

Newport-Mesa Unified School District
Course Description

HONORS BIOLOGY
1 Year Course (1AB)

Content covered in this course is described in the Course of Study. Based upon student needs, teachers select appropriate materials from the Instructional Materials List. Classroom presentations of course content are determined by the instructor and described under Teacher Activities. A more detailed outline of this course can be obtained from the instructor.

OVERVIEW:

Honors Biology is a rigorous year-long laboratory course for 9th and 10th grade students. The course is an accelerated college preparatory biology class for highly motivated students who have demonstrated excellent study skills and high aptitude in math. Prerequisites include completion of 3 of the following 4 conditions:

1. Completion of or concurrent enrollment in Geometry;
2. A score of 'highly proficient' on California Standards Test in Science;
3. Cumulative G.P.A. of 3.5 or higher;
4. Teacher recommendation

The course will cover basic chemistry, cellular biology, genetics, evolution, ecology, classification, and human physiology in greater depth than Biology 1AB. The curriculum integrates writing skills, critical-thinking skills, laboratory skills and dissection skills as they apply to the standards. In addition, the course work will emphasize microscopy, calculating data, graphing and essay exam questions.

COURSE OF STUDY OBJECTIVES:

1.0 The student will describe and apply the chemical context of life.

1.1 SUGGESTED STUDENT ACTIVITIES:

- Atomic models
- Periodic Table
- Organic chemistry (carbon chain and functional groups)
- pH Lab
- Reaction Lab
- Activities and worksheets involving electron dot diagram and energy

1.2 INSTRUCTIONAL MATERIALS USED:

- Videos
- Overheads and diagrams
- Adopted Biology and Chemistry textbook
- Atomic model kits

1.3 TEACHER ACTIVITIES:

- Conduct lectures
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion and class demonstrations.

2.0 The student will describe the fundamental life processes of plants and animals and how they depend on a variety of chemical reactions that are carried out in specialized areas of the organism's cells.

2.1 SUGGESTED STUDENT ACTIVITIES:

- Drawings of plant and animal cells
- Compare and contrast prokaryotic cells, eukaryotic cells and viruses
- Computer Lab activity
- Cell membrane and transport activity
- Build a cell membrane model
- Report on cell organelles structure and function

- Plant and animal cell Lab
- Macromolecule Lab
- Enzyme Lab- quantitative
- Limits of cell size Lab
- Photosynthesis Lab

2.2 INSTRUCTIONAL MATERIALS USED:

- Videos
- Overheads and diagrams
- Adopted Biology textbook
- Microscopes

2.3 TEACHER ACTIVITIES:

- Conduct lectures
- PowerPoint presentation
- Semi-permeable demonstration- osmosis
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion and class demonstrations.

3.0 The student will identify and describe what leads to genetic variation in a population.

3.1 SUGGESTED STUDENT ACTIVITIES:

- Meiosis verses mitosis pamphlet
- DNA models
- From Gene to Protein
- Mutation simulation

3.2 INSTRUCTIONAL MATERIALS USED:

- Videos
- Overheads, diagrams and charts
- Adopted Biology textbook

3.3 TEACHER ACTIVITIES:

- Conduct lectures
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion and class demonstrations.

4.0 The student will understand that multicellular organisms develop from a single zygote and its phenotype depends on its genotype by performing genetic crosses and reading pedigrees.

4.1 SUGGESTED STUDENT ACTIVITIES:

- Punnett Square word problems
- Blood Type Lab
- Pedigree charts
- Genetic cross Lab

4.2 INSTRUCTIONAL MATERIALS USED:

- Videos
- Overheads, diagrams and charts
- Adopted Biology textbook

4.3 TEACHER ACTIVITIES:

- Conduct lectures
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion and class demonstrations.

5.0 The student will understand that genes are a set of instructions encoded in the DNA sequence of each organism that specify the sequence of amino acids in protein characteristic of that organism by using tRNA to translate from mRNA and predicting the sequence of amino acids from codons.

5.1 SUGGESTED STUDENT ACTIVITIES:

- Gel electrophoresis Lab
- RNA decoding activity
- DNA worksheets and activities
- Vocabulary pictionary

5.2 INSTRUCTIONAL MATERIALS USED:

- Videos
- DNA electrophoresis plates
- Restriction enzymes
- Overheads, diagrams and charts
- Adopted Biology textbook

5.3 TEACHER ACTIVITIES:

- Conduct lectures
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion and class demonstrations.

6.0 The student will discuss and write about how the genetic composition of cells can be altered.

6.1 SUGGESTED STUDENT ACTIVITIES:

- Debate on the pros and cons of genetic engineering
- Research paper on genetic disorder
- Biotechnology articles and readings
- Current event report

6.2 INSTRUCTIONAL MATERIALS USED:

- Videos
- Overheads, diagrams and charts
- Adopted Biology textbook

6.3 TEACHER ACTIVITIES:

- Conduct lectures
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion and class demonstrations.

7.0 The student will describe and understand the mechanisms of evolution and population genetics.

7.1 SUGGESTED STUDENT ACTIVITIES:

- How things change activity and report
- Timeline of evolution
- Barriers to evolution
- Hardy Weinberg Model with calculations

7.2 INSTRUCTIONAL MATERIALS USED:

- Videos
- Overheads, diagrams and charts
- Adopted Biology textbook

7.3 TEACHER ACTIVITIES:

- Conduct lectures
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion and class demonstrations

8.0 The student will identify and describe the classification of organisms.**8.1 SUGGESTED STUDENT ACTIVITIES**

- Classification Lab
- Classification pamphlet / flip-chart

8.2 INSTRUCTIONAL MATERIALS USED

- Adopted advanced placement Biology textbook
- Videos
- Overheads, diagrams and charts
- Animals for classification Lab

8.3 TEACHER ACTIVITIES:

- Conduct lectures
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion and class demonstrations.

9.0 The student will discuss and explain how stability in an ecosystem is a balance between competing effects.**9.1 SUGGESTED STUDENT ACTIVITIES:**

- Read, discuss and activities with *Silent Springs*
- Ecology Lab
- Debate and research paper on pesticides and impact on food chain.
- Vocabulary charades
- Back Bay Field Trip
- Current event report

9.2 INSTRUCTIONAL MATERIALS USED:

- Class set of *Silent Springs* by Rachel Carson
- Videos
- Overheads, diagrams and charts
- Adopted Biology textbook

9.3 TEACHER ACTIVITIES:

- Conduct lectures
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion and class demonstrations

10.0 The student will describe the structures and functions of organ systems.**10.1 SUGGESTED STUDENT ACTIVITIES:**

- PowerPoint project
- Drawings, posters, or diagrams for each system

10.2 INSTRUCTIONAL MATERIALS USED:

- Videos
- Overheads, diagrams and charts
- Adopted Biology and Anatomy/Physiology textbook

10.3 TEACHER ACTIVITIES:

- Conduct lectures
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion and class demonstrations

11.0 The student will identify structures/organs from dissected material.**11.1 SUGGESTED STUDENT ACTIVITIES:**

- Pre-dissection Lab with computer simulation
- Fetal pig lab on systems (circulation, respiration, excretion, reproduction, and digestion)
- Orange Coast College cadaver lab field trip

11.2 INSTRUCTIONAL MATERIALS USED:

- Appropriate dissection manual
- Dissection CD-ROM
- Videos
- Overheads, diagrams and charts
- Adopted Biology and Anatomy/Physiology textbook

11.3 TEACHER ACTIVITIES:

- Conduct lectures
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion and class demonstrations

INSTRUCTIONAL MATERIALS:

TEXTBOOKS – (List all titles)

Biology – The Living Science (Miller and Levine)
Biology: fourth edition (Neil A. Campbell)
Silent Spring (Rachel Carson)
Essentials of Anatomy and Physiology- Martini and Bartholomew

SUPPLEMENTARY MATERIALS – (List all titles)

Overhead transparencies and test banks – available from many book publishers.

AUDIO-VISUAL MATERIALS – (List all titles)

Cycles of Life series – 26 ½ hour lessons
Unseen Life on Earth series – 12 1 hour lessons

The following Biology/Life Sciences Standards have been integrated into this course: Cell Biology 1 a, b, c, d, e, f, g, h, i, j; Genetics 2 a, b, c, d, e, f, g, 3 a, b, c, 4 a, b, c, d, e, f and 5 a, b, c, d, e; Ecology 6 a, b, c, d, e, f; Evolution 7 a, b, c, d, e and 8 a, b, c, d, e, f, g; Physiology 9 a, b, c, d, e, f, g, h, i and 10 a, b, c, d, e; Investigation and Experimentation a, b, c, d, e, f, g, h, i, j, k, l, m, n.

Submitted by Melissa Hoener, Newport Harbor High School March, 2004