

Roy C. Ketcham High School – Mr. Manzo
Contact: mitchell.manzo@wcsdny.org
Office: 298-5100 Ext. 31065
Classroom: 295

Advanced Placement Environmental Science: 2022-23
Course Number: S687 Credits: 1 Rank Weight: 1.10
Text: Environmental Science for the AP Course, 3rd ed.
Prerequisites: >85 Regents Biology;
>85 Regents Earth Science;
Chemistry preferred or concurrent

AP Environmental Science 2022-23 Course Description & Syllabus

Course Description: Advanced Placement Environmental Science (APES) is designed to be the equivalent of a one-semester, introductory college course in environmental science. The course effectively combines components of earth science, biology, chemistry, ecology, and environmental ethics as they apply to the study of our environment, including natural and man-made processes that effect global change. Since colleges and universities offer environmental science from a wide variety of departments (geology, biology, environmental studies, environmental science, chemistry, geography) different emphases can be placed on various topics. This course is designed to combine these various disciplines with emphasis placed on scientific principles and analysis, and includes a critical laboratory component. While environmental issues are considered primarily from a scientific viewpoint, the sociological and political perspective is also considered. Ultimately, this course is intended to enable students to undertake a more advanced study of topics in environmental science as first-year college students, and to become more competent proponents for environmental sustainability.

Prerequisites: Students are screened for this course primarily because it is a college level introductory course in environmental science. Students should have completed courses in earth science and biology at a minimum, and preferably chemistry prior to taking this course. It is expected that students enrolled in the course maintain a rigorous pace of reading and turning in assignments on time. Late work will not be accepted for any reason without prior approval, and will be seriously reduced in point value. **All students enrolled in this course are expected to sign up for and take the AP Environmental Science exam. The fee for this year's exam is \$94.** Students who do not sign up for the AP Exam by the deadline will be automatically **re-registered for a non-AP level course** in environmental studies, which will be reflected on transcripts sent to colleges.

Required Textbook: Environmental Science for the AP Course, 3rd ed.; Friedland & Relyea. 2019.

***Note:** We will incorporate other texts and required readings at times.

Other Required Materials: Notebook, **3-ring binder**, scientific & graphing calculator, continuous access to internet/web materials with Google login/password (use district account), AP Classroom account

Critical thinking and writing skills will be stressed throughout the course. This requires extensive study time, regardless of whether instruction occurs in person in the **classroom laboratory** setting, at **home** in a **fully remote** setting, or a combination of both in a “**hybrid**” learning environment. We will be starting the school year in-person, and hopefully it stays that way. Regardless, it is imperative that students log into the Classroom site each day to receive new instruction, announcements, and learning activities. Should distancing requirements become an issue, some labs or activities may be online or “virtual” labs, but are still required learning activities. We will utilize many of the following learning methods through the school year:

- Whole group instruction; Small group breakout instruction
- **AP Classroom:** Each of you will join our class on the college board AP Classroom learning module to receive activities, tests, topic videos, etc. The join code will be provided to you, and assignments will often be posted through google classroom (however the AP Classroom is a separate login and does not sync to classroom directly).
- Individual: Each unit will require several activities that must be completed in a timely manner, including but not limited to following commonly used methods:
 - Reading any notes, Google Slides, PowerPoint presentations, documents and articles provided for each lesson
 - Watching video clips or video instructional segments posted on Google Classroom utilizing Screencastify, Youtube, Edpuzzle, etc. Note: Edpuzzle videos will count as learning activities, and may contain questions that must be submitted.
 - Selected articles and/or current events and associated questions given for any of the lessons

- Google Forms and quizzes provided for any of the lessons
- Notes, both handwritten and utilizing Kami provided for each lesson

AP Environmental Science Exam: The exam is on **Tuesday, May 2nd, 2023 at 8:00 a.m.** and is composed of two parts. The College Board may make changes this year due to Covid-19 considerations, but currently here is what the new exam you will take will consist of:

Section I: Multiple Choice

80 Questions | 1 Hour 30 Minutes | 60% of Exam Score (Includes Individual questions & set-based questions)

- 3–4 sets include quantitative data, such as data tables, charts, or graphs. These questions primarily assess Practice 5, but can also assess Practices 1, 4, 6, or 7.
- 3–4 sets include qualitative data or information, such as models, representations, or maps. These questions primarily assess Practice 2, but can also assess Practices 1, 4, or 7.
- 2 sets include text-based sources. These questions primarily assess Practice 3, but can also assess Practices 1, 6, or 7.

Section II: Free Response

3 Questions | 1 Hour 10 Minutes | 40% of Exam Score

- Question 1: Design an investigation presents students with an authentic environmental scenario accompanied by either a model/visual representation or quantitative data.
- Question 2: Analyze an environmental problem and propose a solution presents students with an authentic environmental scenario accompanied by either a model/visual representation or quantitative data.
- Question 3: Analyze an environmental problem and propose a solution doing calculations presents students with an authentic environmental scenario.

In addition, the exam will assess content from the “four big ideas” from the course, as follows:

Big Idea 1: Energy Transfer

Big Idea 2: Interactions between Earth systems

Big Idea 3: Interactions between different species and the environment

Big Idea 4: Sustainability

Final Exam: A final exam will be **given to all students** during the final week of classes. The format and number of questions will be announced before the exam, but will likely consist of 100 multiple choice questions and a free response essay section.

Required Assignments:

1. **Current events:** Each student is responsible to stay up to date on news, policies, and current environmental topics. New environmental topics arise on a regular basis, and how people deal with current environmental issues changes regularly as well. So, it is expected that you will be scanning these new issues and changes as they are covered in newspapers, online journals, periodicals, etc. and reflecting upon your reading at regular intervals. At times, we may select an article for the entire class to read and discuss/reflect/react upon. Students will maintain a portfolio of articles, including the original or copy, and your reaction piece. For now, all of these should be saved in a folder on your Google drive. In addition, students will present an article and response of choice to the class, typically once per quarter (4 - 8 times during the school year). A grading rubric and list of expectations will be provided separately for this. Typically, one day every other week will be dedicated to presentation and class discussion of current environmental topics. In addition, there are several required readings that will be substituted for current events throughout the year.
2. **Research papers/projects:** Research papers and projects will be completed by each student throughout the course. Each project will have its own specific set of requirements and grading criteria. After the AP exam, students will complete a final course research project. Details about this activity will emerge later. This is a requirement of the course.

- Field Labs & Activities:** Under normal circumstances, this course places extensive focus on field studies including both on campus and off-campus locations. However, due to our current situation, no field work will be allowed and no field trips can be approved. If we are able to conduct our field labs, an email notification will be sent with further details.
- Reading & Quarterly Assignments:** As noted, keeping up with reading assignments is critical to your understanding of class lectures and allows you to contribute positively and meaningfully during class. *It will become apparent if you have not read prior to our class discussions, which will negatively impact your participation grade.*

Grading: Each quarter (10 weeks), your grade will be determined by the quality of your class work, homework assignments, tests, quizzes, current events assignment, laboratory investigations, and various other items, including class participation. **Note:** Class participation will be part of your score on both individual and group assignments. Also, a separate participation grade is typically included with your test average.

Course Syllabus: The following is the outline of topics provided by the College Board for AP Environmental Science. The percentages represent the estimated weight of each topic on the AP exam, and therefore largely reflect the time spent on each area of study in the course. Please note, the order of topics in the outline holds no special significance, since there are many different sequences in which the topics can be appropriately addressed in the course.

1. The Living World: Ecosystems (6-8%)

Introduction to Ecosystems; Terrestrial Biomes, Aquatic Biomes, The Carbon Cycle, The Nitrogen Cycle, The Phosphorus Cycle, The Hydrologic (Water) Cycle, Primary Productivity, Trophic Levels, Energy Flow and the 10% Rule, Food Chains and Food Webs

2. The Living World: Biodiversity (6-8%)

Introduction to Biodiversity, Ecosystem Services, Island Biogeography, Ecological Tolerance, Natural Disruptions to Ecosystems, Adaptations, Ecological Succession

3. Populations (10-15%)

Generalist and Specialist Species, K-Selected r-Selected Species, Survivorship Curves, Carrying Capacity, Population Growth and Resource Availability, Age Structure Diagrams, Total Fertility Rate, Human Population Dynamics, Demographic Transition

4. Earth Systems and Resources (10-15%)

Plate Tectonics, Soil Formation and Erosion, Soil Composition and Properties, Earth's Atmosphere, Global Wind Patterns, Watersheds, Solar Radiation and Earth's Seasons, Earth's Geography and Climate, El Niño and La Niña

5. Land and Water Use (10-15%)

The Tragedy of the Commons, Clearcutting, The Green Revolution, Impacts of Agricultural Practices, Irrigation Methods, Pest Control Methods, Meat Production Methods, Impacts of Overfishing, Impacts of Mining, Impacts of Urbanization, Ecological Footprints, Introduction to Sustainability, Methods to Reduce Urban Runoff, Integrated Pest Management, Sustainable Agriculture, Aquaculture, Sustainable Forestry

6. Energy Resources and Consumption (10-15%)

Renewable and Nonrenewable Resources, Global Energy Consumption, Fuel Types and Uses, Distribution of Natural Energy Resources, Fossil Fuels, Nuclear Power, Energy from Biomass,

Solar Energy, Hydroelectric Power, Geothermal Energy, Hydrogen Fuel Cell, Wind Energy, Energy Conservation

7. Atmospheric Pollution (7-10%)

Introduction to Air Pollution, Photochemical Smog, Thermal Inversion, Atmospheric CO₂ and Particulates, Indoor Air Pollutants, Reduction of Air Pollutants, Acid Rain, Noise Pollution

8. Aquatic & Terrestrial Pollution (7-10%)

Sources of Pollution, Human Impacts on Ecosystems, Endocrine Disruptors, Human Impacts on Wetlands and Mangroves, Eutrophication, Thermal Pollution, Persistent Organic Pollutants (POPs), Bioaccumulation and Biomagnification, Solid Waste Disposal, Waste Reduction Methods, Sewage Treatment, Lethal Dose 50% (LD₅₀), Dose Response Curve, Pollution and Human Health, Pathogens and Infectious Diseases

9. Global Change (10–15%)

Stratospheric Ozone Depletion, Reducing Ozone Depletion, The Greenhouse Effect, Increases in the Greenhouse Gases, Global Climate Change, Ocean Warming, Ocean Acidification, Invasive Species, Endangered Species, Human Impacts on Biodiversity

Laboratory and Field Investigation: Because it is designed to be a course in environmental science rather than environmental studies, the AP Environmental Science course must include 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.” In these experiences students can employ alternative learning styles to reinforce fundamental concepts and principles. Because all students have a stake in the future of their environment, such activities can 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 should be

encouraged to retain their laboratory notebooks, reports, and other materials.

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