Advanced Placement Environmental Science Course Syllabus

Clinton High School

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Semester: TBD

Textbook: Environmental Science: Earth as a Living Planet 6th Edition (Botkin & Keller)

Laboratory Manual: AP Advantage Laboratory Investigations: AP Environmental Science by William Molnar

Supplementary Text:

Austin, M. *The Land of Little Rain* (reissued in 1997; originally published in 1903) Bergenfield, New Jersey: Penguin Nature Classic Series. A lyrical look at the desert and foothills between Death Valley and the High Sierras.

Berry, W. *Home Economics* (1987) New York: North Point Press. A collection of essays about living responsibly.

Safina, C. *Song for the Blue Ocean: Encounters along the World's Coasts and Beneath the Seas* (1997) New York: Henry Holt and Company. A passionate revelation of the conditions of the world's oceans.

Department Philosophy: To provide quality science education to all students at Clinton High School.

Course Description: The goal of AP Environmental Science is to provide students with rigorous understanding of the interrelationships of the natural world. Using contextual themes of energy, human intervention, and the Earth's dynamic systems, students will identify and analyze environmental problems, evaluate the relative risks associated with these problems and examine solutions. The course is designed to prepare students to take the AP Environmental Science Exam in May. The course will include lectures, field investigations, scientific journal article reviews, and laboratory exercises paralleling those in a first year college Environmental Science course. In addition to using resources such as the textbook and lecture content, students will be expected to participate in extensive lab activities and engage in peer debates. **The following themes provide a foundation for the AP Environmental Science course:**

1. **Science as a process**
   - Science is a method of learning more about the world.
   - Science constantly changes the way we understand the world,

2. **Energy conversions underlie all ecological processes**
   - Energy cannot be created; it must come from somewhere.
   - As energy flows through systems, at each step more of it becomes unstable.

3. **The Earth itself is one interconnected system**
   - Natural systems change over time and space.
   - Biogeochemical systems vary in ability to recover from disturbances.

4. **Humans alter natural systems**
   - Humans have had an impact on the environment for millions of years.
   - Technology and population growth have enabled humans to increase both the rate and scale of their impact on the environment.

5. **Environmental problems have a cultural and social context**
   - Understanding the role of cultural, social, and economic factors is vital to the development of solutions.

6. **Human survival depends on developing practices that will achieve sustainable systems**
   - A suitable combination of conservation and development is required.
   - Management of common resources is essential.

Course Prerequisites: Earth/Environmental Science, General Biology, & Physical Science. Students must adhere to all course ***requirements*** before being admitted to an AP course. Please refer to your handbook for further clarification.

North Carolina Standard Course of Study: Please refer to the Department of Public Instructions Website for the full List of AP Environmental Science Goals and Objectives. http://www.dpi.state.nc.us/

Course Outline:

Time of Study	Unit of Study	Content
3 Week Progress Reporting Period 3 Weeks	**Unit 1: Key Themes in Environmental Science** (1 week) Unit Understanding: This unit provides a broad overview of the key themes in Environmental Science, the scientific method, and thinking critically about the environment.	**Focus:** Chapter 1: Key Theories in Environmental Science Chapter 2: Science as a Way of Knowing: Critical Thinking about the Environment **Major Assignments and/or Assessments:** Salinization Lab The Lorax (Movie) Ecological Footprint Webquest
	Unit 2: The Earth as a System (2 weeks) Unit Understanding: In this unit, students will study the Earth as a system, emphasizing how systems work and the basic biochemical cycles of our planet.	**Focus:** Chapter 3: The Big Picture: Systems of Change Chapter 4: The Human Population and the Environment Chapter 5: Biogeochemical Cycles **Major Assignments and/or Assessments:** The Rock Cycle, Rocks, and Soil (Molnar) Project- Plate Tectonics (Molnar) Human Population Debate World Population Growth (Molnar) Project- Global Population Trends (Molnar) Population Distribution and Survivorship (Molnar)

6 Week Progress Reporting Period 3 Weeks	**Unit 3: Life and the Environment** (3 weeks) Unit Understanding: In this unit, students will study ecosystems, biological diversity, biological productivity and energy flow, and restoration and recovery of ecosystem response to disturbance.	**Focus:** Chapter 6: Ecosystems and Ecosystem Management Chapter 7: Biological Diversity Chapter 8: Biogeography Chapter 9: Biological Productivity and Energy Flow Chapter 10: Ecological Restoration **Major Assignments and/or Assessments:** Exploring Biodiversity Lab Primary Productivity Lab Formation of Deserts (Molnar) Endangered Species Debate Strange Days on Planet Earth (Movie)
9 Week Progress Reporting Period 3 Weeks	**Unit 4: Living Resources and Sustainability** (3 weeks) Unit Understanding: In this unit, students will examine living resources from a sustainability viewpoint by investigating world food supply, agriculture and environment, plentiful and endangered species, forest ecology, conserving and managing life in the oceans, and environmental health and toxicology.	**Focus:** Chapter 11: Producing Enough Food for the World: How Agriculture Depends on the Environment Chapter 12: Effects of Agriculture on the Environment Chapter 13: Forests, Parks, and Landscapes Chapter 14: Wildlife, Fisheries, and Endangered Species Chapter 15: Environmental Health, Pollution, and Toxicology **Major Assignments and/or Assessments:** Project- Natural Areas (Molnar) Chemical Characteristics of Soil Lab Soil Analysis (Molnar) Pesticide Debate Bioassay Experiment (Molnar)

12 Week Progress Reporting Period 3 Weeks	**Unit 5: Energy** (2 weeks) Unit Understanding: In this unit, students will examine topics relating to energy by investigating basics necessary for understanding energy, fossil fuels and environment, alternative energy, and nuclear energy. **Unit 6: The Water Environment on Earth (**1 week) Unit Understanding: In this unit, students will examine topics relating to the water environment on Earth by investigating water supply use and management, and water pollution.	**Focus:** Chapter 16: Energy: Some Basics Chapter 17: Fossil Fuels and the Environment Chapter 18: Alternative Energy and the Environment Chapter 19: Nuclear Energy and the Environment **Major Assignments and/or Assessments:** Solar House Lab Solar Absorption (Molnar) Personal Energy Consumption Audit (Molnar) Alternate Energy Debate **Focus:** Chapter 20: Water Supply, Use, and Management Chapter 21: Water Pollution and Treatment **Major Assignments and/or Assessments:** Personal Water Consumption Audit Wastewater Treatment Lab Water Quality Lab Bacterial Examination of Drinking Water Water Treatment Debate
15 Week Progress Reporting Period 3 Weeks	**Unit 7: The Air Environment on Earth** (1 ½ weeks) Unit Understanding: In this unit, students will examine topics relating to the air environment on Earth by investigating global issues such as climate, global warming, and stratospheric ozone depletion to regional issues such as acid rain, to local issues such as urban air pollution and indoor air pollution. **Unit 8: Environment and Society Part I** (1 ½ weeks) Unit Understanding: In this unit, students will examine topics relating to the environment and society by investigating environmental economics, the	**Focus:** Chapter 22: The Atmosphere, Climate, and Global Warming Chapter 23: Air Pollution Chapter 24: Indoor Air Pollution **Major Assignments and/or Assessments:** Air Pollution Lab Global Warming Debate An Inconvenient Truth (Movie) **Focus:** Chapter 26: Minerals and the Environment Chapter 27: Dollars and Environmental Sense: Economics of Environmental Issues

	urban environment, integrated waste management, minerals and the environment, environmental impact and planning, and the achievement of sustainability.	**Major Assignments and/or Assessments:** Rock and Mineral Lab Political Activism Letter (Molnar)
	Unit 8: Environment and Society Part II (1 ½ weeks) Unit Understanding: In this unit, students will examine topics relating to the environment and society by investigating environmental economics, the urban environment, integrated waste management, minerals and the environment, environmental impact and planning, and the achievement of sustainability.	**Focus:** Chapter 28: Urban Environments Chapter 29: Waste Management Chapter 30: Imagine a Sustainable Future **Major Assignments and/or Assessments:** Solid Waste Collection (Molnar) Copper Extraction (Molnar) Energy and Recycling (Molnar)
18 Week Progress Reporting Period 2 ½ Weeks	**AP Environmental Science Review (**1 week) Unit Understanding: Students will review course content and practice taking the AP Environmental science exam.	**Focus:** All content, labs, and projects previously discussed. **Major Assignments and/or Assessments:** All course exams will be reexamined, and all APES released questions will be practiced and discussed. Students exchange papers to give peer evaluations based on the suggested grading scales.

Semester Project:

Students must work in assigned lab groups to create a video podcast every six weeks. This podcast must have information included in labs and lectures and must center on a single topic. These podcast will be posted to the schools website and will be discussed by you and your classmates.

- Students are allowed to use the schools resources to create this podcast.
- Students are allowed to create any type of program they would like. (Ex. Environmental Science News).
- The Podcast must also include at least one interview with a community member.
- Students will have most of the six weeks to complete this assignment.
- Each video must be at least five minutes in length.
- Each video must be edited and show professional techniques in completion.
- All podcasts must show a working knowledge of the concepts covered in AP Environmental Science.
- **No Late Work Will Be Accepted.**

All units integrate laboratory investigations and other hands-on experiences that incorporate the process of scientific inquiry and develop students' understandings of the characteristics and nature of science. Units should be addressed in a manner that integrates themes throughout the course.

Grading Scale

Area	Percentage	Area	Percentage
Class work/Daily Work	**25%**	Labs	**10%**
Projects	**15%**	Tests	**50%**
TOTAL			**100%**

Required Materials: 3-ringed binder, notebook dividers, paper for the binder, textbook, blue or black pen and pencil, a 3-subject spiral bound notebook, carbonless laboratory notebook (Staples, Office Max, and Office Depot)

Late Assignments: No Late Work Will Be Accepted.

Make-up Policy: Students must request their make-up assignment from the teacher and submit missed assignments within the amount of days missed for and EXCUSED absence. Please refer to your student handbook for further clarification.

Re-do Policy: All students will be given an opportunity to master course content in an effort to ensure proficiency on the AP Exam and the teacher made final examination.

The Exam:

The A.P. Environmental Science Exam created by the College Board and Educational Testing Service will be administered on May 2010. This exam is three hours in length and consists of two parts: a multiple-choice section comprised of 100 questions and forming 60% of the grade, and a free response section comprised of four free-response questions and forming 40% of the grade. The multiple choice section is designed to cover your knowledge and understanding of environmental science and includes thought provoking problems and questions based on fundamental ideas from environmental science as well as questions based on the recall of basic facts and major concepts. The free-response section emphasizes the application of principles in greater depth; you will need to organize answers to broad questions, demonstrating reasoning and analytical skills, as well as the ability to synthesize material from several sources into a coherent essay. There are three types of free response questions: data analysis, document based, and synthesis and evaluation.

LABORATORY and FIELD INVESTIGATIONS

Laboratory and field investigations are designed to complement the lecture portion of the course by providing opportunities to learn about the environment through firsthand observations, to test concepts and principles which have been introduced in class, to explore specific issues and problems in greater depth, and to gain an awareness of the importance of confounding variables which exist in the real world. Investigations will be diverse and will include indoor laboratory activities, outdoor activities, as well as field experience outside the confines of the campus. The labs are designed to invite students to think critically, to observe environmental systems, to develop and conduct well designed experiments, to utilize appropriate techniques and instrumentation, to analyze and interpret data, to present data orally and in the form of statistical and graphical presentations, to apply concepts to the solution of environmental problems, to form conclusions and to propose further study.

FIELD TRIPS

The AP Environmental Science classes participate in several organized field trips. Many of the field trips will be conducted as weekend excursions. Students are strongly encouraged to participate since these experiences will provide opportunities and knowledge that cannot be obtained from the textbook. Also, students are encouraged, with extra credit, to submit pictures of locations they visit on their travels during school holidays and weekends, along with a report on an issue of the environmental significance of the trip.

Planned Trips

- *Sampson County Landfill*
- *Clinton Waste Water Treatment Plant*
- *Sampson County Wildlife Preserve*
- *Hog Slat Farms (TDM Farms)*
- *Prestage Farms*
- *Local Nature Walk and Sampling Survey*
  **scheduled during school hours*