

Exam 3 Study Guide: Geology and the Environment

Chapter 11: Glaciation and Long Term Climate Change

- 1) Alpine vs. Continental Glaciers
 - a. Valley, Piedmont, and Cirque glaciers
 - b. Ice Sheets
 - c. Ice Caps
- 2) Glacial Budgets
- 3) Erosional Landscapes Associated With Alpine Glaciation
- 4) Depositional Features Associated with Glaciation
- 5) The Effects of Glaciation
 - a. Soils
 - b. Groundwater and Outwash
 - c. Sealevel Change
 - d. Isostasy
 - e. Human Transportation Routes
 - f. Pleistocene Lakes
 - i. Pluvial
 - ii. Proglacial
- 6) Causes of Climate Change
 - a. Variations in the Earth's Orbit: Milankovitch-Kroll Cycles
 - b. Atmospheric Gases, such as Carbon Dioxide
 - c. Variations in Solar Radiation
 - d. Plate Tectonic Influence
 - e. Dust and Aerosols
 - f. Changes in Ocean Currents
- 7) Evidence of Global Warming
 - a. Increasing Temperatures
 - b. Glacial Change
 - c. Thawing of subarctic regions
 - d. Rising Sea Level
 - e. Biological Responses
 - f. Thinning of Polar Ice Caps
- 8) Projections of the Scientific Community
 - a. Very Probable
 - b. Probable
 - c. Uncertain
- 9) Case Studies

Chapter 12: Arid Lands and Desertification

- 1) Kinds of Deserts
 - a. Polar
 - b. Subtropical
 - c. Mid-Latitude

- d. Rainshadow
 - e. Coastal
- 2) Causes of Desertification
 - a. Overgrazing
 - b. Trampling by Livestock
 - c. Clearcutting of Land without Restoration
 - d. Surface Mining without Reclamation
 - e. Depletion of Groundwater
 - f. Replacement of Natural Vegetation with Cultivated Crops
 - g. Soil Salinization due to Evaporation of Irrigation Water
- 3) Arid Regions, Winds and Human Health
- 4) Case Studies

Chapter 13: Mineral Resources and Society

- 1) Mineral Reserves vs. Mineral Deposits
- 2) Origins of Mineral Deposits
 - a. Igneous Processes
 - b. Sedimentary Processes
 - c. Weathering Processes
 - d. Metamorphic Processes
- 3) Mineral Resources
 - a. Metallic Minerals
 - b. Nonmetallic Minerals
 - i. Industrial
 - ii. Agricultural
 - iii. Construction Materials
- 4) Mining and its Environmental Impacts
 - a. Impacts of Coal Mining
 - b. Impacts of Underground Mining
 - c. Impacts of Surface Mining
- 5) Impacts of Mineral Processing
 - a. Separation Methods
 - i. Flotation
 - ii. Gravity
 - iii. Chemical
 - 1. Leaching
 - 2. Cyanide
 - b. Smelting
- 6) Mine Land Reclamation
- 7) The Future of Mining
- 8) Case Studies

Chapter 14: Energy and the Environment

- 1) The Energy Equation

- 2) Petroleum
 - a. Origin and Accumulation of Hydrocarbon Deposits
 - i. Source Rock
 - ii. Reservoir Rocks
 - iii. Caprock
 - b. Geologic Traps
 - i. Structural Traps
 - ii. Stratigraphic Traps
 - c. Oil Production and Drilling
 - d. Quality, Price and the Future of Oil
- 3) Coal
 - a. Coalification and Rock
 - b. Reserves and Production
- 4) Non-Conventional Fossil Fuels
 - a. Tar Sands
 - b. Oil Shales
- 5) Problems of Fossil Fuel Combustion
 - a. Air Pollution
 - i. Sulfur Emissions and Acid Rain
 - ii. Nitrogen Oxides and Smog
 - iii. Domestic Coal Burning
 - b. Mine Collapses
- 6) Energy For the Future
 - a. Direct Solar Energy
 - b. Indirect Solar Energy
 - i. Wind
 - ii. Hydroelectric
 - c. Geothermal
 - d. Nuclear
 - e. Energy From the Sea
 - i. OTEC
 - ii. Wave
 - iii. Tidal Currents
- 7) Case Studies

Chapter 15: Waste Management and Geology

- 1) Municipal Waste Deposal Methods
 - a. Sanitary Landfills
 - b. Incineration
 - c. Ocean Dumping
- 2) Problems of Municipal Waste Isolation
 - a. Stabilization
 - b. Gas Generation
 - c. Leachate
- 3) Recycling

- 4) Composting
- 5) Hazardous Waste Disposal Methods
 - a. Secure Landfills
 - b. Deep-well Injection
- 6) Superfund
- 7) Nuclear Waste
 - a. High Level Wastes
 - b. Low-Level Wastes
 - c. Mill Tailings
- 8) Isolation of Nuclear Waste
 - a. Yucca Mountain
 - b. Health and Safety
- 9) Case Studies

I will ask you eight essay questions from this list of topics. You will be only required to answer five of those questions. There will also be a bonus question. The essay section of the test is worth 50 points. The multiple choice part of the exam is also worth 50 points.