# AP® Environmental Science Syllabus

Mr. Wm. Saunders-Cummings

Environmental Science Teacher

(706) 751 - 7595

SaundWi@richmond.k12.ga.us

**Office Hours/Tutoring:** Wednesday until 3:00 PM or by appointment

**Communication:** Email is the primary and preferred method of communication. Any emergency communication must go through the Main Office - 706-772-8140

**AP® Environmental Science Course Description:** Advanced Placement Environmental Science (“APES”) is a college-level environmental science course. This course is taught as a traditional science course, incorporating laboratory activities, virtual activities, short-term projects, long-term studies, field investigations, and the use of technology for gathering data (Veneer data collection probes, computer analysis software, etc.). Educational experiences in the laboratory and field and through virtual internet labs will provide students with opportunities to relate classroom concepts to real-world applications of environmental science. Through these experiences, students will be recording data, gathering evidence and presenting it to their peers verbally and in writing in different formats both digitally and via poster sessions. Students will be able to explore specific real-world environmental issues and gain an awareness of the science behind these issues. Students will explore the impact of our growing human population and understand that they have a stake in the future of the environment.

The course follows guidelines established by the College Board with the goal to provide students with scientific principles, concepts, and methodologies required to understand interrelationships in 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 alternatives for resolving and/or preventing them, including environmental policies and legislation.

APES is interdisciplinary and incorporates a wide variety of topics from many different areas of study. There are several major unifying themes, or big ideas, that cut across the topics within APES. The following big ideas provide the foundation for the structure of the APES course:

Big Idea 1: Energy Transfer (ENG)

Big Idea 2: Interactions Between Earth Systems (ERT)

Big Idea 3: Interactions Between Different Species and the Environment (EIN)

Big Idea 4: Sustainability (STB)

To enable students to immerse themselves in the big ideas and content of the APES course, they will apply several major scientific skills and practices that allow them to engage in authentic scientific inquiry. The following scientific processes provide the foundation for the exploration of the APES course:

Science Practice 1: Concept Application

Science Practice 2: Visual Representations

Science Practice 3: Text Analysis

Science Practice 4: Scientific Experiments

Science Practice 5: Data Analysis

Science Practice 6: Mathematical Routines

Science Practice 7: Environmental Solutions

Additionally, students will utilize cross-cutting concepts from other academic disciplines to develop skills in communication and critical thinking, such as artistic designs to help non-scientists to understand the concepts presented. Students will understand the big ideas and perform the science skills and practices through deep study of nine major topics indicated by the College Board as the units of study. The units within the APES course with corresponding exam weighting are as follows:

• Unit 1: The Living World: Ecosystems 6–8%

• Unit 2: The Living World: Biodiversity 6–8%

• Unit 3: Populations 10–15%

• Unit 4: Earth Systems and Resources 10–15%

• Unit 5: Land and Water Use 10–15%

• Unit 6: Energy Resources and Consumption 10–15%

• Unit 7: Atmospheric Pollution 7–10%

• Unit 8: Aquatic and Terrestrial Pollution 7–10%

• Unit 9: Global Change 15–20%

Students will also engage with the course material by researching environmental policies and legislation implemented in connection with human interaction with the environment. The study of laws and policies expose students to environmental issues, the debates and negotiations among parties with competing interests that arise in connection with these issues, and the outcomes of those debates and negotiations. The requisite environmental policies and legislation are as follows:

Clean Air Act

Clean Water Act

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Montreal Protocol

Kyoto Protocol

Endangered Species Act

Safe Drinking Water Act (SDWA)

Delaney Clause of Food, Drug and Cosmetic Act

Resource Conservations and Recovery Act (RCRA)

*Student Practice*

Throughout each unit, Topic Questions will be provided to help students check their understanding. The Topic Questions are especially useful for confirming understanding of difficult or foundational topics before moving on to new content or skills that build upon prior topics. Topic Questions can be assigned before, during, or after a lesson, and as in-class work or homework. Students will get rationales for each Topic Question that will help them understand why an answer is correct or incorrect, and their results will reveal misunderstandings to help them target the content and skills needed for additional practice.

At the end of each unit or at key points within a unit, Personal Progress Checks will be provided in class or as homework assignments in AP® Classroom. Students will get a personal report with feedback on every topic, skill, and question that they can use to chart their progress, and their results will come with rationales that explain every question’s answer. One to two class periods are set aside to re-teach skills based on the results of the Personal Progress Checks

**Textbook:** Withgott, J., & Laposata, M. (2021). *Environment: the science behind the stories* (7th Ed, AP ed.). New York: Pearson.

**Additional Materials:**

College Board. (2020). AP Environmental Science Course and Exam Description, Effective Fall 2020. Retrieved from AP Central: https://apcentral.collegeboard.org/media/pdf/ap-environmental-science-course-and-exam-description.pdf

Environmental Literacy Council. (n.d.). ELC. Retrieved from https:///enviroliteracy.org

HHMI BioInteractive. (n.d.). Retrieved from hhmi BioInteractive: https://biointeractive.org

Society of Science. (n.d.). Retrieved from ScienceNews: sciencenews.org

**Classroom Expectations:**

**Be on-time and prepared to participate.** This means students will be in their seats ready to engage in the assignment when the bell rings.

**Be respectful to all members of the classroom.** Common courtesy is expected from all people in the classroom.

**All laboratory safety procedures and rules must be followed**. This is not negotiable; failure to follow safety rules is considered a serious offense and will result in immediate removal from the activity and loss of the grade (NO CREDIT).

**All county and school policies will be enforced.**

**Cells phones, tablets and headphones are not allowed without direct permission.**

**No personal hygiene products may be used *in the room*.**

**Grading Policy**

*Grades are viewable in Infinite Campus with the following categories and weights:*

* *Minor – 60%*

*Ex: Classwork, Participation, learning the content and more.*

* *Major – 40%*

*Ex: Quizzes, Tests, Projects, proving you know it.*

*Because students are expected to master the content, grade recovery will be ongoing throughout the school year as each module is completed. Academic dishonesty (cheating) will result in the student receiving NO CREDIT for that graded item and can result in disciplinary action. The grade will have to be recovered during afterschool tutoring hours with an alternate assignment ​*

***Make-up work:*** *Classwork will be found in Canvas and/or AP® Classroom (most assignments will be in AP® Classroom). All students will have access to the assignments as soon as they are posted. Therefore, all students returning from absences will be expected to turn in the missed work within 5 days of returning.*

***Test Retake Policy***: Students may retake a test if they are unhappy with their grade. To qualify, a student must create a “Plan to Relearn,” laying out what they plan to do in order to better prepare for their retake. If you score higher on the retake, scores on the unit’s quizzes and tests will be replaced with that score.

***Academic Rigor****:* This class is a college level course, so an increased difficulty level and workload is to be expected. Homework will not always be assigned, but when it is, should take up no more than 45 minutes any given night. I want to prepare my students for college without overloading them. Every assignment will have purpose.

**Final Exam (Friday, May 15th, 2026 8am):** The AP® exam determines whether you earn college credit for the class (provided the college/university you attend accepts AP® credits). The exam will contain multiple choice questions (MCQs) and free response questions about every unit we cover during the semester.

**Materials:**

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| Required materials | Suggested material |
| * Computer (school issued preferred) * Writing implement (pen/pencil; pen preferred) * Composition book (college ruled) * three ring binder and paper (college ruled) | * Colored pencils or fine point markers * Graph Paper * Index cards * Highlighters |

**Lab Safety:**

***PASSES OUT OF CLASS ARE FOR EMERGENCIES ONLY! ABUSE WILL RESULT IN LOSS OF PRIVILEDGE!***

* Read and follow directions first!
* NO FOOD OR DRINK IN LAB
* Know the location of safety equipment
* Dress for the lab
* Don't taste or sniff chemicals
* Don't play mad scientist in the laboratory
* Dispose of lab waste properly
* Know what to do with lab accidents
* Leave experiments at the Lab
* No horseplay!

**Expectations of a Science Student​**

*This syllabus is subject to change if required.*

*Students will be supplied with an updated syllabus 48 hours prior to changes being implemented.*

* Follow all established rules. ​
* Be willing to make mistakes so you can learn from them. ​
* Review course materials regularly. ​
* Be willing to push your own boundaries every day. ​
* Be inquisitive…ask questions, ask questions, ask questions!

*We are always in need of the following for our class: ​*

* Tissues​
* Colored copy paper​
* White school glue​
* Colored pencils​
* Pencils​
* Clorox wipes​
* Paper towels​
* Magic Erasers©​

**Course and Topic Outline**

This course will be taught in two semesters with approximately 17 weeks in each. Students attend seven 43-minute classes per week with a minimum of three class periods per week dedicated to laboratory activities, field activities, and long-term study. A minimum of 25% of instructional time is devoted to laboratory investigation and/or fieldwork. There are nine units in the course, each lasting approximately two to three weeks. Two weeks will be allotted for test preparation, with additional laboratory time and study for the time period after the AP® Exam.

All alpha and/or numerical codes refer to the AP® Environmental Science Course and Exam Description, Effective Fall 2020.

**Unit 1: The Living World: Ecosystems 2–3 weeks**

*Big Idea: Interactions Between Earth Systems (ERT-1): Ecosystems are the result of biotic and abiotic interactions.*

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| --- | --- |
| Topic | Skill Pairing |
| 1.1 Introduction to Ecosystems | 1.A |
| 1.2 Terrestrial Biomes | 1.B |
| 1.3 Aquatic Biomes | 1.B |
| 1.4 The Carbon Cycle | 2.B |
| 1.5 The Nitrogen Cycle | 2.B |
| 1.6 The Phosphorus Cycle | 2.B |
| 1.7 The Hydrologic (Water) Cycle | 2.B |

*Big Idea: Energy Transfer (ENG-1): Energy can be converted from one form to another.*

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| --- | --- |
| Topic | Skill Pairing |
| 1.8 Primary Productivity | 1.A |
| 1.9 Trophic Levels | 1.B |
| 1.10 Energy Flow and the 10% Rule | 6.C |
| 1.11 Food Chains and Food Webs | 2.A |

¨ Complete Personal Progress Check MCQ for Unit 1.

¨ Complete Personal Progress Check FRQ for Unit 1.

¨ Take Unit 1 Test.

**Unit 2: The Living World: Biodiversity 2–3 weeks**

*Big Idea: Interactions Between Earth Systems (ERT-2): Ecosystems have structure and diversity that change over time.*

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| Topic | Skill Pairing |
| 2.1 Introduction to Biodiversity | 1.A |
| 2.2 Ecosystem Services | 1.B |
| 2.3 Island Biogeography | 1.A |
| 2.4 Ecological Tolerance | 3.A |
| 2.5 Natural Disruptions to Ecosystems | 5.A |
| 2.6 Adaptations | 5.B |
| 2.7 Ecological Succession | 5.C |

¨ Complete Personal Progress Check MCQ for Unit 2.

¨ Complete Personal Progress Check FRQ for Unit 2.

¨ Take Unit 2 Test.

**Unit 3: Populations 2 weeks**

*Big Idea: Interactions Between Earth Systems (ERT-3): Populations change over time in reaction to a variety of factors.*

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| Topic | Skill Pairing |
| 3.1 Generalist and Specialist Species | 1.B |
| 3.2 K-Selected r-Selected Species | 5.A |
| 3.3 Survivorship Curves | 5.C |
| 3.4 Carrying Capacity | 5.E |
| 3.5 Population Growth and Resource Availability | 6.B |

*Big Idea: Interactions Between Different Species and the Environment (EIN-1): Human populations change in reaction to a variety of factors, including social and cultural factors.*

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| Topic | Skill Pairing |
| 3.6 Age Structure Diagrams | 5.C |
| 3.7 Total Fertility Rate | 5.A |
| 3.8 Human Population Dynamics | 7.A |
| 3.9 Demographic Transition | 1.C |

¨ Complete Personal Progress Check MCQ for Unit 3.

¨ Complete Personal Progress Check FRQ for Unit 3.

¨ Take Unit 3 Test.

**Unit 4: Earth Systems and Resources 2–3 weeks**

*Big Idea: Interactions Between Earth Systems (ERT-4): Earth’s systems interact, resulting in state of balance over time.*

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| Topic | Skill Pairing |
| 4.1 Plate Tectonics | 2.C |
| 4.2 Soil Formation and Erosion | 4.B |
| 4.3 Soil Composition and Properties | 4.C |
| 4.4 Earth’s Atmosphere | 2.A |
| 4.5 Global Wind Patterns | 2.B |
| 4.6 Watersheds | 1. C |

*Big Idea: Energy Transfer (ENG-2): Most of the Earth’s atmospheric processes are driven by input of energy from the sun.*

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| Topic | Skill Pairing |
| 4.7 Solar Radiation and Earth’s Seasons | 2.A |
| 4.8 Earth’s Geography and Climate | 2.B |
| 4.9 El Niño and La Niña | 7.A |

¨ Complete Personal Progress Check MCQ for Unit 4.

¨ Complete Personal Progress Check FRQ for Unit 4.

¨ Take Unit 4 Test.

**Unit 5: Land and Water Use 2–3 weeks**

*Big Idea: Interactions Between Different Species and the Environment (EIN-2): When humans use natural resources, they alter natural systems.*

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| Topic | Skill Pairing |
| 5.1 The Tragedy of the Commons | 1.B |
| 5.2 Clearcutting | 1.A |
| 5.3 The Green Revolution | 3.B |
| 5.4 Impacts of Agricultural Practices | 1.A |
| 5.5 Irrigation Methods | 7.C |
| 5.6 Pest Control Methods | 7.E |
| 5.7 Meat Production Methods | 5.E |
| 5.8 Impacts of Overfishing | 7.B |

•Complete Personal Progress Check MCQ Part A for Unit 5.

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| Topic | Skill Pairing |
| 5.9 Impacts of Mining | 7.E |
| 5.10 Impacts of Urbanization | 7.C |
| 5.11 Ecological Footprints | 5.E |

*Big Idea: Sustainability (STB-1) Humans can mitigate their impact on land and water resources through sustainable use.*

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| Topic | Skill Pairing |
| 5.12 Introduction to Sustainability | 5.E |
| 5.13 Methods to Reduce Urban Runoff | 4.B |
| 5.14 Integrated Pest Management | 7.D |
| 5.15 Sustainable Agriculture | 7.E |
| 5.16 Aquaculture | 7.C |
| 5.17 Sustainable Forestry | 7.F |

¨ Complete Personal Progress Check MCQ Part B for Unit 5.

¨ Complete Personal Progress Check FRQ for Unit 5.

¨ Take Unit 5 Test.

**Unit 6: Energy Resources and Consumption 2–3 weeks**

*Big Idea: Energy Transfer (ENG-3): Humans use energy from a variety of sources, resulting in positive and negative consequences.*

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| Topic | Skill Pairing |
| 6.1 Renewable and Nonrenewable Resources | 1.C |
| 6.2 Global Energy Consumption | 6.C |
| 6.3 Fuel Types and Uses | 1.A |
| 6.4 Distribution of Natural Energy Resources | 2.B |
| 6.5 Fossil Fuels | 7.A |
| 6.6 Nuclear Power | 2.B |

•Complete Personal Progress Check MCQ Part A for Unit 6.

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| Topic | Skill Pairing |
| 6.7 Energy from Biomass | 7.B |
| 6.8 Solar Energy | 5.C |
| 6.9 Hydroelectric Power | 7.F |
| 6.10 Geothermal Energy | 1.B |
| 6.11 Hydrogen Fuel Cell | 1.C |
| 6.12 Wind Energy | 7.B |
| 6.13 Energy Conservation | 6.C |

¨ Complete Personal Progress Check MCQ Part B for Unit 6.

¨ Complete Personal Progress Check FRQ for Unit 6.

¨ Take Unit 6 Test.

**Unit 7: Atmospheric Pollution 2 weeks**

*Big Idea: Sustainability (STB-2): Human activities have physical, chemical, and biological consequences for the atmosphere.*

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| Topic | Skill Pairing |
| 7.1 Introduction to Air Pollution | 4.E |
| 7.2 Photochemical Smog | 5.B |
| 7.3 Thermal Inversion | 2.C |
| 7.4 Atmospheric CO2 and Particulates | 4.C |
| 7.5 Indoor Air Pollutants | 5.C |
| 7.6 Reduction of Air Pollutants | 7.D |
| 7.7 Acid Rain | 4.B |
| 7.8 Noise Pollution | 3.C |

¨ Complete Personal Progress Check MCQ for Unit 7.

¨ Complete Personal Progress Check FRQ for Unit 7.

¨ Take Unit 7 Test.

**Unit 8: Aquatic and Terrestrial Pollution 2–3 weeks**

*Big Idea: Sustainability (STB-3): Human activities, including the use of resources, have physical, chemical, and biological consequences for ecosystems.*

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| Topic | Skill Pairing |
| 8.1 Sources of Pollution | 1.A |
| 8.2 Human Impacts on Ecosystems | 6.B |
| 8.3 Endocrine Disruptors | 1.A |
| 8.4 Human Impacts on Wetlands and Mangroves | 7.B |
| 8.5 Eutrophication | 2.C |
| 8.6 Thermal Pollution | 1.C |
| 8.7 Persistent Organic Pollutants (POPs) | 1.B |
| 8.8 Bioaccumulation and Biomagnification | 4.A |

• Complete Personal Progress Check MCQ Part A for Unit 8.

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| Topic | Skill Pairing |
| 8.9 Solid Waste Disposal | 7.D |
| 8.10 Waste Reduction Methods | 6.B |
| 8.11 Sewage Treatment | 2.A |

*Big Idea: Interactions Between Different Species and the Environment (EIN-3): Pollutants can have both direct and indirect impacts on the health of organisms, including humans.*

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| --- | --- |
| Topic | Skill Pairing |
| 8.12 Lethal Dose 50% (LD50) | 6.A |
| 8.13 Dose Response Curve | 5.E |
| 8.14 Pollution and Human Health | 4.C |
| 8.15 Pathogens and Infectious Diseases | 2.B |

¨ Complete Personal Progress Check MCQ Part B for Unit 8.

¨ Complete Personal Progress Check FRQ for Unit 8.

¨ Take Unit 8 Test.

**Unit 9: Global Change 2–3 weeks**

*Big Idea: Sustainability (STB-4): Local and regional human activities can have impacts at the global level.*

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| Topic | Skill Pairing |
| 9.1 Stratospheric Ozone Depletion | 1.A |
| 9.2 Reducing Ozone Depletion | 7.B |
| 9.3 The Greenhouse Effect | 1.B |
| 9.4 Increases in the Greenhouse Gases | 2.C |
| 9.5 Global Climate Change | 5.D |
| 9.6 Ocean Warming | 7.A |
| 9.7 Ocean Acidification | 1.C |

*Big Idea: Interactions Between Different Species and the Environment (EIN-4): The health of a species is closely related to its ecosystem, and minor environmental changes can have a large impact.*

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| --- | --- |
| Topic | Skill Pairing |
| 9.8 Invasive Species | 7.E |
| 9.9 Endangered Species | 7.D |
| 9.10 Human Impacts on Biodiversity | 7.C |

¨ Complete Personal Progress Check MCQ for Unit 9.

¨ Complete Personal Progress Check FRQ for Unit 9.

¨ Take Unit 9 Test.

Complete the AP® Environmental Science exam.

**Labs and Activities**

Labs are conducted at least three times per week (exceeding the minimum 25% instructional time as required by the College Board), two 43-minute blocks on the same day and an additional 43-minute block on another day. Some labs require individual research and data gathering and others have groups of 3–4 students work together. Ongoing field studies and long-term projects are incorporated into lab time. CR11

Lab and field reports include: Title, Introduction, Problem Statement, Methods, Data, Findings, and Conclusions. Reports are compiled into a lab/field experience notebook.

Topics with some associated activities are listed below. Some topics are taught via lecture and classroom discussions, which are not listed below. Units will include additional labs to increase understanding of the curriculum and students will be given the opportunity to develop their own lab activities for themselves and their peers connecting their interests to the concepts presented in the unit.

Practice 3: Text Analysis

**Unit 1: The Living World: Ecosystems**

*Terrestrial and Aquatic Biomes Project—Gallery Walk and Discussion*

DESCRIPTION:

Students create posters related to terrestrial and aquatic biomes that include information related to land/water type, vegetation, topography, food webs, adaptations, latitude, precipitation, climatograms, ecosystem services, etc. (Requisite information depends on whether the biome is terrestrial or aquatic.) On the day of the gallery walks, students record information from other posters. They then reflect on how the biomes are different or the same, what causes changes, and research how climate change may be affecting the biome in question, including biome shifts. Science Practice 2: Visual Representations; Science Practice 5: Data Analysis

*Creating Food Webs/Chains Activity*

DESCRIPTION:

Students will utilize their chosen “favorite creature” to select a biome to research and diagram the food chains and food webs within it. They will provide descriptions of the interactions they drew. Students then hypothesize about the impacts the removal or addition of certain organisms have on their food web.

*Biodiversity: Why Is It Important? Simulation*

DESCRIPTION:

Students are given different cards designating them as a specific type of tree in a “forest” of students. The first forest of “Douglas fir” gets a disease, and since it is a monoculture type of forest, the entire forest is decimated by the disease. The second forest is more diverse, which allows it to become more resilient to disease. Science Practice 1: Concept Application

*Brown Bag Surprise*

DESCRIPTION:

Students learn about species diversity and species richness by investigating the different types of shells that are found in their bag or “ecosystem.” They identify the different “species” of shells that are in their ecosystems and calculate both diversity and richness and determine what they mean to an ecosystem. Science Practice 5: Data Analysis

**Unit 2: The Living World: Biodiversity**

*The Pachyderm in the Room: should we use genetic editing to return species humans made extinct?*

Students will research and discuss the effects of extinction on an ecosystem and using the Philosophical chairs format of Socratic debate to determine if humanity should use modern technology to reintroduce an extinct species to an environment. Students will discuss if there should be a time limit on how long the species has been extinct for, what ethical concerns may occur, what (if any) preparation for the environment should be completed before reintroduction, and predict the overall effects on the environment. Science Practice 3: Text Analysis; Science Practice 7: Environmental Solutions

**UNIT 3: Populations**

*Power of the Pyramids*

DESCRIPTION:

Students calculate age group and gender percentages in populations, create population pyramids in connection with the data they calculated, and then make inferences about population dynamics, including population growth rates. Science Practice 2: Visual Representations, Science Practice 6: Mathematical Routines

**Unit 4: Earth Systems and Resources**

Soil Lab

DESCRIPTION:

Students obtain soil from their surrounding neighborhoods and analyze it to determine if it is suitable for any type of agriculture. They use both physical and chemical tests to determine the type of soil it is. As for the physical tests, they use their data to match the soil texture triangle. A formal lab report is submitted discussing whether their hypothesis regarding arable land was supported or unsupported and why. Science Practice 4: Scientific Experiments

**Additional Activity**

Students will visit the Phinizy Center for Water Sciences to explore how environmental science can assist with finding less impactful methods to meet regulatory requirements and improve humans’ relationships the natural watershed of the Savannah River. Students will conduct water and soil tests at the center while there and report on their findings in a audio-visual presentation provided to their peers, other faculty and school administration.

**This syllabus is adapted from the sample AP® Environmental Science syllabus:**

College Board. (2020). *AP Environmental Science Sample Syllabus 1.* Retrieved from AP Central: https://apcentral.collegeboard.org/courses/ap-environmental-science/course-audit