Grade 12 Geography: Climate & Weather Study Guide

Grade 12 | Geography | Study Guide | 2024

Free Study Resources for South African Matric Learners

1. South Africa's Climate

- Most of SA is semi-arid to arid; Mediterranean climate in SW Cape (winter rainfall)
- Interior plateau: hot summers, cold winters, summer rainfall (convection)
- KwaZulu-Natal coast: subtropical; year-round rainfall (orographic + convection)
- West coast: cold Benguela Current; cold, foggy; little rain (atmospheric stability)
- East coast: warm Agulhas Current; warm, humid; more rainfall

2. Factors Affecting Climate

- Latitude: closer to equator = warmer; tropical regions have more solar energy
- Altitude: temperature falls ~6.5 degC per 1000 m (environmental lapse rate)
- Ocean currents: warm currents = more rainfall; cold currents = aridity
- Distance from sea (continentality): inland areas = greater temperature range
- Prevailing winds: moisture from oceans increases rainfall
- Aspect: south-facing slopes (SA) receive less sun = cooler and wetter

3. Types of Rainfall

- Convectional: intense heating causes air to rise; forms cumulonimbus clouds; afternoon thunderstorms common on SA plateau
- Orographic (relief): moist air forced to rise over mountains; rain on windward side; rain shadow on leeward side
- Frontal (cyclonic): cold and warm air masses meet; warm air forced to rise over cold; widespread gentle rain

4. Global Climate Change

Enhanced greenhouse effect: increased CO2, CH4, N2O from fossil fuels, deforestation -> more heat trapped -> global warming.

Effects on SA

- More frequent and intense droughts and heatwaves
- Changed rainfall patterns: some areas wetter, others drier
- Sea level rise threatening coastal cities
- Increased intensity of extreme weather events
- Threat to biodiversity: biome shifts, species extinction

Responses

- Mitigation: reducing emissions (renewable energy, energy efficiency)
- Adaptation: adjusting to changes (drought-resistant crops, sea walls, water conservation)
- International agreements: Paris Agreement (limit warming to 1.5 degC)
- SA NDC: Nationally Determined Contribution under Paris Agreement

TIP Greenhouse gases in order of importance: Water vapour (H2O), Carbon dioxide (CO2), Methane (CH4), Nitrous oxide (N2O). CO2 is most significant due to human activities.