

Honors Biology Expectations
SPRING Semester 2009-2010
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Course Description

Biology is a quest, an ongoing inquiry about the nature of life.

In many ways biology is the most demanding of the sciences. First of all, living things are amazingly complex! Biology is interdisciplinary and requires understanding of chemistry, physics, and mathematics (we'll continue to learn and practice these as we go along!). Biology is also the most connected of the sciences to the humanities and social sciences.

You are becoming involved with biology during its most exciting era. The largest and best-equipped community of scientists in history is beginning to solve biological puzzles that were previously unsolvable. Research breakthroughs are transforming our understanding, for example, of behavior, health,, environment, nutrition, psychology, sociology...

This Honors Biology course is similar to a college level course for non-majors. Students will be involved in an in-depth examination of major topics in Biology. The major difference between this course and an AP Biology course is the level of detail, particularly as related to biochemistry.

Course Goals

The three main goals of General Biology are:

1. To help students develop a conceptual framework for modern biology;
2. To help students gain an appreciation of science as a process.
3. To develop a deeper sense of wonder and curiosity about the living world

The ongoing knowledge explosion in biology makes even these straightforward goals quite challenging. Thus, the primary emphasis in General Biology is on:

1. Developing an understanding of concepts rather than an accumulation of facts (see the attached "Big Ideas in Biology");
2. Personal experience in scientific inquiry;
3. Recognition of unifying themes that integrate the major topics of biology; and
4. Application of biological knowledge and critical thinking to environmental and social concerns.

Although we will be examining many of the major aspects of basic biology, who knows exactly where this journey will lead you? Regardless of the unknowns, by the end of the course you will be richer in knowledge and experience and will be prepared for higher level college biology.

Methods

- Lectures and readings; Discussions; Laboratory; Independent Research/Student Projects; Quizzes; Tests; Homework Assignments; Papers; Presentations; Projects
- Other sources of information will be the textbook, charts and diagrams, videos, and many internet sources selected by Phil and by yourselves.
- **Always remember, you are the learner here! You are the one who needs to actively acquire knowledge.**

The Laboratory

A big portion of your learning will be derived from laboratory work. Laboratory work will encourage the development of important skills including detailed observation, accurate recording, experimental design, manual manipulation, data interpretation and presentation, statistical analysis, and operation of technical equipment. Laboratory assignments will offer the opportunity for students to experience problem solving, the scientific method, techniques of research, and the use of scientific literature. Laboratory investigations also encourage higher-order thinking, including evaluating and monitoring progress through an investigation, generating ideas, and formulating hypotheses.

-INFORMATION ABOUT BEING A SUCCESSFUL STUDENT IN THIS CLASS-

Enjoyment and learning in this course will require steady, careful attention to the readings, assignments, discussions, and lectures. Be involved in class discussions and activities. Help foster an environment that is cheerful while being focused on learning. Be considerate and help maintain an environment that is safe for inquiry and learning (in other words don't scoff or be sarcastic about other student's work or comments).

NOTEBOOKS

You will need a notebook and you will need to take notes during class. Date each new set of entries. You are expected to take notes every day.

ASSIGNMENTS

Assignments will include responses to readings, research presentations, design of experiments, carrying out experiments, and lab reports. Students may miss one minor assignment. Any late assignments must be turned in by the following class in order to receive credit.

PROJECTS

Spring Semester will include a major research project resulting in a paper and a presentation.

ATTENDANCE AND LATENESS

Students are expected to attend every Biology class and be ready to get to work. Absence due to illness (or for other reasons) of more than 9 classes may result in loss of credit as the course is based on laboratory experiences, discussions and interactive lectures or presentations. If you miss classes, for any reason, you are responsible for borrowing and copying class notes from a classmate.

You may not be able to make up a lab if you miss it. In that case, get all notes, handouts, etc. from a classmate. Have them thoroughly explain what took place and what you are expected to do. Then ask Phil to review the lab with you.

ASSESSMENTS

We will have regular quizzes and up to 4 longer assessments during the semester. Students must score at least 80% on their assessments or will need to retake their assessments until they receive an 80%. Retakes will be offered during lunch on Monday, Wednesday, or Friday. You are responsible for scheduling your retakes with me.

SPECIFIC REQUIREMENTS FOR COURSE CREDIT

- 1- Notebooks - More than 2 missed entries will result in no credit for the course.**
- 2- Assignments/Projects – Miss more than 1 minor assignment during the semester and you will not receive credit. If assignments are late, they must be in by next class or counted as a missed assignment. No missed major assignments.**
- 3- Assignment Quality – Assignments must meet quality standards of the instructor or they will be returned to be redone until they meet quality standards. Understanding basic quality standards will be a learning process for some of you. These redone assignments are considered late until accepted as complete.**
- 4- Assessments – Miss more than 1 quiz and you will not receive credit. Students must score at least 80% on their assessments or will need to retake the assessments until they receive 80% or better.**
- 5- Attendance – Miss 9 classes: no credit, Miss 3 labs: no credit**

Big Ideas in Watershed Honors Biology

Big ideas show up again & again throughout the study of biology, & in all biological disciplines. More important than any individual facts, these themes can be applied across the entire curriculum. They are listed here to help you organize concepts & topics into an intellectual framework that will be valid & useful long after many of the details we examine become outdated.

1. Science as a process, & a way of knowing: Science is not a set of facts but a powerful, objective, & potentially remarkably useful way to understand the world & its phenomena. It can involve a discovery process using observation/description, inductive reasoning, or hypothesis testing.

2. The Interrelationship of Science, Technology, & Society: Scientific research often leads to technological advances that can have positive &/or negative impacts on society as a whole. In the 21st century it is absolutely crucial to understand the relationships of science & technology to society.

3. Evolution as a Fundamental Theory: As biology's central organizing theory & principle, evolution explains the unity & diversity of life, & increasingly, social /behavioral aspects of organisms. Species tend to maintain themselves from generation to generation using the same genetic code. But, over time, environmental/genetic mechanisms also lead to evolution, or change. Recent findings in molecular biology have expanded & strengthened our understanding of evolution.

4. Unity & Diversity of Life: life takes on a mind-boggling variety of forms but all living things share many similarities at the cellular-molecular level

5. Cellular Basis of Life: every organism's basic unit of structure & function is the cell & all living things are either single-celled or multicellular.

6. Heredity & Biological Information: the continuity & "success" of life depends on biological information in the form of DNA molecules

7. Energy & Life: Energy is the capacity to do work. All living organisms remain alive because of their abilities to link energy reactions to "life chemistry" (the biochemical reactions) that take place within their cells.

8. Relationship of Structure to Function: every major group of organisms has evolved its own set of specialized "body parts" or "cell-parts" – structures that evolved in ways that make particular functions possible

9. Regulation: at every level -- from cells to organisms to ecosystems -- life is in a state of dynamic balance controlled by systems of positive or negative feedback.

10. Interdependence, Interaction, & Systems in Nature: Most organisms are completely dependent on the cycling of matter &/or the flow of energy provided by the other organisms, as well as non-living resources, within their environment. The living world can be seen as having a hierarchical organization, from molecules to the whole living planet (or biosphere). With each upward step in this hierarchy system properties emerge as a result of interactions among components at "lower" levels.