***AP® Environmental Science Syllabus***

**School: North Atlanta High School**

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**Summer Reading:**

Book: *No Impact Man*

**PREREQUISITES**

The AP Environmental Science course is an excellent option for any interested student who has completed two years of high school laboratory science - one year of life science and one year of physical science. For critical thinking skills, introductory chemistry is

highly recommended. Due to the quantitative analysis that is required in the course, students should also have taken at least one year of algebra. Because of the prerequisites. AP Environmental Science will usually be taken in either the junior or the senior year.

**COURSE DESCRIPTION**

The goal of the AP Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and

human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving or preventing them.

Environmental science is interdisciplinary; it embraces a wide variety of topics from different areas of study. Yet there are several

major unifying constructs, or themes, that cut across the many topics included in the study of environmental science. The following themes provide a foundation for structure of the AP Environmental Science course.

1.

2.

3.

4.

5.

6.

Science is a process

Science is a method of learning more about the world.

Science constantly changes the way we understand the world.

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 unusable.

The Earth itself is one interconnected system.

Natural systems change over time and space.

Biogeochemical systems vary in ability to recover from disturbances.

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.

Environmental problems have a cultural and social context.

Understanding the role of cultural, social, and economic factors is vital to the development of solutions.

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.

**LABORATORY FIELD INVESTIGATION**

Because it is designed to be a course in environmental *science* rather than environmental studies, the AP Environmental Science

course includes a strong laboratory and field investigation component. The goal of this component is to complement the classroom

portion of the course by allowing students to learn about the environment through firsthand observation. Experiences both in the laboratory and in the field provide students with important opportunities to test concepts and principles that are introduced in the

classroom, explore specific problems with a depth not easily achieved otherwise, and gain an awareness of the importance of

confounding variables that exist in the "real world." These experiences will require the students to employ alternative learning styles

to reinforce fundamental concepts and principles. Because all students have a stake in the future of the environment, such activities are

intended to motivate students to study environmental science in greater depth. **Colleges often require students to present their laboratory materials from AP science courses before granting college credit for laboratory, so students will be expected to retain their laboratory notebooks, reports, and other materials.**

**As part of the AP Environmental Science course students will be required to participate in a yearlong field study. The field**

**study will require students to meet outside of normal class hours once per month to test the water quality of a local waterway**

**Pate's Creek which is approximately 1.5 miles from campus), and start the process of becoming an "environmental watchdog." We will measure both the chemistry and biological make-up of the creek monthly.**

**1st Semester**

**Part One: Introducing Environmental Science and Sustainability**

1. Introduction to Environmental Science

 Readings: *Do Environmentalists Overstate their Case? (TS Issue #7)*

 Video: *The Lorax and class discussion*

 Semester Project: *Environmental Science in the news (create a news article scrapbook)*

 Lab: *Tragedy of the Commons*

 Internet Reading: *Tragedy of the Commons, Easter Island*

2. Environmental laws, economics, and ethics

 Readings: *Should the Arctic National Wildlife Refuge Be Opened to Oil Drilling (TS Issue #8) Should DDT*

*Be Banned Worldwide? (TS Issue #16)*

 Project: *Name Droppers (historical figures in the environmental movement)*

 Lab: *Let's Go Fishing*

**Part Two: The World We Live In** [AP I & II - 7 weeks]

3. Ecosystems and Energy [AP II: B - 1.5 weeks]

 Labs: *Net Primary Productivity (Molnar, 109)*

o *Eating at a Lower Trophic Level Quantitative Activity (Molnar, 115)*

o *Predator-Prey Simulation (Molnar, 119)*

4. Ecosystems and Living Organisms [AP II: A,C - 1.5 weeks]

 Readings: *Is Biodiversity Overprotected? (TS Issue #4)*

 Lab: *Owl Pellet*

5. Ecosystems and the Physical Environment [AP I: A,B,C - 4 weeks]

 Readings: *Should Society Act Now to Forestall Global Warming? (TS Issue #9)*

 Video: *Dimming of the Earth*

 Projects: *Plate Tectonics Project (Molnar, 27)*

o *Biogeochemical Cycle*

o *Possible Project- Hurricane Tracking and Prediction (Molnar, 6)]*

 Labs: *Specific Heat and Climate (Molnar, 35)*

 Field Study *- Comparison of Daily Weather Data with Microclimate Data (Molnar, 4)]*

 *[Possible extended project - Hurricane Tracking and Prediction (Molnar, 6)]*

6. Major Ecosystems of the World [AP II: A - 1 week]

 *Readings: Are Marine Reserves Needed to Protect Global Fisheries? (TS Issue #15)*

 *Projects: Biome Project*



7.

o *Formation of Deserts Project (Molnar, 41)*

o *The Moon and Tides Project (Molnar, 51)*

Human Health and Environmental Toxicology

 *Readings: Do Environmental Hormone Mimics Pose a Potentially Serious Health Threat? (TS Issue #17)*

 *Video: The Rx For Survival*

**Part Three: A Crowded World** [AP III- 4 weeks]

8. Population Change

 *Readings: Is Limiting Population Growth a Key Factor in Protecting the Global Environment (TS Issue*

*#13)*

 *Video: The People Bomb*

 *Lab: Population Distribution and Survivorship Lab (Molnar, 149)*

 *Activity: Doubling Time in Exponential Growth Quantitative (Molnar, 139)*

9. The Problems of Overpopulation

 *Projects: Global Population Trends Project (Molnar, 145)*

o *The Face of Hunger (researching poverty throughout the world)*

 *Activity: World Population Growth Quantitative Activity (Molnar, 133)*

10. The Urban World

 *Project: Land Management*

**Part Four: The Search for Energy** [AP V- 4 weeks]

11. Fossil Fuels

 *Readings: Will Hydrogen End Our Fossil-Fuel Addiction? (TS Issue #10)*

 *Is Additional Federal Oversight Needed for the construction of LNG Import Facilities? (TS Issues #21)*

 *Project: Energy Part I (energy efficiency research and presentations)*

 *Energy Resource Comparison Project (Molnar, 163)*

 *Video: Who Killed the Electric Car*

 *Activity: CO2 Emissions from Fossil-Fuel Burning Quantitative Activity (Molnar, 167)*

o *Personal Energy Use Audit Quantitative Activity (Molnar, 171)*

12. Nuclear Energy

 *[Possible extended project - Effects of Gamma Radiation on Seed Growth (Molnar, 21)]*

 *Readings: Is It Time to Revive Nuclear Power (TS Issue #12)*

13. Renewable Energy and Conservation

 *Project: Energy Part II (develop an energy plan for the country used in the "Face of Hunger" project)*

 *Lab: Solar Absorption Lab (Molnar, 175)*

o *Energy and Recycling (Molnar, 63)*

***2nd Semester***

**Part Five: Our Precious Resources** [AP IV- 4 weeks]

14. Water: A Limited Resource

 *Readings: Should Environmental Policy Attempt to Cure Environmental Racism (TS Issue #5)*

 *Video: Water Resource at Risk*

 *Project: National and Local Water Use Project (Molnar, 79)*

o *Water Diversions Project (Molnar, 101)*

 *Activity: Water Loss Drop by Drop Quantitative (Molnar, 99)*

15. Soil Resources

 *Readings: TS Issue #3*

 *Project: [Possible extended project - The Rock Cycle, Rocks, and Soil (Molnar, 23)]*

 *Lab: Soil Analysis (Molnar, 67)*

o *Soil Salinization: An Experimental Design Lab (Molnar, 77)*

16. Minerals: A Nonrenewable Resource

 *Readings: Should a Price Be Put on the Goods and Services Provided by the World's Economy? (TS Issue*

*#1)*

 *Lab: Copper Extraction Lab (Molnar, 59)*

o *Rock Decomposition*

17. Preserving Earth's Biological Diversity

 *Lab: Shannon-Weiner Diversity Index Lab (Molnar, 127)*

 *Field Study - Stream Water Quality and Macroinvertebrate Population Comparison (Molnar, 2)]*

18. Land Resources

 *Readings: Is Sustainable Development Compatible With Human Welfare (TS Issue #2)*

 *[Possible extended project - Land Uses Changes in Your Area (Molnar, 18)*

19. Food Resources: A Challenge for Agriculture

 *Readings: Is Genetic Engineering an Environmentally Sound Way to Increase Food Production (TS Issue*

*#14)*

 *Project: [Possible extended project - Elevated CO2 Levels and Plant Growth (Molnar, 12)]*

 *Lab:Bioassay Experiment Lab (Molnar, 189)*

o *Natural vs. Synthetic Chemical Fertilizers (Molnar, 14)*

**Part Six: Environmental Concerns** [AP VI & VII - 12 weeks]

20. Air Pollution

 *Readings: Can Pollution rights Trading Effectively control Environmental Problems (TS Issue #6)*

 *Should Existing Power Plants Be Required to Installl State-of-the-Art Pollutioin Controls (TS Issue #11)*

 *Lab: Particulate Air Pollution (Molnar, 179)*

21. Regional and Global Atmospheric Changes

 *Video: The Inconvenient Truth*  *Lab: Acid Rain (Molnar, 183)*

 *Testing for Tropospheric Ozone Pollution (Molnar, 8)*

 *Project: Global Climate Change Project (Molnar, 209)*

o *[Possible extended project - Global Warming and Atmospheric CO2 Correlation (Molnar, 10)]*

22. Water Pollution

 *Lab: Water Quality Index (Molnar, 85)*

23. The Pesticide Dilemma

 *Readings: Should the Military Be Exempt from Environmental Regulations (TS Issue #20)*

24. Solid and Hazardous Wastes

 *Readings: Is the Superfund Program Successfully Protecting the Environment from Harzardous Wastes?*

*(TS Issues #18)*

o *Should the United States Continue to Focus Plans for Permanent Nuclear Waste Disposal*

*Exclusisvely at Yucca Mountain? (TS Issue #19)*

 *Video: Garbage Mountain*

 *Lab: Solid Waste Collection Lab (Molnar, 193)*

 *Auto and Truck Tires and the Environment Quantitative Activity (Molnar, 197)*

 *Project: [Possible extended project - Toxic Sites in Your Neighborhood (Molnar, 20)]*

**Part Seven: Tomorrow's World**

25. Tomorrow's World

 *Projects: Political Activism Letter Project (Molnar, 201)*

o *Creating an Environmental Law*

**A.P. Exam**