due to:
 - zone of competition
 - variety of goods offered
 - en-route to work/home

range of goods:

- maximum distance that people are willing to travel to buy goods or services

low order goods and services:

- goods used daily
- have a small range
- have a small sphere of influence

low order centres:

- offer low order services or functions
- small threshold population

high order goods and services:

- goods and services that are required infrequently
- have a large range
- have a large sphere of influence

high order centres:

- variety of services or functions offered
- large threshold population

6. Urban Structure and Patterns

A: Street Patterns

- grid iron/rectangular
 - streets intersect at right angles
 - found on land that is flat
 - hampers traffic flow
 - does not work on steep land
- radial
 - roads radiate away from central point
 - joined by ring roads
 - traffic congestion at the centre
 - ring roads allow for traffic bypass
- unplanned/irregular
 - maze of streets with no order
 - associated with broken relief
- planned irregular
 - new urban developments
 - ensures a smooth flow of traffic
 - hilly relief

B: Building Density

- number of buildings per unit area
- density decreases from city centre outwards
- due to high land values in the city centre, buildings are close together and tall

C: Urban Profile

- the side view of a city showing building density and building height
- land value influences the shape of an urban profile
- building density and height is greatest where land value is highest

D: Land Use Zones

Factors influencing location of urban land use zones:

- accessibility:
 - the ease with which a place can be reached
 - CBD has greatest accessibility
 - Heavy industries locate near transport routes

- Compatibility:
 - Degree to which functions attract each other
 - Recreational areas are found near residential areas- high compatibility
- Specialised requirements:
 - Some land use zones require special features to develop e.g. a water source
- Land values
- Centrifugal force (push factors)
- Centripetal forces (pull factors):
 - Functional magnetism: functions that benefit each other
 - Functional convenience: CBD highly convenient since close to work
 - Functional prestige: a certain area becomes well known for a specific function offered

Urban land use zones: urban land set aside for a specific purpose

1. CBD (central business district)

- Found in city centre
- High degree of accessibility
- Tallest buildings and highest building density
- Combination of high and low order goods offered
- Grid iron street pattern
- High traffic congestion
- Commercial decentralisation:
 - City is invaded by illegal immigrants, becomes dilapidated
 - Forms:
 - Isolated store cluster (low order centre)
 - Commercial ribbon development (along main roads)
 - Outlying business centres (high and low order centre located in densely populated area)
 - Planned neighbourhood shopping centre (found in residential area)
 - Planned regional shopping centre
 - Informal trading (low order goods sold by unlicensed businesses)
- Problems in CBD:
 - Traffic congestion
 - Air pollution
 - Crime
 - Shortage of space
 - Littering

2. Transition Zone

- Located on the edge of CBD
- Mixed land use zone
- Buildings are old and dilapidated
- Urban decay occurs here
- Characteristics:
 - Informal traders on pavements
 - Lots of street children
 - Many foreigners
 - High crime rate

3. Residential Zone

- Occupies the most amount of urban land
- Wealth segregates this zone:
 - High income residential
 - Away from CBD and heavy industries
 - Good views
 - Well maintained
 - High land value
 - Many recreational facilities

- Middle income residential
 - Medium size houses
 - Location varies, but approximately 15-20min from CBD
 - Mostly occupied by government workers
- Low income residential
 - Located near industrial areas
 - Close to CBD
 - Small houses found close together
 - Little to no recreational facilities
 - Houses are old and neglected
 - Informal settlements found in LEDC
 - Unplanned, built with various materials, lack of basic services, no proper roads and poor hygiene
 - Ghettos or slums found in MEDC
 - Found in transition zone
 - Old and densely populated buildings

4. Industrial Zone

- Heavy industrial zones
 - Pollution
 - Far from high income residential zones
 - Found on outskirts of urban areas due to requirement of large spaces
 - Close to transport facilities
 - Produce heavy goods
- Light industrial zones
 - Occupies small spaces
 - Little pollution
 - Locate near to customers
 - Produce small and comparatively lighter goods

5. Green Belts

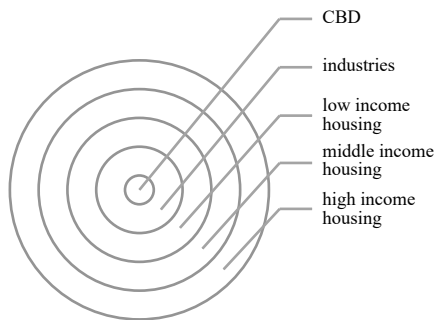
- Piece of land found within a city that has natural vegetation
- Protects natural environments
- Improves air quality
- Controls GHGs
- Reduces effects of urban heat islands
- Reduces runoff
- Challenges of greenbelt development:
 - Development of urban structures limits space for greenbelt development
 - Pollution destroys greenbelt development
 - Limited space for greenbelt development
 - Costly to develop and maintenance is expensive

6. Rural-urban Fringe

- Outskirts of city
- Mixture of rural and urban functions
- Land here is cheap
- Sewage, cemeteries, airports etc. found here

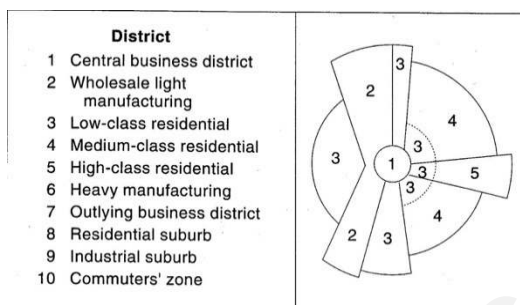
E: Models of Urban Structure

Burgess- concentric zone model:



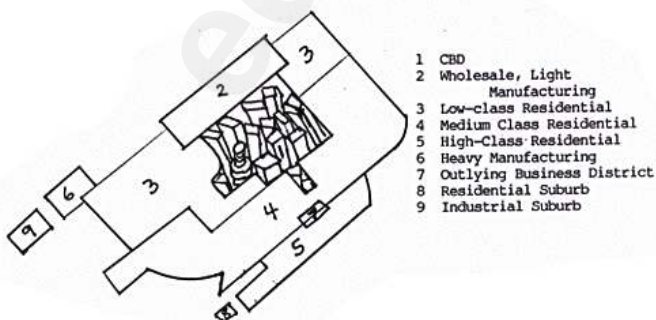
- inner zones invade outer zones in a process called invasion and succession
- does not have all land use zones
- no commercial decentralisation
- no consideration of relief
- little accessibility

Hoyt- sector model:



- sectors develop along main transport routes
- unrealistic due to circular CBD- relief not considered
- Residential zones and industrial zones extend outwards in sectors
- Sectors form along transport routes
- Low income residential areas are close to industrial areas
- High income residential area away from CBD / industries

Harris and Ullman- multiple nuclei model:



- cellular pattern allowing for growth into each other
- caters for decentralisation, relief and all land use zones
- shows the true complexity of cities

Modern American-western city:

- multi-centred
- CBD called downtown
- High level of commuting
- Decentralisation
- Sharply defined land use zones

Third world city:

- Land use zones are mixed
- Lots of informal trading
- City centres are compact
- Poor infrastructure
- Social problems in excess

South African city:

- Influenced by colonialism and apartheid
- Land use zones influenced by group areas act
- Post-apartheid- income determines where people live, not race

7. Urban Settlement Issues

A: Urban issues related to rapid urbanisation

Inner-city problems:

- Rise of squatter settlements
- Industrial expansion is slower than the rate of urbanisation
- Unequal provision of services
- Poverty and unemployment
- Environmental pollution
- Crime and violence

Urban blight:

- Deterioration of parts of an urban area
- Area of decay is transition zone
- Owners do not maintain buildings in this area
- Solutions:
 - Slum clearance- demolishing old buildings and starting from scratch. Housing provided for residents
 - Regeneration- improving physical environment by renovating old buildings, creating employment and improve quality of life
 - Invasion and succession- replacing the original function with a new function
 - Gentrification- low cost housing bought by wealthy people and are modernised
 - Façadism- front of building preserved for heritage remembrance but the rest of the building is renovated

Lack of planning:

- Low income residential areas found on outskirts
- Results in high rate of commuting putting pressure on transport
- Poor service provision results in protests

Traffic congestion:

- Build-up of vehicles on roads occurring mostly during peak hours
- Causes:
 - People live far from work
 - Inefficient public transport
 - Poor road safety
 - Excessive use of private vehicles
 - Expensive parking
 - Grid iron street patterns

- Solutions:
 - Monitoring of public transport
 - Introduce rapid and safe transport
 - Decentralisation
 - Cycle lanes
 - Ring roads
 - Park and ride facilities

ADVANTAGES	DISADVANTAGES
○ Easier mode of public transport ○ Can get through traffic easily ○ Relieves being caught up in traffic congestion ○ Travel short distances at low costs ○ Creates employment	○ Can only accommodate small number of people ○ Travels at low speed ○ Conflict with other taxi-drivers ○ Operates and transports within a small radius

Reasons why people move out of the CBD:

- Overcrowding and congestion in the city centre forces people to move to security estates.
- Pollution, noise and decay of the city centre forces people out of the CBD.
- CBD appears old and undesirable whereas the security estates are seen as young, vibrant and dynamic.
- Due to high crime rates people prefer security estates.

Overcrowding and housing shortages:

- Shortage of living space due to rapid urbanisation
- Effects of urban sprawl on environment:
 - Deforestation
 - Habitat destruction
 - Reduction in biodiversity
 - Groundwater table lowered
 - Increased pollution

Service provision:

- Municipalities are struggling to provide basic services due to rapid urbanisation
- Resulting in protests for better service delivery

B: Informal Settlements

- Illegally built settlements due to lack of housing by poor people
- Lack basic services
- Mostly found in LEDCs

○ Problems: • Vulnerable to elements • Susceptible to wild fires • Spread of diseases • Crime, drugs, poverty • Unhygienic • Little recreation • Lack of police • Lack of electricity • Fires	○ Solutions: • Supply them with piped water services • Supply them with electricity services • Improve accessibility, e.g. roads • Implement job creation projects to reduce unemployment • Improve service delivery, e.g. refuse removal services • Create more medical facilities • More open spaces • Build RDP housing • Reduce density of housing / buildings
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- Impact of informal settlements on the environment:
 - Soil erosion
 - Pollution from open fires and dumping
 - River contamination
 - Unhygienic living conditions
 - Increased crime rate
 - Lower property value
 - Costly to rehabilitate natural environment
- } natural environment
- } Social environment
- } economic environment

C: Justice Issues in Urban Areas

Social injustices:

- Causes of unequal access to resources and services
 - Greed and corruption
 - Nepotism
 - Lack of public participation
- Impact
 - Xenophobia
 - Violent protests
 - Crime

Economic injustices:

○ Poverty • Causes → Lack of education → Wages in primary sector too low → Unemployment • Solutions → Basic income grant → Increase support to farmers → Skills programmes • Impact → Increased crime → Malnutrition → Increased illness → Low standard of living	○ Poor public transport • Impact → Frequent accidents → Pollution → Traffic congestion • Solutions → Improve bus routing → Upgrade taxi ranks → Dedicated public transport lanes → Introduce eco-friendly transport systems → Subsidies for public transport improvement
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Environmental injustices:

Type	cause	effect	solution
Air pollution	○ CO ○ Sulphur ○ Power stations ○ Domestic activities	○ Health problems ○ Acid rain ○ Destruction of ecosystems ○ Global warming	○ Electricity saving campaigns ○ Strict control of pollution by government ○ Use ozone friendly products ○ Extend green belts
Noise pollution	○ Industries ○ Airplanes ○ Traffic ○ Fire crackers	○ Hypertension and hearing loss ○ Reduces quality of life	○ Noise barriers ○ Altering flight paths ○ Restrict times of day for certain noise levels
Destruction of ecosystems	○ Population growth ○ Settlement expansion	○ Soil erosion ○ Pollution of freshwater	○ Legislation ○ Education ○ Buffering

Module 4

Economic Geography

1. Structure of the Economy

Primary sector:

- Concerned with extraction of raw materials from the environment
- E.g. farming, fishing, forestry, mining

Secondary sector:

- Activities that process raw materials into useful goods
- E.g. steel making, food canning, construction

Tertiary sector:

- Provision of services
- E.g. doctors, accountants, teachers, lawyers

Quaternary sector:

- Hi-tech sector linked to research and development
- E.g. scientists and researchers

GDP- total goods and services produced in a country in one year

GNP- total goods and services produced in a country by the permanent inhabitants in one year

Impact of load shedding on the economy:

- Negative impact on the economy
- If there is no electricity there won't be any production.
- Export will decline and will cause lower foreign exchange.
- Workers will earn less income and spend less in the commercial sector.
- Increase in prices because of shortage in production
- Importing of products because of short supply, will increase expenditure and result in a price increase of products.
- Service delivery will decline.

Initiatives to reduce demand for electricity:

- The private sector can reduce electricity demand through using it responsibly e.g. regulation of geyser, switch lights off.
- Public sector can use sustainable energy e.g. solar power to reduce electricity demand on Eskom.
- Educate people on sustainable electricity practices.

2. Agriculture

Contribution to SA economy:

- Food production- sufficient to meet demand rids need of imports
- Earner of foreign exchange- 10% of exports
- Contribution to GDP- farmers pay taxes
- Job creation- 10% of labour force employed
- Industrial development- stimulation of industries by high volume of raw materials

Role of small-scale and large-scale farmers:

	Small-scale farmers	Large-scale farmers
Description	Small but economically viable piece of land used with the purpose of making a profit.	Production of crops for local and overseas markets to make a profit
Inputs	○ Limited fertiliser ○ Manual labour ○ Some capital ○ Intensive farming	○ Fertilisers ○ Machinery ○ Large amounts of capital ○ Paid labour ○ GM seeds
Farm size	○ Small plots of intensive farming ○ Irrigation: weirs, small dams and pipes	○ Large plots of extensive farming ○ Irrigation schemes ○ Highly mechanised
Yield	○ Medium per hectare ○ Variety of crops	○ High per hectare ○ Monoculture
Importance	○ To reduce poverty in rural areas ○ To provide employment ○ Promotes food security	○ To produce large quantities of food for local and international markets ○ To provide employment
Problems	○ Poor infrastructure ○ Poorly financed ○ Lack of trained farmers ○ Limited to manual labour ○ No insurance for crop loss	○ Climate change ○ Increasing cost of labour ○ Lack of subsidies

Main products produced:

- Cattle:
 - EC, FS, KZN, LP and NC
 - Problems:
 - Foot and mouth disease and tick problems
 - Variable price of beef
 - Limited grazing due to SA's hot conditions
- Maize:
 - Highveld
 - Staple food of population
 - Earner of foreign exchange
 - Creates job opportunities
- Sugarcane:
 - Provides employment
 - Hulett, Illovo, TSB
 - Ideal growing conditions:
 - Long, warm growing season
 - Lots of sunlight and moisture
 - Dry, sunny and cool conditions for ripening

Factors favouring agriculture: ○ Trade opportunities (well-developed transport infrastructure) ○ Research ○ Climatic variation ○ Available labour supply ○ Government support	Factors hindering agriculture: ○ Climate change (effects on soil, water and temperature) ○ Droughts and floods ○ Diseases and pests ○ Fluctuating prices ○ Wild fires ○ Crime ○ Labour strikes ○ Lack of funding and training
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Food security:

- When enough nutritious food is produced to meet the needs of people
- Famine: lack of food, giving rise to starvation and malnutrition
- Importance:
 - Needed to maintain good health of people
 - Prevents social uprising
 - Prevents hunger and famine
 - Malnutrition can be prevented
- Factors affecting food security:

Negatively	Positively
○ Thin and infertile soils, soil erosion ○ Droughts and floods ○ Pests and diseases ○ Deforestation ○ Lack of capital ○ Poor infrastructure in rural areas ○ HIV infected workers	○ Greater variety of crops due to climatic variation ○ Government incentives ○ GM seeds

- Reasons for low food security index:

NATURAL	SOCIAL/SERVICES	ECONOMIC
• Drought • Climate change • Pests and diseases • Soil erosion	• Lack of water • Transport inaccessibility • Poor use of technology	• Inflation • Fluctuating food prices • Lack of commercial farmers

- Positive impact of food security:
 - Ensure high productivity of inhabitants
 - Reduces need to import
 - Prevents famine and hunger
 - Prevents social uprising
- Sustainable measures to ensure food security:
 - Use GM seeds
 - Invest in research to increase food production
 - Train farmers so that they can increase crop yield
 - Move away from monoculture
 - Rooftop farming in urban areas
 - Use drought resistant crops
 - Fund small-scale farmers

3. Mining**Contribution to SA economy:**

- Contribution to GDP:
 - mining companies pay tax
 - employment
 - foreign investment
 - increased skills development
 - generates infrastructure
 - production of raw material to country
- Industrial development:
 - demand for tools and machinery stimulates industries
 - community develops around mine
 - promotes industries that process products obtained from mining

- infrastructure development:
 - development of transport networks
 - better electricity supply due to demand
 - telecommunication networks improved

Significance of mining to development of SA:

- Discovery of diamonds started the mining industry
- Contributed to rapid urbanisation
- Established the JSE
- Led to development of secondary and tertiary industries as well as infrastructure

Main products produced:

Coal mining: ○ Most of SA's electricity is coal generated ○ Used by Mittal, SASOL and is exported ○ Challenges: • Labour strikes • Limited resource • Environmental issues	Platinum: ○ Large contribution to GDP ○ Labour strikes said to impact contribution to GDP ○ Challenges: • Declining competitiveness • Labour strikes • Union disputes • Hesitant investors	Gold: ○ Largest foreign income earner ○ Challenges: • Labour strikes • Diseases spreading in workforce due to mine conditions • Poor working conditions • Environmental problems
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Reasons for instability of mining industry:

- Labour unrest
- Load shedding
- Poor mine safety
- Dependence on foreign exchange markets
- Fluctuation market prices

Ways to reduce mine strikes:

- Profit sharing
- Communication improvement between management and workforce
- Improve working conditions
- Skills development programmes

Factors favouring mining ○ Variety of minerals ○ Large mineral reserves ○ Low production costs of surface minerals ○ Lower rock temperatures allow for deeper mining ○ Access to cheap labour ○ Government assistance	Factors hindering mining ○ Strikes and protests ○ Minimum wage increase ○ Transport costs ○ Fluctuating prices due to foreign exchange ○ Mine disasters ○ Distance to markets
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4. Secondary Sector

A: Contribution to SA economy

- Contribution to GDP- money is generated in the form of taxes
- foreign exchange- money from exports are used on imports for development of the country
- job creation- increases purchasing power of people and improves life quality

B: Types of industries

Heavy industries:

- large scale
- generates pollution
- outskirts of settlement
- close to bulk transport facilities
- uses lots of raw materials and energy
- e.g. Iscor (steel), oil refining, engineering

Light industries:

- small products manufactured
- close to CBD
- small areas used
- little pollution generated
- road transport used
- e.g. clothing manufacturers

Raw material orientated industries:

- locate close to source of raw materials since they are bulky and expensive to transport
- e.g. sugar mill

Market orientated:

- locate close to market/customers since goods produced are perishable
- e.g. cheese industry

Footloose industries:

- location not dictated by access to materials or markets
- service orientated
- no pollution generated
- highly skilled
- e.g. research companies

Ubiquitous industries:

- can locate anywhere
- fulltime services offered
- e.g. telecommunication services

Break-of-bulk industries:

- located between source of raw materials and customers, where transport type changes
- e.g. sugar refineries

C: Factors favouring industrial development in SA

Raw materials:

- wide range available in abundance

Labour supply:

- access to skilled and semiskilled labour
- access to tertiary education to skill labour force

water supply:

- close to water supply for industrial use (manufacturing or cooling machinery)
- water transfer schemes supplement water supply

Energy supply:

- large coal reserves for electricity generation
- industries locate close to source of energy

transport:

- well established transport infrastructure
- 8 seaports and 4 international airports

Political intervention:

- Government policies in place to support local industries
- Incentives given to industries

Competition and trade:

- International trade facilitated by harbours and airports
- No trade barriers
- Access to local and international markets promotes competition and trade

D: Factors hindering industrial development in SA

Over-concentration:

- Traffic congestion
- Higher rentals due to demand for land- lower profits
- Higher salary demands

Transport:

- Unreliable
- Repair of roads and railways is costly
- Markets are far away
- Isolated from most world markets
- High export costs make it hard for local industries to compete with industries close to large international markets

Labour supply:

- Brain drain results in loss of skilled workers, making it necessary to employ foreigners at high costs
- Lack of funding to uplift education results in lack of skilled labour force
- Workers demand higher pay by striking which hinders production

Air pollution:

- Industries have the responsibility to reduce air pollution since it is the main contributor.
- Effects of industrial pollution:
 - Negative impact on human health
 - Kills animals and plants
 - Causes imbalance in ecosystems
 - Degrades air quality
 - Damages buildings
 - Reduces quality of life
- Causes of air pollution:
 - Lack of policies to control air pollution:
Allows industries to bypass laws
 - Unplanned industrial growth:
In industrial towns, pollution level increases above norm
 - Use of outdated technology:
Industries rely on old technology that generates large amounts of waste
 - May small scale industries:
Escape environmental regulations and release more pollution than normal

Water supply:

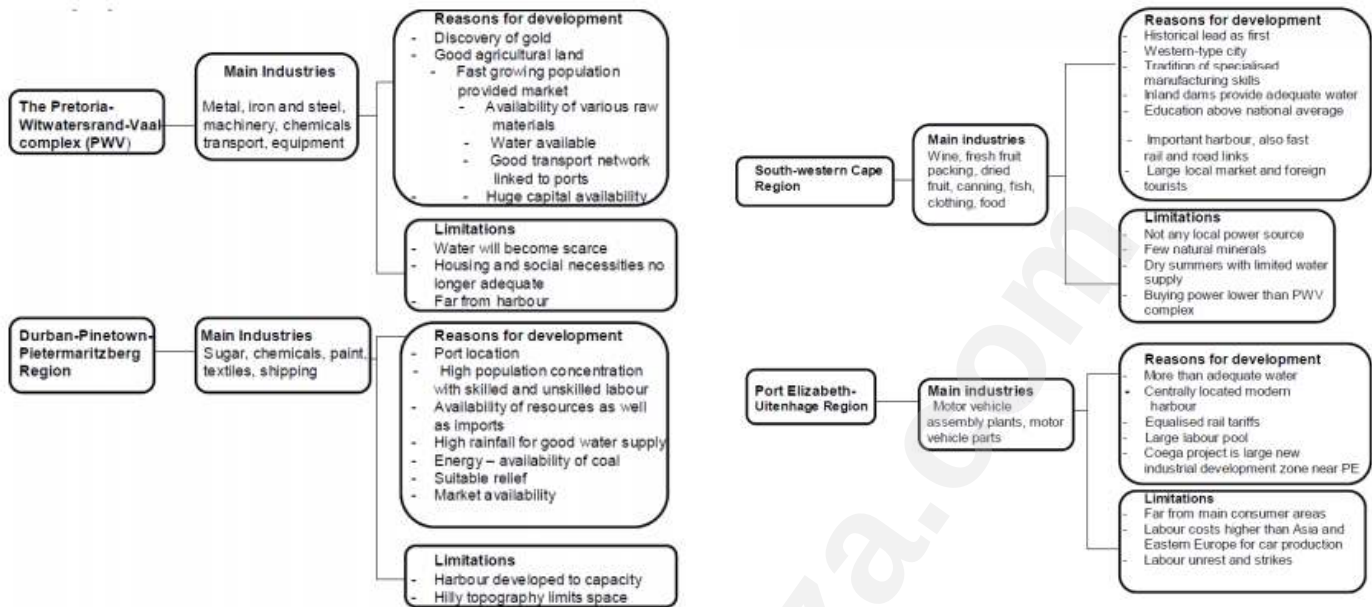
- Water is scarce in SA
- Large companies forced to recycle water
- Pollution is dumped into usable water
- Solutions:
 - Recycling and reusing water
 - Lowering toxicity in operations involving water
 - Make production process more water efficient

Raw materials:

- Use of imported raw materials increases production costs
- Cost of imports fluctuates with foreign exchange rate

Competition and trade:

- Local industries cannot compete with imported goods from china
- Fluctuating rand value creates instability

E: Four Core Industrial Areas of South Africa**PWV- Pretoria Witwatersrand Vereeniging (Gauteng):**

Factors favouring location	Factors hindering development	Main industrial activities
- Market - Dense population resulting in high demand for goods - High buying power - Transport - Dense network of roads and railways - Labour - Dense population-larger labor force - Raw materials - Gold - Iron ore - Maize - Platinum - Water - Eastern half- receives adequate rainfall - Vaal river water supplemented by TUGA water transfer schemes - Electricity - Cheap since coal is mined here - Short distance from source - Relief - On Highveld where land is flat - Easy for transport and construction	- Overuse of water from Vaal river - Pollution - Great distance from ports	- Chemical - Iron and steel - Metal processing - Explosives

Durban-Pinetown (eThekweni)

Factors favouring location	Factors hindering development	Main industrial activities
○ Market • Densely populated • High demand for manufactured goods ○ Transport • Harbour • Many links to rest of the country ○ Labour • Large labour force due to large population ○ Raw materials • Sugarcane • Dairy • Meat • Subtropical fruit ○ Water • Abundant rain • Presence of perennial rivers (Tugela & Umgeni) ○ Relief • Flat along coast	○ Capacity of harbour is limited ○ Hilly topography restricts growth of harbour	○ Oil and sugar refining ○ Ship building ○ Food and drink ○ Textiles ○ Footwear ○ Soap making

Benefits of local manufacturing instead of importing:

- It creates more employment opportunities.
- It developed and upgraded existing infrastructure.
- It brought in more foreign investment.
- Increase in employment resulted in an increase in the market.
- Exporting of these vehicles brought in more foreign exchange.
- More industries that were related to the motorcar industries developed.

South Western Cape

Factors favouring location	Factors hindering development	Main industrial activities
○ Market • High purchasing power • Coastal- access to large overseas markets ○ Transport • Table bay for overseas trade • Dense railway network for local links ○ Labour: • Dense population of skilled and unskilled ○ Raw materials: • Deciduous fruit • Grape • Fish ○ Relief: • Flat land	○ Electricity is expensive since coal fields are far away ○ Water shortages- located on the western half that receives less rainfall ○ Few mineral resources	○ Food processing ○ Textiles ○ Fish and fruit canning ○ Wine ○ Petrol refineries

F: Strategies for industrial development in SA

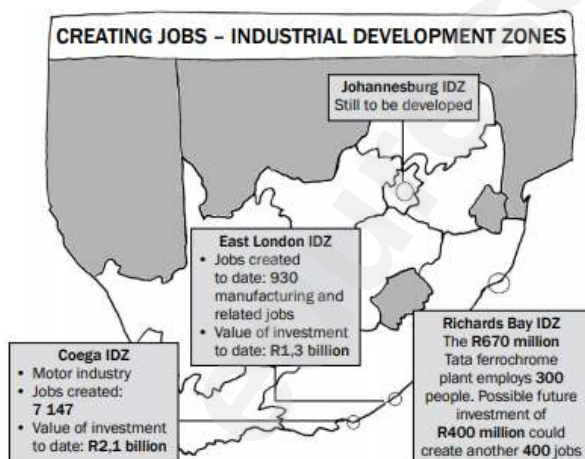
Overview of apartheid industrial development strategies

- *Good hope plan*
 - To spread economic wealth in SA
 - Lead to the regions making up the 9 provinces
 - De-concentration points created
 - Isolated industrial development points
 - Tax incentives to encourage industrial growth
 - Border industries created on homelands

Overview of post-apartheid industrial development strategies

- *Reconstruction and Development Programme (RDP)*
 - Improved quality of life
 - Redistribution of wealth, healthcare, jobs, and basic services
 - Aimed at local development
- *Growth, Employment and Redistribution (GEAR)*
 - Macro-economy policy
 - Focuses on redistribution of wealth to eliminate poverty
 - Attracts foreign investment
 - Focuses on country as a whole by:
 - Creating jobs
 - Increasing exports
 - Developing infrastructure
- *Accelerated and shared growth in SA*
- *National development plan*

Industrial development zones (IDZs)



- Specialised industrial zone
- Promotes competition and attracts foreign investment
- Locate near harbours and airports
- World-class infrastructure and industrial parks
- Government incentives offered (tax deductions and reduced import costs)
- Benefits of IDZs:
 - Provides job opportunities
 - Lowers crime rates
 - Improves infrastructure
 - Better housing

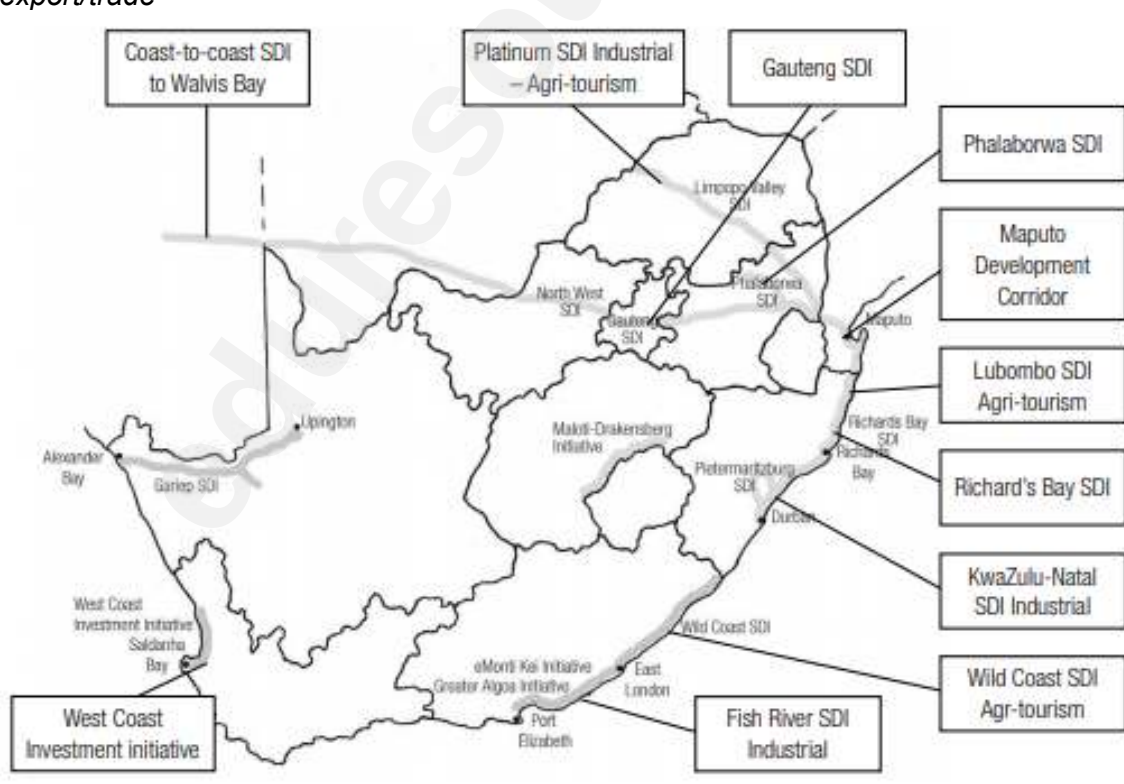
- How IDZs create opportunity for decentralisation:
 - Tax rebates
 - Well-developed infrastructure
 - Access to labour supply
 - Duty-free benefits on importing raw materials

- East London IDZ:

Industry types	○ Automotive ○ Marine aquaculture ○ Agro-processing ○ Pharmaceuticals ○ ICT & electronics and business processes
Advantages of location	○ Excellent transport ○ Automotive industry provides economic growth ○ Clustered industries reduce logistics cost ○ Close to ports
Incentives	○ Duty free imports for goods used in manufacturing ○ Zero VAT on supplies used to manufacture export goods ○ Discounted utility services and affordable land prices
Flaws	○ Lack of skilled labour ○ Poor harbour facilities ○ Limited electricity supply ○ High demand for water

Spatial development initiatives (SDIs)

An area along a major transport route linking major markets with harbours for the purpose of export/trade



- Development corridor: development along a major transport route
- Links IDZs

- Provides communities with opportunities to participate in economic activities
- Promotes job creation
- Promotes use of local resources to generate economic growth
- Benefits of SDIs on local economy:
 - Generates economic growth
 - Generates employment
 - Promotes skills development
 - Upgrades infrastructure
 - Better standard of living

- Phalaborwa SDI

Location	○ Limpopo ○ Favourably situated for economic links with other countries ○ Runs through Great North Road
Resources	○ Platinum, iron ore, coal, diamonds ○ Wood ○ Mangoes, papayas, avocados, potatoes
Objectives	○ Use underutilised resources sustainably ○ Develop small-scale mining ○ Integrate urban and rural areas ○ Promote tourism
Challenges	○ Poverty and unemployment ○ Unmaintained roads ○ Poor infrastructure ○ Lack of clean water

Environmental impact of tourism:

POSITIVE	NEGATIVE
○ More conservation will take place, e.g. national parks ○ More money will be made available for conserving the natural environment ○ Importance of conserving the natural environment by the locals will be emphasised ○ Ecosystems will be protected ○ Biodiversity will be protected	○ Removal of natural vegetation to build infrastructure ○ Damage to natural environment by tourists ○ Development of illegal game farms (canned hunting)

Ways to ensure sustainability of both SDI and the natural environment:

- Involve the community in the development and conservation initiatives.
- Create awareness of sustainable methods of development.
- Conduct sufficient impact studies before the development strategies are finalised.
- Invest in local businesses for their expertise.
- Encourage recycling.
- Create incentives for the people to adhere to the rules that limit the impact on the natural environment and resources.
- Use environmentally friendly energy sources such as solar or wind energy.

○ West Coast SDI

Location	○ Stretches from Cape Town to Northern Cape border
Resources	○ Rich in avian resources- Lambert's Bay Waterfront ○ Cultural heritage ○ Fish ○ Rich in biodiversity ○ fruit
Objectives	○ protect west coast environment ○ promote job opportunities and economic growth ○ develop social well-being of people ○ promote infrastructure development
Challenges	○ lack of technical skills ○ inadequate marketing ○ growing informal settlements ○ xenophobia ○ sand mining decreases tourism

G: Industrial centralisation and decentralisation

Advantages of centralisation	Disadvantages of centralisation
○ 4 core areas highly developed ○ Clustering of similar industries ○ Infrastructure and service network establishment ○ Good market ○ Large labour force	○ Uneven spread of wealth ○ Peripheral areas remain underdeveloped ○ Congestion and pollution ○ Social problems ○ Labour issues due to poor living conditions ○ Demand for housing ○ Declination of rural towns

Decentralisation			
Reasons to move out of urban areas	Effects	Reasons to move into rural areas	Effects
○ Depletion of primary resources ○ Decreased demand ○ Functional magnetism	○ Job losses ○ New office parks ○ Urban blight	○ Available land ○ Cheaper land ○ Closer to market	○ Improved infrastructure ○ Improved services ○ Job creation

Benefits of decentralisation on core areas:

- Relieves pressure on infrastructure
- Less pollution
- Less pressure on services
- Reduces rural-urban migration
- Reduces overcrowding

impact of decentralisation on CBD:

POSITIVE	NEGATIVE
○ CBD less overcrowded ○ Less traffic ○ CBD attractive for investors	○ Urban decay ○ Illegal occupation of vacant buildings ○ City is unattractive

5. Tertiary sector

- Involve selling of goods and provision of services
- Hairdressers, doctors, internet cafes, repair companies

Contribution to SA economy:

- Provides employment to skilled population
- Contributes to GDP via tax
- Provides population with higher incomes and better standard of living
- Encourages growth of financial and business services

The role of international trade in economic development:

- Benefits of international trade
 - Access to foreign currency
 - Variety of goods for consumers
 - Promotes competition
 - Better international relations
 - Exchange of technical knowhow
 - Increases sales and profits
- Disadvantages of international trade:
 - Local production suffers
 - Rich countries influence poorer nations and take control

The role of transport in economic development:

- Dense transport infrastructure results in high level of development
- Better accessibility to markets
- Efficient transport reduces costs
- Provides employment
- Encourages domestic and international trade

Ways to increase trade:

- Exporting more processed goods
- Improving skills development in the country to increase production
- Improving the marketing of South African goods

Advantages of more exports than imports:

ECONOMIC	SOCIAL
○ More investments in the country ○ Foreign currency entering the country ○ Stronger value of the rand ○ More job opportunities available in the country ○ Larger domestic market available	○ More money available to build schools and health services ○ More money available for social grants ○ More job opportunities therefore less poverty ○ More houses can be built

6. Informal sector

- Definition: unregistered workers
- Characteristics
 - Self-employed workers
 - Casual labour
 - Unskilled or semiskilled workers
- Importance:
 - Provides income and reduces unemployment
 - Consumers can buy goods in small quantities cheaply
 - Allows for people to grow entrepreneurial skill
- Reasons for development:
 - Large scale job losses due to mechanisation
 - Many people lack formal qualifications and they cannot get jobs in formal sector
 - Immigrants cannot find legal employment
- Problems faced:
 - Traders harassed by authorities
 - Traders lack access to proper trading facilities
 - Unreliable income
 - Banks do not grant loans to traders
- Measures to improve informal sector:
 - Introduce licensing requirements
 - Dedicate areas for informal trading
 - Provide infrastructure for traders
 - Provide easier access to bank loans

ADVANTAGES OF INFORMAL TRADING	DISADVANTAGES OF INFORMAL TRADING
○ More people can earn a living ○ Lower unemployment rate ○ People can become semiskilled ○ Means through which people can escape poverty	○ Lowers income of formal businesses ○ Associated with illegal imports ○ Little to no GDP contribution ○ Dirty environment creates health hazard

Written by Zaid Ganie, in accordance with The Department of Basic Education, Geography Examination Guidelines, Grade 12, 2017.