AP Environmental Science Syllabus

AP Environmental Science Course Description and Schedule

Text: Environmental Science for AP by Friedland and Relyea

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| **Area** | | **Ch**  **in**  **Text** | **Assessment** | **Labs** | **Targeted Completion Date** |
| Summer Work | How it all began!  Read Rachel Carson’s “Silent Spring” | - | Questions:  Several open ended questions dealing with the chapters in the book and relating how students felt before and after reading each chapter. | Lab 1- Introduction to ecology through plants | (2 days) |
| I. Introduction | A. Ecosystem ecology – study whole to understand parts (holistic) | 3 | Lab Data and Questions | Lab-Tulpehocken Creek -physical | (5 days) |
| B. Population ecology – study parts to understand whole | 6 |  |
| C. What, How, Why? Complexity | 1,2 |  |
| D. Practical application |  |
| II. Natural Selection | A. Geologic history of earth  1. Precambrian era  2. Paleozoic era  3. Mesozoic era  4. Cenozoic era | 5,8 | Chapter Review  Lab Data and Questions | Lab-Tulpehocken Creek-Chemical | (8 days) |
| B. Evolution of life  1. Precambrian era  2. Paleozoic era  3. Mesozoic era  4. Cenozoic era | Chapter Review  Lab Data and Questions | Lab-Blue Marsh Dam-Phys. & Chem. |
| C. Natural selection  1. Adaptation  2. Variation  a. statistical analysis  b. sources of variation  3. Types of selection  4. Genetics of small populations | Chapter Review  Lab Data and Questions  Test on History of Earth | Lab-Cacoosing Creek-Phys. & Chem. | (5 days) |
| D. Species and speciation  1. Allopatric  2. Sympatric  3. Parapatric  4. Isolating mechanisms  5. Adaptive radiation  6. Gradualism vs. punctualism | Lab Data and Questions  Take home test on speciation | Lab-Cacoosing Creek-Biol. | (6 days) |

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| III. Conditions for Life | A. Homeostasis | 4 | Chapter Review  Lab Data and Questions | Lab-Tulpehocken Creek-Biol | (15 days) |
| B. Sun | Lab Data and Questions | Lab- Cacoosing Creek-Fish Shocking |
| C. Climate  1. Atmospheric movement  2. Relative humidity  3. Ocean currents  4. El Nino | Lab Data and Questions  Comparative write-up on status of Cacoosing vs Tulpehocken Creeks | Lab-Hawk Mtn.-raptor migration |
| D. Microclimates | Test on air and water flow on Earth |  |
| E. Climate modification |  |  |
| V. Temperature | A. Movement of heat | 3,6 | Lab Data and Questions | Lab-Population Studies-Middle Creek | (15 days) |
| B. Thermoregulation in animals  1. Poikilothermy  2. Homeothermy  3. Body size | Chapter Review  Lab Data and Questions | Lab-Deciduous Forest-Penn State |
| C. Heat strategies  1. Behavioral  2. Morphological  3. Physiological  a. continuously active  b. periodically inactive | Chapter Review  Lab Data and Questions  Test on Thermoregulation | Lab-Coniferous Forest-Penn State |
| D. Plant adaptations to temperature |  |  |
| V. Moisture | A. Physical properties of water | 9 | Chapter Review  Lab Data and Questions | Lab- succession- Lake Ontelaunee | (12 days) |
| B. Plant response to moisture |  | Lab-Population sampling techniques |
| C. Animal response to moisture | Lab Data and Questions |
| D. Salinity |  |  |
| E. Temperature moisture interaction |  |  |
| VI. Light | A. Nature of light | 3 |  |  | (11 days) |
| B. Shade tolerance | Lab Data and Questions | Lab-Snow Goose Ecology and Population sampling - Ontelaunee |
| C. Light in water |  |  |
| D. Photosynthesis  1. C3 cycle  2. C4 cycle  3. C.A.M. cycle | Lab Data and Questions  Lab paper on comparison of Jamaica waters to New York waters | Lab-Tropical Ecology- St. Ann’s Bay, Jamaica |
| E. Periodicity  1. Biological clocks  2. Daily  3. Annual  4. Other | Chapter Review  Lab Data and Questions  Test on Light | Lab-Population density and biomass |
| VII. Production in Ecosystems | A. Energy and thermodynamics |  | Lab Data and Questions | Lab-Avian Ecology and Identification-3 labs | (13 days) |
| B. Primary productivity  1. GPP vs. NPP  2. Shoot to root  3. Vertical distribution |  | Lab Data and Questions | Lab-NPP-Blue Marsh |
| C. Secondary productivity |  | Chapter Review  Test on Productivity |  |
| VIII. Trophic structure | A. Food webs  1. Components  2. Major food “chains” | 3 | Lab Data and Questions | Lab-Microclimates-Blue Marsh | (7 days) |
| B. Nutrient flow | Chapter Review |  |
| IX. Soil | A. Soil development  1. Physical weathering  2. Biological weathering  3. Chemical weathering  4. Soil horizons | 8 | Lab Data and Questions | Lab-Deciduous and Coniferous Soil-Penn State Berks | (12 days) |
| B. Soil profiles | Lab Data and Questions | Lab-Agricultural Soil-Hartman’s farm |  |
| C. Soil characteristics  1. Chemistry  2. Texture  3. Moisture | Chapter Review  Lab paper on comparison of soils in different forests vs agricultural fields. |  |
| D. Soil as an environment |  |  |
| E. Erosion |  |
| X. Ecosystems- (soil, climate, vegetation, animal life, human impact) | A. Grasslands | 4 | Chapter Review  Lab Data and Questions | Lab-Bogs-Hawk Mountain | (11 days) |
| B. Savanna |  |  |
| C. Shrubland |  |  |
| D. Desert |  |  |
| E. Tundra |  |  |
| F. Taiga | Lab Data and Questions | Lab-Man made ecosystems-Middle Creek |
| G. Temperate forests  1. Coniferous  2. Broadleaf |  |  |
| H. Tropical forests  1. Rainforest  2. Seasonal  3. Dry |  |  |
| I. Ponds and lakes | 4  13 |  |  |
| J. Wetlands  1. Marshes  2. Swamps  3. Bogs |  |  |
| K. Flowing water ecosystems |  |  |
| L. Estuaries |  |  |
| M. Open ocean  1. Benthos  2. Pelagic |  |  |
| N. Coral reef |  |  |
| O. Intertidal  1. Rocky  2. Sandy or muddy | Test on Ecosystems |  |

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|  | A. Overpopulation | 7 | Test on Human demographics |  |  |
| XI. Environmental Issues | |  | | --- | | B. Loss of Biodiversity-Endangered plants and animals | | 18 | Chapter Review  Lab Data and Questions | Lab-Spring Twp. Sewage Treatment Plant | (29 days) |
| C. Global Warming and Ozone Depletion-Causes and solutions | 15,19 | Chapter Review  Lab Data and Questions | Lab-Western Berks Water Treatment Plant |
| D. Renewable Energy-Alternative sources of energy | 12 | Chapter Review |  |
| E. Air Pollution-Outdoor and indoor air pollution | 14 | Chapter Review  Lab Data and Questions | Lab-Air Pollution tests |
| F. Toxic and Solid Waste-Disposal, regulations, prevention | 16 | Chapter Review  Lab Data and Questions | Lab-Pioneer Sanitary Landfill |
| G. Pesticides-History, problems, and alternatives | 18 | Chapter Review  Lab Data and Questions  Test on Air, water, and land pollution | Lab-Mid Atlantic Coastal Marine Ecology-Wallops Island Marine Science Consortium |
| H. Land and Water Management-Conservation, problems, and wilderness | 10 | Chapter Review |  |
| I. Preserving Animal Diversity-Human encroachment and sustainable management | 17 | Chapter Review  Test on Land Use |  |
| J. Economics, Politics, Ethics and the Environment-Dealing with environmental policy, problem solving, and environmental education | 11,  20 | Chapter Review |  |
| AP Final | |  |  |  | (2 days) |
| Review AP Final for AP Exam | |  |  |  | (5 days) |
| Post Test Activities | |  |  |  | (12 days) |