

Curriculum Outline



Campbell High School

Character – Courage – Respect – Responsibility

Course & Level: **Advanced Placement Environmental Science**

Department: **Science**

Teacher: **Chet Orban**

Grade level: **11 and 12**

Description of Course:

This is a college level course that incorporates both physical and biological sciences in the study of the environment. Topics include the interdependence of Earth's systems, human population dynamics, renewable and non-renewable resources, environmental quality, global changes, and their consequences, environment and society, and choices for the future. The course will include quantitative analysis of data and significant laboratory and field investigations and project components. Students are required to complete three hours of community service on an environmental project. All enrolled students are expected to pick up a textbook and summer assignments before leaving in June. A quiz will be given the first week in September on the assigned summer assignment.

School – Wide Expectations:

Academic:

1. Read, write and speak effectively
2. Exhibit critical thinking and problem solving skills
3. Use resources to obtain information and facilitate learning

Civic/Social:

1. Work cooperatively in an atmosphere of mutual respect
2. Exhibit personal responsibility

The school-wide expectations are incorporated into all courses at Campbell High School. Underlined words in the following text illustrate this alignment between the school-wide expectations and the course

Core Competencies and State Standards:

1. **Environmental Concepts** – Students will explore and understand between and among species, their environment, and their effects by human interaction. Students will demonstrate their understanding through written and oral assignments.

LS 1 All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, and species).

LS 2 Matter cycles and energy flows through an ecosystem.

LS 3 Groups of organisms show evidence of change over time (structures, behavior, and biochemistry).

LS 4 Humans are similar to other species in many ways, and yet are unique among Earth's life forms.

PS 1 All living and nonliving things are composed of matter having characteristics properties that distinguish one substance from another.

PS 2 Energy is necessary for change to occur in matter. Energy can be stored, transferred and transformed, but cannot be destroyed.

2. **Scientific Technique and Investigation** - Students will evaluate, solve, and explain solutions to problems via the scientific process and use scientific equipment for data collection to investigate natural phenomena and communicate findings through summative and formative standard reporting method. Students will complete individual and cooperative assignments.

SPS1 – Scientific Inquiry and Critical Thinking Skills (INQ) **SPS2** – Unifying Concepts of Science **SPS3** – Personal, Social, and Technological Perspectives **SPS4** – Science Skills for Information, Communication and Media Literacy

3. **Scientific Research** – Students will research, review and interpret significant scientific and human developments that pertain to the environment, and produce tangible, project-based application.

SPS1 – Scientific Inquiry and Critical Thinking Skills (INQ) **SPS2** – Unifying Concepts of Science **SPS3** – Personal, Social, and Technological Perspectives **SPS4** – Science Skills for Information, Communication and Media Literacy

Suggested Texts and Media (Software, AV, etc.):

1. Textbook and ancillary materials (concept development sheets, labs, etc.): Living in the Environment by Miller.
2. Eight different field guides, i.e. Trees, forests, weeds, insects by Peterson
3. Numerous manuals on soil, water, and air testing and standards by EPA.
4. Specific online programs for monitoring world climate data.

The science curriculum at Campbell High School is a dynamic document, reflecting the nature of the subject. It addresses ever-changing areas of study, such as genetics and quantum physics, as well as the fundamentals, such as the Periodic table and Newton's Laws of Motion. Scientific Research is an important component for each course at Campbell. The analysis and interpretation of recent scientific information and articles will vary appropriately with grade level and course difficulty.

We utilize a variety of instructional resources beyond the identified textbooks and materials throughout the school year to enhance your student's educational experience. Parents/Guardians are welcome to review the available resources throughout the school year by contacting their student's teacher. Due to religious or moral objections, alternative assignments may be available upon request.

Suggested Instructional Strategies:

1. Lecture and Demonstration – Use of demonstration apparatus to guide student inquiry. For example, numerous biological specimens i.e. the “Black walnut event” – students make predictions on what this item is used for and who does it belong to, followed by lab investigations to collect evidence to support their predictions. Lectures frequently revolve around what students think about certain concepts, i.e. What causes the ocean gyros to move clockwise in the northern hemisphere, and counter-clockwise in the southern hemisphere? This type of approach leads to a student discovering alternate conceptions, which can be addressed during a guided discovery learning process.

2. Lab, Investigations - Exploratory or investigation labs allow students to ask their own questions about a particular concept. These labs have limited formal outcomes and are instead designed to elicit ideas from students to investigate and evaluate, and quantify as well as predict. Other labs called technique labs allow students to learn how to use equipment in order to obtain data.

3. Research Project – Students will gain a broader understanding of the essence of scientific inquiry performing research for the purpose of writing an academically sound paper, as well as presenting their findings to the rest of the class in the form of a Power Point Presentation. This is specifically done in the Wood Lot Project, The Wildlife Habitat Project, the Mammal Project and Darrah Pond Project.

Suggested Assessment Strategies:

1. **Quiz/ Test** – See Environmental Science, FS Creation Exam Pro Software. Typically 60% multiple choice, and/or matching and 40% open response (graphical analysis, data analysis, problem solving, and essay).
2. **Lab Report Rubric** – In order to demonstrate competency in the Scientific Investigation requirement, students communicate lab outcomes that comply with a standard reporting framework, as well as an informal lab inquiry. See attached lab reporting guidelines.
3. **Project Rubric** – there are several authentic projects which contain both performance criteria, journaling criteria, and reporting criteria. See attached examples of “Wood Lot Project” as examples of performance guideline and rubric.
4. **Informal Groupwork** – Summative and formative assessment in which students work on a particular problem in groups of two or four. Groupwork encourages peer learning, strengthens topical skill sets through teaching, and promotes collaboration and community. Examples of groupwork include inquiry investigations, data analysis, and laboratory experimental problem sets.