AP Exam Review
APES

Earth Systems and Resources (10-15% of exam)

Earth Science

- Geologic Time Scale
- Earth Structure (crust-continental and oceanic, mantle, core)
- Plate Tectonics/Continental Drift (convergent boundaries, divergent boundaries, transform faults)
- Rock Cycle
- Earthquakes
- Tsunamis
- Volcanos
- Seasonality/Solar intensity
- Soil composition (horizons, sand-silt-clay, fertilization-organic vs. inorganic)
- Erosion (desertification, salinization, water-logging)

Atmosphere

- Composition
- Structure/Layers
- Factors that influence climate
- Convection cells
- El Nino and La Nina

Water Resources

- Fresh vs. Saltwater
- Aquifers
- Agricultural irrigation
- Surface and groundwater problems
- Methods to conserve water

The Living World (10-15% of exam)

Ecosystems

- Populations and communities (dispersion patterns, ecological niches)
- Species interactions (commensalism, competition, mutualism, parasitism, predation)
- Keystone species
- Species diversity and adaptations to environments
- Edge effects
- Major terrestrial and aquatic biomes
- Photosynthesis and cellular respiration
- Food webs and tropic levels
- Factors that increase/decrease biodiversity
- Natural selection (stabilizing, directional, disruptive)
- Evolution (speciation, convergent evolution)
- Ecosystem services
- Ecological succession

Biogeochemical Cycles

- Carbon cycle
- Nitrogen cycle (nitrogen fixation, denitrification)
- Phosphorus cycle
- Sulfur cycle
- Water cycle

Population (10-15% of exam)

- Carrying Capacity
- Reproductive strategies (K-selected vs. r-selected)
- Survivorship curves
- Human population distribution
- Fertility rates (TFR)
- Doubling time (rule of 70)
- Demographic transition (pre-industrial, transitional, industrial, post-industrial)
- Age structure diagrams
- Impacts of population growth
- Disease impacts

Land and Water Use (10-15% of exam)

- Human nutritional requirements
- Types of agriculture (agroforestry, alley cropping, crop rotation, industrial agriculture, intercropping, low-till, monoculture, polyculture, organic farming, plantation, subsistence)
- Green revolution (especially criticisms)
- Genetic engineering
- Irrigation
- Sustainable agriculture
- Controlling pests (biological pesticides, chemical pesticides)
- Integrated Pest Management
- Forest ecological services
- Old growth forests
- Forest fires (surface fires, crown fires)
- Deforestation
- Rangelands (overgrazing, desertification, rangeland management)
- Urbanization (suburban sprawl)
- Federal lands (national parks, wildlife refuges, wetlands)
- Mining
- Global reserves (oil, coal, natural gas)
- Fishing (trawling, drift nets, long lines, purse seine)
- Overfishing
- Aquaculture
- Tragedy of the Commons

Energy and Resource Consumption (10-15% of exam)

- Metric conversions
- First and Second Law of Thermodynamics
- Fossil fuel extraction and reserves (coal, oil, natural gas)
- Advantages and disadvantages of each fossil fuel
- Clean coal
- Oil shale
- Tar sands
- OPEC
- Nuclear fuel sources
- Nuclear fission reaction
- Nuclear reactors
- Advantages and disadvantages of nuclear energy
- Hydroelectric power methods (advantages and disadvantages)
- CAFE standards
- Hybrid vehicles
- Mass Transit (advantages and disadvantages)
- Renewable energy sources advantages and disadvantages (solar, hydrogen fuel cells, biomass, wind, hydroelectric and tidal, geothermal)

Pollution (25-30% of exam)

Air Pollution

- Sources
- Major air pollutants (Nitrogen oxides, ozone, PANs, sulfur dioxide, SPM, VOCs)
- Smog
- Acid deposition
- Heat islands
- Indoor air pollution

Noise Pollution

Water Pollution

- Sources
- Cultural Eutrophication
- Groundwater pollution
- Water purification
- Wastewater treatment (primary, secondary, tertiary)

Solid Waste (advantages and disadvantages of each)

- Incineration
- Composting
- Sanitary Landfills
- Open Dumping
- Ocean Dumping
- Recycling
- Reuse

Toxicology/Human Health

- Acute vs. Chronic Effects
- Dose-Response Curves
- LD_{50}
- Major air pollutant effects (asbestos, carbon monoxide, lead, nitrogen oxides, ozone, SPM, sulfur dioxide)
- Treatment and cleanup of contaminated sites
- Bioaccumulation
- Biomagnification

Global Change (10-15% of exam)

Stratospheric ozone

- What does it do?
- How is it formed?
- How is it depleted? What effects does depletion have?
- How can depletion be reduced?
- CFCs

Climate Change/Global Warming

- Causes/benefits of natural greenhouse effect
- Greenhouse gasses
- Consequences
- Methods of reduction

Loss of Biodiversity/Endangered Species

Introduced Species

Important Laws/Treaties

- Soil Erosion Act - 1935
- Federal Insecticide, Fungicide, and Rodenticide Control Act (FIFRA) - 1947
- Convention on International Trade in Endangered Species (CITES) - 1963
- Clean Air Act - 1963
- Solid Waste Disposal Act - 1965
- Clean Water Act - 1972
- Safe Drinking Water Act - 1974
- Endangered Species Act - 1973
- Toxic Substances Control Act - 1976
- Surface Mining Control and Reclamation Act - 1977
- Comprehensive Environmental Response, Compensation and Liability (CERCLA or SUPERFUND) - 1980
- Pollution Prevention Act - 1990
- Food Quality Protection Act (FQPA) - 1996
- Kyoto Protocol - 1997