**AP Environmental Science Course Syllabus 2014-2015**

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**Textbook:** *Environmental Science: Toward a Sustainable Future* by Richard T. Wright (Pearson/Prentice Hall, 2008). We will also be using a variety of *supplementary texts and resources.*

**Course Description:**

**Environmental Science Curricular Requirements:** This course provides instruction in each of the seven content areas outlined in the *AP Environmental Science Course Description*.

**Class Size and Scheduling:** Class size is held to 25 students due to lab equipment and logistics. Individual class periods are 50 minutes long with additional all day and multiple hour field trips. The class is held at the end of the instructional day to allow for extended lab activities when necessary. Each semester consists of two nine-week quarters for approximately 170 days of instruction when accounting for standardized testing.

**Course Prerequisites and Requirements:** AP Environmental Science is open to juniors and seniors who have passed CP Biology, AP Biology, Geometry, and Chemistry or Physics with a B or better. Students should be prepared to do outdoor, in-the-field lab work, as well as some light hiking and strenuous activity.

**Grading and Late Work:**

Grading in each area will be point based. Students will be graded on the below scaled, point based system:

 *Assessments: Tests and Quizzes* (All missed points can be corrected for half credit) 70%

 *Homework and Class discussion* (Weekly Assignments) 15%

 *Labs, Field Studies* *&* *Projects* (Most labs will be held in the field, 1 Project per sem.) 15%

No late work will be accepted unless an extension is cleared *prior to assignment due date*!!!

**Class Format and Expectations:**

* Absent students are expected to contact the instructor as soon as possible, preferably prior to absence.
* Most weeks students will be given a weekly assignment sheet outlining reading and assignments. *Weekly Packets are due when noted on the assignment sheet or assignment board if no assignment sheet is given..*
* Students are expected to finish outlined readings *prior to class time* to better enrich *class discussion*.
* Class discussions will serve to stimulate awareness of relevant issues. These common experiences will strengthen students’ ability to articulate ideas and formulate educated opinions about key issues.
* Periodic essay activities (FRQ’s) will help the students learn to communicate their understanding of environmental concepts, problems and solutions. *A rubric will be provided for essays similar to the rubric used to correct AP exams. Most essays will be free response questions (FRQ’s) from past AP Exams.*
* Cornell Notes will **not** be required **unless** a student’s grade falls **below 80%.** In that case they will be collected as part of the assignment grade until the grade improves to 80% or better.
* Unit tests will be given at the conclusion of each Unit. Some Units span multiple questions.
* Take home Unit Tests will be given at the end of each large Unit that will be based on the format of the AP Exam. Previous released AP essays and MC questions will be given when and where applicable. Students CAN NOT discuss ANY facet of the test/share work. This is an Academic Honesty infraction (see handbook)
* Students will be given *one take home final* at the *end of the first semester* that combines AP ES questions with questions from Unit’s covered during the first Semester. The *second semester final will be a full AP practice test regardless of whether a student decides to take the AP Exam. Taking the AP Exam is encouraged and expected.*
* Local guest lecturers, labs and field experiences will serve to add depth and reinforce topics covered in text.
* An end of the year project may be assigned in early spring and completed by May 22nd.

**Course Outline:**

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| **Units/Chapters in Text** | **Corresponding Topic from Outline** | **Timeline** | **Dates** |
| **Unit 1-** **Introduction: Building Awareness**(20 pages) | **Issues** of Environmental Science | **1 week** | Aug. 18 -22  |
|  **Unit 2 - Ecosystems:**  | **The Living World** | **6 weeks** |  |
| 2 - **Ecosystems**: What They Are (24 pages) | Ecosystem Structure |  | Aug. 25 -Sept. 5  |
| 3 - **Ecosystems**: How They Work(25 pages) | Energy Flow, Natural Biogeochemical Cycles |  | Sept. 8– 19  |
| 4 - **Ecosystems**: How They Change(31 pages) | Natural Ecosystem change, Population Biology Concepts |  | Sept. 22– Oct. 3 |
| **Unit 3 - Renewable Resources** | **Earth Systems and Resources,** **Land and Water Use** | **10 weeks** |  |
|   7 - **Water**: Hydrologic Cycle and Human Use (23 pages) | Atmospheric Circulation, Coriolis Effect, Weather, Water Cycle, Global Water Resources and Use  |  | Oct. 6- 10  |
| – *Planet Earth* – *(supplementary matl.)* | The Structure of Earth, Plate Tectonics, Earthquakes, Volcanoes |  | Oct. 13– 17 |
| – *Rocks/Minerals & Weathering* *(supplementary matl.)* | Properties of Minerals, Indicators and Formation, Rock Weathering, Soils, The Rock Cycle |  | Oct. 20– 24 |
| 8 - **Soil: Foundation for Land Ecosystems**(20 pages) | Soil and Soil Dynamics, Soil Types, Erosion and Salinization, Soil Conservation  |  | Oct. 27– Oct.31 |
| 9 - **The Production and Distribution of Food**(24 pages) | Agriculture, Rangelands |  | Nov. 3- 7 |
| 10 - **Wild Species and Biodiversity**(25 pages) | Ecosystem Diversity, Loss of Biodiversity |  | Nov. 12- 21 |
| 11 - **Ecosystem Capital**: Use and Restoration(27 pages) | Forestry, Mining, Other Land Use, Global Economics |  | Dec. 1Dec. 16 |
| **Semester 2** |  |  |  |
| **Unit 4 - The Human Population** | **Population** | **3 weeks** |  |
| 5 - **The Human Population**(23 pages) | Human Population Dynamics, Impacts of population growth |  | Jan. 6Jan. 13 |
| 6 - **Population and Development**(21 pages) | Population size |  | Jan. 14Jan. 23 |
| **Unit 5 - Energy** | **Energy Resources and Consumption** | **3 weeks** |  |
| 12 - **Energy from Fossil Fuels**(25 pages) | Energy Concepts, Energy Consumption and Conservation (Use – Past, Present, Future), Fossil Fuel Resources and Use |  | Jan. 26Jan. 30 |
| 13 - **Energy from Nuclear Power**(22 pages) | Nuclear Energy |  | Feb. 2-11 |
| 14 - **Renewable Energy**(25 pages) | Hydroelectric Power, Renewable Energy (Passive and Active Solar Energy, Wind Power, Biofuels, and Hydrogen) |  | Feb. 12-20 |
| **Unit 6 - Pollution and Prevention** | **Pollution** | **7 weeks** |  |
| 15 - **Environmental Hazards and Human Health**(23 pages) | Impacts on the Environment and Human Health |   | Feb. 23-27 |
| 16 - **Pests and Pest Control**(23 pages) | Pollution Types: Water Pollution |   | Mar. 2-6 |
| 17 - **Water Pollution and Its Prevention**(25 pages) | Pollution Types: Water Pollution |   | Mar. 9-13 |
| 18 - **Municipal Solid Waste**: Disposal and Recovery(17 pages) | Pollution Types: Solid Waste |   | Mar. 16-20 |
| 19 - **Hazardous Chemicals**: Pollution and Prevention(21 pages) | Impacts on the Environment and Human Health |   | Mar. 23 -27 |
| 20 - **The Atmosphere**: Climate, Climate Change, and Ozone Depletion(31 pages) | The Atmosphere and Weather, Stratospheric Ozone, Global Warming |   | Mar. 30 to Apr. 3  |
| 21 - **Atmospheric Pollution**(27 pages) | Pollution Types: Air Pollution, Impacts on the Environment and Human Health |   | Apr 14– Apr.17  |
| **Unit 7 - Toward a Sustainable Future** | **Global Change/Pollution/Land and Water Use** | **2 weeks** |  |
| 22 & 23- **Economics, Public Policy, Sustainable Communities and the Environment**(44 pages) | Other Land Use: Sustainable Land-use Strategies, Policy and Economic Impacts |  | Apr.20 – 27  |
| 23 – **AP ES Review** |  |  | Apr.28 – May 1  |
| **\*\*\*\*\*\*\*AP ES Test\*\*\*\*\*\*\*** | *Morning Test held at 8:00AM* | **Monday** | **May 4th**  |

**Resources:**

**Textbooks**

Richard T. Wright: *Environmental Science: Toward a Sustainable Future.* Tenth edition (Pearson/Prentice Hall, 2008).

B. Skinner: *The Dynamic Earth: an Introduction to Physical Geology. .pdf from* [*www.usgs.gov*](http://www.usgs.gov)

**Lab Manuals:** *Various Activities from a variety of sources including…*

Wagner and Sanford. *Environmental Science: Active Learning Laboratories and Applied Problem Sets.* (John Wiley & Sons, Inc., 2005)

Mitchell and Stapp: *Field Manual for Water Quality Monitoring: An Environmental Education Program for Schools.* Twelfth edition. (Kendall/Hunt Publishing Company, 2000)

**Software:**

Microsoft Office Suite: Specifically Word, Excel, PowerPoint

**Laboratory and Field Experiences:**

Lab activities will be performed in a variety of different settings including in class labs, off-site whole and half day field experiences, and project related field experiences. Labs are subject to change as opportunities with community partners arise. A few of the below labs are tentative, however students will have *no fewer than 70 hours of lab throughout the year*. **A lab donation of $10.00 per student is recommended. Please reference APES Donation on the check and give to your instructor no later than September 2nd.**

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| **Labs/Activities** | **Reference** | **Duration** | **Description** |
| Turtle Bay Restoration Visits | Instructor | 12 hrs. | Students will research restoration and participate with community partners such as the BLM, Turtle Bay, DFG, RCD & COR |
| Macroinvertebrates Lab | Water Quality Monitoring, Pg.83 | 3 hrs. | Students will study ecosystem structure and biodiversity from a nearby stream using techniques used by WSRCD  |
| Water Quality Lab | Wagner, Pg. 37 | 2 hrs. | Students will monitor local streams for various pollutants using a biological pollution index determined by macroinvertebrate distributions |
| Primary Succession Lab | Instructor and NPS | 6 hrs. | Students will be taken on a tour/hike in a nearby watershed to survey various stages in succession and decomposition |
| Salmon Population study | Instructor and DFG | 5 hrs. | Students will collect data from local riverine environments on fish counts to determine salmonid populations and migrations |
| Water Measurement Lab  | Instructor and USGS | 4 hrs. | Students will learn how the USGS determines flow rate and stage of rivers and creeks |
| Soil Characterization Lab | Wagner, Pg. 97 | 4 hrs. | Students will use both soil samplers and soil test pits to identify soil horizons, use color and texture guide to describe soil characteristics and produce soil reports. |
| Net Primary Producers Lab Design | TBD | 3 hrs. | Students will collect and analyze data on net primary production from local ecosystems using cut and weigh methods. |
| Aquatic Species Diversity Lab  | Wagner, Pg. 63 | 3 hrs. | Students will compare biodiversity in various aquatic habitats using the Sequential Comparison Index to study the impact of development on biodiversity. |
| Carbon Sequestration and Board foot calcs | NPS | 3 hrs. | Students will measure how much carbon is tied up in a stand of trees, and will do board foot calculations on trees in the stand. |
| Energy Conservation Lab | Instructor | 3 hrs. | Students will perform a basic energy audit to identify how energy is used and means of improving energy efficiency. |
| Solar House Lab | The Environmental Literacy Council | 2 hrs. | Students will research active and passive solar systems, design and build a scale model of solar house that will then be tested to determine its ability to use solar energy well. |
| Toxicity Testing Lab | Wagner, Pg. 123 | 3 hrs. | Students will use Brine shrimp, dissection equipment and microscopes to generate dose-response curves and determine lethal concentrations (LC50) of various household chemicals. |
| Golf course Water Quality Lab | Water Quality Monitoring, Ch. 3 | 3 hrs. | Students will use water quality testing procedures outlined in Mitchell and Stapp manual to study the effects on water quality due to a local golf course and residential development. |
| Environmental Forensics Lab | Wagner, Pg. 67 | 3 hrs. | Students will use several field and lab techniques to detect environmental contaminants and report on their potential sources using an analytical and deductive approach. |
| Solid Waste Water Quality Lab | Water Quality Monitoring, Ch. 3 | 3 hrs. | Students will use water quality testing procedures outlined in Mitchell and Stapp manual to study variations in water quality above and below various points of entry of treated solid waste into local rivers/streams. |
| Environmental Contamination Lab (exp. Design) | Wagner, Pg. 47 | 3 hrs. | Students will design and conduct an experiment to study the effects of various soil contaminants on hard red winter wheat. |
| Air Quality and Automobiles Lab | Wagner, Pg. 85 | 3 hrs. | Student will use a combination of internet research, field surveys and field sampling to estimate the average amounts of annual pollutants emitted by cars on our campus. |
| Indoor Air Quality Lab | Wagner, Pg. 91 | 2 hrs. | Students will investigate and report about the indoor air quality (carbon dioxide levels, temp. humidity and flow of air) within certain buildings on campus. |
| Life Cycle Assessment | Wagner, Pg. 33 | 2 hrs. | Students will perform a "cradle-to-grave" analysis to identify and evaluate the potential environmental effects of a locally produced product over its lifetime. |
| Pollution Prevention: Solid Waste Lab | Wagner, Pg. 113 | 5 hrs. | Students will use a combination of visual inspection, tallies, surveys and research techniques, in combination with the Pollution Prevention Hierarchy (SB 6602(b)), to evaluate our campus and identify ways to promote "greener living." |

**21 field experiences** for  **77 hrs.**