Curriculum Outline

Campbell High School
Character – Courage – Respect – Responsibility

Course & Level: **Honors Biology**

Department: **Science**

Teacher: **Mr. Orban**

Grade level: **10**

Description of Course:
Students taking Honors Biology will participate in a similar course of study to the conventional Biology curriculum based on topics in ecology, cell structure, biochemical pathways, genetic evolution, classification, structure, and function of living organisms. The above topics will be studied and investigated through three lenses of inquiry. These lenses or modes of inquiry are the biochemical, genetic, and evolutionary applications that will relate student understanding to the general concepts of Biology. Students will also study topics of microbiology and the bio-chemistry of symbiotic relationships. Further, it will be possible to introduce more sophisticated and technological advanced labs into this course, and blend the classical biology of comparative anatomy with the modern approach of genetics, evolution and biochemistry.

School – Wide Expectations:

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

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.
3. Work cooperatively in an atmosphere of mutual respect

Core Competencies and State Standards:

Semester 1

Cell Biology - Students will describe, orally or in a written format the structure and function of cells, and compare and contrast prokaryote and eukaryote cells.
LS 1 *All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, and species).*
Understanding Biodiversity - Students will examine and illustrate the complexity and diversity of life, its classification and integration.
LS 2 *Matter cycles and energy flows through an ecosystem.*
LS5 *The growth of scientific knowledge in Life 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.*

Semester 2

Living Systems - Students will review the characteristics and properties of organisms, including their structure and function. The complexity and diversity of life will be examined by comparing and contrasting a variety of living organisms. Students will demonstrate their understanding both orally and in written 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.*
Genetics and Evolution - Students will identify the basic mechanisms and outcomes of human hereditary and genetic engineering. Students will demonstrate their understanding and critical thinking skills by recognizing and predicting patterns and products of evolution, and its relationship to hereditary.
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.*
LS5 *The growth of scientific knowledge in Life 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.*

Scientific Research – Semester 1 and 2

Students will research, review and interpret current scientific developments and its ethical implications.

Scientific Technique and Investigation – Semester 1 and 2

Students will demonstrate scientific inquiry and its nature of science analysis in a laboratory investigation. They will produce individually work and also work cooperatively in group situations. Students are to demonstrate correct handling and safety techniques of laboratory equipment including accuracy in the dissection of specimens.

State Standards in all Skill Competencies.
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 and ancillary materials (concept development sheets, labs, etc.): *Biology*, Miller, Levine

2. *DVD Medicine Man (*Biosphere, biomes, global problems), *Double Helix* (DNA), *Dive to the Edge of Creation* (Chemosynthesis, biomes), Gattaca (human cloning and ethical issues)

3. Prentice Hall Test Bank and Generator software

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 and Demonstration – Use of demonstration apparatus to guide student inquiry. For example, numerous biological specimens i.e. the "Raccoon quill Event" – students make predictions on what this item is used for and who does it belong to, followed by lab investigation to collect evidence to support their predictions. This brings the hypothetical-deductive inquiry into the forefront of the learning process. Lectures frequently revolve around what students think about certain concepts, i.e. Do Plants breath? This type of approach leads the teacher and student to discover the students alternate conceptions which can be addressed during the guided discovery learning process.

2. Lab Investigation – 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. Students are also presented with labs that have expected outcomes. For example, students investigate the effect of temperatures on enzymes where students must construct an experiment in which they explore how varying temperatures affect the enzymes in potatoes. Individual assignments and cooperative work is required in the lab investigations.

3. Lab, Evaluation – Lab evaluations are both informal and formal. Students are expected to record data and make predictions both orally and in written lab formats. The labs are evaluated and assessed as part of the Lab Investigation and Techniques competency.

4. Construction Project – Modeling is a primary aspect of the sciences both as a predicting mechanism and a learning mechanism. For this reason we have instituted some projects that require students to construct models such as the "Plant Cell Model", as well as a hypothetical model of a animal or plant (that does not exist now) that could live in a harsh environment. Application of what students have learned about life is then applied with some creativity to what could possibly be. This leads to Hypothesis formation.

5. 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 finding to the rest of the class in the form of a Power Point Presentation. This is specifically done in the Biome Project.

Suggested Assessment Strategies:

1. Quiz / Test – See Biology Test Generator Software. Multiple choice, true/false, or matching and open response (a mixture of problem solving, essay, and graphical analysis).

2. Lab Report – In order to demonstrate competency in the Scientific Investigation requirement, students **communicate** lab outcomes in basic formats appropriate for sophomores.

3. Project – Students are assessed on **oral and written** presentations.

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**.

5. Notebooks – Notebooks are periodically checked to ensure that students are taking accurate notes and retaining the appropriate materials and labs for future reference.