**APES EXAM REVIEW IN CRUNCH**

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|  | **Unit** | **Bozeman Science**  |
|  | **I. EARTH SYSTEMS AND RESOURCES (10-15%)**1. **Earth Science Concepts** (*Geologic time scale; plate tectonics, earthquakes, volcanism; seasons; solar intensity and latitude)*
2. **The Atmosphere** *(Composition; structure; weather and climate; atmospheric circulation and the Coriolis Effect; atmosphere- ocean interactions; ENSO)*
3. **Global Water Resources and Use** (*Freshwater/saltwater; ocean circulation; agricultural, industrial, and domestic use; surface and groundwater issues; global problems; conservation)*
4. **Soil and Soil Dynamics** *(Rock cycle; formation; composition; physical and chemical properties; main soil types; erosion and other soil problems; soil conservation)*
 | * [**002 - Environmental Systems**](http://www.bozemanscience.com/ap-es-002-environmental-systems)
* [**003 - Geology**](http://www.bozemanscience.com/ap-es-003-geology)
* [**004 - The Atmosphere**](http://www.bozemanscience.com/ap-es-004-the-atmosphere)
* [**005 - Water Resources**](http://www.bozemanscience.com/ap-es-005-water-resources)
* [**006 - Soil**](http://www.bozemanscience.com/ap-es-006-soil-soil-dynamics)
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|  | **II. THE LIVING WORLD (10-15%)**1. **Ecosystem Structure** (Biological populations and communities; ecological niches; interactions among species; keystone species; species diversity and edge effects; major terrestrial and aquatic biomes)
2. **Energy Flow** (Photosynthesis and cellular respiration; food webs and trophic levels; ecological pyramids)
3. **Ecosystem Diversity** (Biodiversity; natural selection; evolution; ecosystem succession)
4. **Natural Ecosystem Change** (Climate shifts; species movement; ecological succession)
5. **Natural Biogeochemical Cycles** (Carbon, nitrogen, phosphorous, sulfur, water, conservation of matter)
 | * [**007 - Ecosystem Ecology**](http://www.bozemanscience.com/ap-es-007-ecosystem-ecology)
* [**008 - Energy Flow in Ecosystems**](http://www.bozemanscience.com/ap-es-008-energy-flow-in-ecosystems)
* [**009 - Ecosystem Diversity**](http://www.bozemanscience.com/ap-es-009-ecosystem-diversity)
* [**010 - Natural Ecosystem Change**](http://www.bozemanscience.com/ap-es-010-natural-ecosystem-change)
* [**011 - Biogeochemical Cycles**](http://www.bozemanscience.com/ap-es-011-biogeochemical-cycles)
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|  | **III. POPULATION (10-15%)**1. **Population Biology Concepts** (Population ecology; carrying capacity; reproductive strategies; survivorship)
2. **Human Population**
3. **Human Population Dynamics** (Historical population sizes; distribution; fertility rates; growth rates and doubling times; demographic transition; age-structure diagrams)
4. **Population Size** (Strategies for sustainability; case studies; national policies)
5. **Impacts of Population Growth** (Hunger; disease; economic effects; resource use; habitat destruction)
 | * [**012 - Population Ecology**](http://www.bozemanscience.com/ap-es-012-population-ecology)
* [**013 - Human Population Dynamics**](http://www.bozemanscience.com/ap-es-013-human-population-dynamics)
* [**014 - Human Population Size**](http://www.bozemanscience.com/ap-es-014-human-population-size)
* [**015 - Human Population Impacts**](http://www.bozemanscience.com/ap-es-015-human-population-impacts)
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|  | **IV. LAND AND WATER USE (10-15%)**1. **Agriculture**
2. **Feeding a growing population** *(Human nutritional requirements; types of agriculture; Green Revolution; genetic engineering and crop production; deforestation; irrigation; sustainable agriculture)*
3. **Controlling pests** *(types of pesticides; costs and benefits of pesticide use; integrated pest management; relevant laws)*
4. **Forestry** (*Tree plantations; old growth forests; forest fires; forest management; national forests)*
5. **Rangelands** *(Overgrazing; deforestation; desertification; rangeland management; federal rangelands)*
6. **Other Land Use**
7. **Urban Land Development** *(Planned Development; suburban sprawl; urbanization)*
8. **Transportation Infrastructure** *(Federal highway system; canals and channels; road less areas; ecosystem impacts)*
9. **Mining** *(Mineral formation; extractional; global reserves; relevant laws and treaties)*
10. **Fishing** *(Fishing techniques; over fishing; aquaculture; relevant laws and treaties)*
11. **Global Economics** *(Globalization; World Bank; Tragedy of the Commons; relevant laws and treaties)*
 | * [**016 - Agriculture**](http://www.bozemanscience.com/ap-es-016-agriculture)
* [**017 - Forestry & Rangelands**](http://www.bozemanscience.com/ap-es-017-forestry-rangelands)
* [**018 - Land Use**](http://www.bozemanscience.com/ap-es-018-land-use)
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 | * [**019 - Mining**](http://www.bozemanscience.com/ap-es-019-mining)
* [**020 - Fishing**](http://www.bozemanscience.com/ap-es-020-fishing)
* [**021 - Environmental Economics**](http://www.bozemanscience.com/ap-es-021-environmental-economics)
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|  | **V. ENERGY RESOURCES AND CONSUMPTION (10-15%)**1. **Energy Concepts** (Energy forms; power; units; conversions; Laws of Thermodynamics)
2. **Energy Consumption**
3. **History (Industrial Revolution)**
4. **Present Global energy use**
5. **Future energy needs**
6. **Fossil Fuel Resources and Use** (Formation of coal, oil and natural gas; extraction/purification methods; world reserves and global demands; synfuels; environmental advantages/ disadvantages of sources)
7. **Nuclear Energy** (Nuclear fission processes; nuclear fuel; electricity production; nuclear reactor types; environmental advantages/disadvantages; safety issues; radiation and human health; radioactive wastes; nuclear fission)
8. **Hydroelectric Power** (Dams; flood control; salmon; silting; other impacts)
9. **Energy Conservation** (Energy efficiency; CAFE standards; hybrid electric vehicles; mass transit)
10. **Renewable Energy** (Solar energy; solar electricity; hydrogen fuel cells; biomass; wind energy; small-scale hydroelectric; ocean waves and tidal energy; geothermal; environmental advantages/disadvantages)
 | * [**022 - Energy Concepts**](http://www.bozemanscience.com/ap-es-022-energy-concepts)
* [**023 - Energy Consumption**](http://www.bozemanscience.com/ap-es-023-energy-consumption)
* [**024 - Fossil Fuel Resources**](http://www.bozemanscience.com/ap-es-024-fossil-fuel-resources)
* [**025 - Nuclear Energy**](http://www.bozemanscience.com/ap-es-025-nuclear-energy)
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 | * [**026 - Hydroelectric Power**](http://www.bozemanscience.com/ap-es-026-hydroelectric-power)
* [**027 - Energy Reduction**](http://www.bozemanscience.com/ap-es-027-energy-conservation)
* [**028 - Renewable Energy**](http://www.bozemanscience.com/ap-es-028-renewable-energy)
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|  | **VI. POLLUTION (25-30%)**1. **Pollution Types**
2. **Air Pollution** (*Sources- primary and secondary; major air pollutants; measurement units; smog; acid deposition- causes and effects; heat islands and temperature inversions; indoor air pollution; remediation and reduction strategies; Clean Air Act and other Relevant Laws)*
3. **Noise Pollution** *(Sources; effects; Control Measures)*
4. **Water Pollution** *(Types; sources, causes, and effects; cultural eutrophication; groundwater pollution; maintaining water quality; water purification; sewage treatment/septic systems; Clean Water Act and other relevant laws)*
5. **Solid Waste** *(Types; disposal; reduction)*
6. **Impacts on the Environment and Human Health**
7. **Hazards to human health** *(Environmental risk analysis; acute and chronic effects; dose-response relationships; air pollutants; smoking and other risks)*
8. **Hazardous chemicals in the environment** *(Types of hazardous waste; treatment/disposal of hazardous waste; cleanup of contaminated sites; biomagnification; relevant laws )*
9. **Economic Impacts** *(Cost-benefit analysis; externalities; marginal costs; sustainability)*
 | * [**029 - Air Pollution**](http://www.bozemanscience.com/ap-es-029-air-pollution)
* [**030 - Water Pollution**](http://www.bozemanscience.com/ap-es-030-water-pollution)

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 **C. Economic Impacts** *(Cost-benefit analysis; externalities; marginal costs; sustainability)* | * [**031 - Solid Waste**](http://www.bozemanscience.com/ap-es-031-solid-waste)
* [**032 - Health Impacts of Pollution**](http://www.bozemanscience.com/ap-es-032-health-impacts)
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|  | **VII. GLOBAL CHANGE (10-15%)**1. **Stratospheric Zone** *(Formation of stratospheric ozone; ultraviolet radiation; causes of ozone depletion; strategies for reducing ozone depletion; relevant laws and treaties)*
2. **Global Warming** (*Greenhouse gases and the greenhouse effect; impacts and consequences of global warming; reducing climate change; relevant laws and treaties)*
3. **Loss of Biodiversity**
4. Habitat loss; overuse; pollution; introduced species; endangered and extinct species
5. Maintenance through conservation
6. Relevant laws and treaties
 | * [**033 - Stratospheric Ozone**](http://www.bozemanscience.com/new-page)

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 | * [**034 - Global Climate Change**](http://www.bozemanscience.com/ap-es-034-global-climate-change)
* [**035 - Loss of Biodiversity**](http://www.bozemanscience.com/ap-es-035-loss-of-biodiversity)
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| **5/10 APES TEST DAY – Bring an ID.****ARE YOU READY TO SCORE A 5?****Reminders: #2 pencil, blue pen, sweater/jacket in case its cold** |