

Curriculum Outline



Campbell High School

Character – Courage – Respect – Responsibility

Course & Level: Astrobiology

Department: Science

Teacher: Jeanne Schratwieser

Grade level: 11 and 12

Description of Course:

This course emphasizes hands-on, project-based inquiry. Astrobiology is the study of life in the universe. This course explores basic concepts in Astronomy to support the investigation of the origin, distribution and future of life on earth and beyond. Students learn about how the sun and stars have influenced life on earth throughout the millennia, conditions for life within our solar system, the status of our space program, the SETI (Search for Extra-Terrestrial Intelligence) project, and current NASA research in astrobiology. Students examine such issues as: Are there signs of any life on Mars or elsewhere in our solar system? Could there be intelligent life elsewhere in the universe? What conditions would be necessary for life to exist? How could humans colonize environmentally hostile planets?

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

Core Competencies and State Standards:

1. **Scientific Technique and Knowledge-** Students will demonstrate scientific knowledge in content areas using appropriate terminology both in an oral and writing format.
2. **Scientific Investigation-** Students will investigate, solve, explain solutions, and evaluate scientific problems through the scientific process.
3. **Scientific Research-** Students will research, review and interpret significant scientific developments.

State Standards in all Competencies.

ESS 1 The Earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

ESS 2 The earth is part of a solar system, made up of distinct parts that have temporal and spatial interrelationships.

ESS3 The origin and evolution of galaxies and the universe demonstrate principles of physical science across vast distances and time.

ESS4 The growth of scientific knowledge in Earth Space Science has been advanced through the development of technology and is used (alone or in combination with other sciences) to identify, understand and solve local and global issues.

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, A/V, etc.):

- 1. Textbook: Concepts and Challenges** - Astrobiology: An Integrated Science Approach (It's About Time, Herff Jones Education Division)
- 2. Ancillary materials (concept development sheets, labs, etc):** Teachers resources color overheads and teacher edition books. NASA materials and websites.
- 3. Various DVD's and Videos:** Bill Nye the Science Guy (Astrobiology), NASA videos and DVD's, The Universe (History channel); Known Universe (National Geographic).

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. Please contact the classroom teacher for further details.

Suggested Instructional Strategies:

- 1. Lecture, Discussion and Demonstration** – Students are expected to take notes from lecture, power point presentations and demonstrations. Use of demonstrations are a way to guide student inquiry. Students are encouraged to ask questions and discussion is an integral part to the inquiry process. Through this, students are encouraged to think independently and 'outside of the box' in order to exhibit critical thinking and problem solving skills.
- 2. Lab, Investigation** – Exploratory or investigation labs allow students to ask their own questions about a particular concept. Students also use labs to explore different concepts with expected outcomes. Some labs will be completed individually or cooperatively.
- 3. Projects** – Students are expected to use prior knowledge learned as well as research to create projects that are meaningful and fun. Students are expected to present projects to class through various forms such as posters, oral presentations, and power points. One example of this is Carbon's Ultimate Road Trip.
- 4. Current Events** – Students are expected to research recent discoveries or current events in astrobiology. They will then present this new information and research to the class for group discussion.

Suggested Assessment Strategies:

- 1. Quiz / Test** – Typically multiple choice, true/false, or matching and open response (a mixture of problem solving, essay, and graphical analysis), Lab activities.
- 2. Lab Report** – In order to demonstrate competency in the Scientific Investigation requirement, students communicate lab outcomes in the Campbell High School Lab Report Format revised to be appropriate for juniors and seniors.
- 3. Project** – Students are assessed on oral, written presentations and visual displays.
- 4. Informal Groupwork** – Various modes of formative assessment in which students work on a particular problem in groups of two to four. Groupwork encourages peer learning, strengthens topical skill sets through teaching, and promotes collaboration and community. Examples of groupwork include Data Analysis, oral presentations and Problem Solving.