

AP Biology Syllabus

Tully Central School District

Teacher: Karrie Frey

Course Resources:

Text: Biology - 7th Edition by Neil Campbell and Jane Reece. (Published by Pearson - Benjamin Cummings)

Lab Manual: AP Biology Lab Manual for Students (College Board)

Review Book: (teacher use) Preparing for the AP Biology Exam for use with Biology 7th edition. (Published by Pearson - Benjamin Cummings)

Other Resources:

- Access to 27 PC computer lab as well as two, 24 PC laptop computer carts
- Software
 - CAT Lab - purchased as a site license for the high school, allows students to mate cats and using the percentage of traits apply mendelian inheritance rules to the outcomes.
 - CD - ROM that comes with the text (also available online) with excellent animations, activities and lab simulations for review.
- Duke University Talent Identification Program Advanced Placement Teacher Manual - Biology by Bert Wartski
- Subscription to:
 - Scientific American Magazine
 - Discover Magazine
 - AP Biology Listserve through the College Board
- Websites: (not a comprehensive list, most commonly referenced)
 - <http://apbio.biosci.uga.edu/> University of Georgia
 - <http://genome.ucsc.edu/index.html?org=Human> Human Genome browser
 - <http://www.biology.arizona.edu/> University of Arizona
 - http://nobelprize.org/educational_games/medicine/ Educational games
 - <http://www.sciencecourseware.org/vcise/> Online simulation
 - <http://plantsinmotion.bio.indiana.edu/plantmotion/starthere.html> Indiana University
 - <http://www.dhpc.adelaide.edu.au/projects/vishuman2/VisibleHuman.html> Visible Human Viewer
 - http://bio.kimunity.com/ap_biology/ Teacher site by Kim Foglia
 - http://www2.nfld.k12.mn.us/education/components/docmgr/default.php?sectiondetailid=3516&sc_id=1170081088&PHPSESSID=60fcdfb6461e248c897a85658bdcbf38 Teacher site by Jody Saxton-West

Course Overview

AP Biology is introduced to the students as a science that looks at both the unity and diversity of life. We start by looking at the chart provided by the AP Biology Review Book (p. 24 and 25) that has organized nine content topics into eight overarching themes of Biology. These themes are: Science as a process, evolution, energy transfer, continuity and change, relationships of structure to function, regulation, interdependence in nature, and finally science, technology and society. These themes are constantly referred to and play an important role as we review, emphasizing the importance of connections over the memorization of unrelated facts.

The AP Biology class meets every day for 40 minutes, with an alternating lab period scheduled contiguously with the lecture for another 40 minutes. This enables us to have 80 minutes of class every other day. The content has been broken down into 11 units, with chapter reading and questions, essays and a practice multiple choice test assigned at the start of each. The unit exam consists of multiple choice questions that closely resemble the practice test assigned, and three to four essay questions taken from the assigned essays.

The syllabus below is a copy of what the students received for the 2006 - 2007 school year:

| <u>Unit</u> | <u>Chapters</u> | <u>Topic</u> | <u>Exam Date</u> | <u>Days</u> |
|-------------|-----------------|---|------------------|-------------|
| 1 | 1-5,8 | Chemistry, Water and Enzymes | 9/22 | 13 |
| 2 | 6 & 7 | Cells | 10/12 | 12 |
| 3 | 9 & 10 | Cell Respiration and Photosynthesis | 10/30 | 12 |
| 4 | 12 – 15 | Mitosis, Meiosis and Mendelian Genetics | 11/27 | 13 |
| 5 | 16 – 20 | Molecular Genetics, DNA and Protein Synthesis | 12/19 | 16 |
| 6 | 22 – 26 | Evolution | 1/12 | 12 |

| | | | | |
|----|----------------|-----------------|------------|----|
| | | | | |
| 7 | 40 – 44 | Animals Part I | 2/8 | 17 |
| 8 | 45 – 50 | Animals Part II | 3/9 | 16 |
| 9 | 29,30, 35 – 39 | Plants | 3/28 | 12 |
| 10 | 50 – 54 | Ecology | 4/23 | 12 |
| 11 | 27,28,31 - 34 | Taxonomy | 4/24 – 5/2 | 9 |

Review for AP Exam: 5/3 – 5/11

Aside from the unit assignment sheets, students are given a unit calendar so they know what will be happening each day, when lab days are and what labs we are doing for that unit. This helps them plan when to prepare the essays, knowing when the content is being covered.

Articles are occasionally inserted when related to the information being studied. One example of this was an article from Discover Magazine on Epigenetics and the implication it had on evolution, especially the discredited Theory of Inheritance of Acquired Characteristics by Lamarck.

Student evaluation

| Category | Percentage of Grade |
|--|---------------------|
| Multiple choice and Essays on unit exams | 60 |
| Take Home Multiple choice test | 10 |
| Essay preparation | 10 |
| Laboratory write up | 20 |

Labs performed by Unit in the course:

| Unit | Topics | Labs |
|------|--|---|
| 1 | Chemistry, water and enzymes | <ul style="list-style-type: none"> • Behavior of Betta fish • Properties of water • Enzyme catalysis |
| 2 | Cells | <ul style="list-style-type: none"> • Diffusion and osmosis |
| 3 | Cell respiration and photosynthesis | <ul style="list-style-type: none"> • Plant pigments and photosynthesis • Cell respiration • Florescence of pigments (demo) |
| 4 | Mitosis, meiosis and mendelian genetics | <ul style="list-style-type: none"> • Mitosis and Meiosis (I use prepared sordaria crosses) • Genetics of organism (online drosophila simulation) • CAT Lab - computer program purchased by TCS • Online simulation - cell control cycle |
| 5 | Molecular genetics, DNA and protein synthesis | <ul style="list-style-type: none"> • DNA Fingerprinting with gel electrophoresis • Transformation of <i>e coli</i> with firefly gene • Chromatin isolation from a banana |
| 6 | Evolution | <ul style="list-style-type: none"> • Population genetics and evolution • Evolution with food (Duke TIP) • Genetic drift (online simuation) |
| 7 | Animals I - Principals of form and function, nutrition, circulation and gas exchange, immunity and osmoregulation. | <ul style="list-style-type: none"> • Physiology of the circulatory system • Cat dissection: Muscles, digestive and circulatory systems |
| 8 | Animals II - Hormones and endocrine, reproduction, development, nervous, sensory and motor mechanisms. | <ul style="list-style-type: none"> • Cat dissection: Reproductive, nervous and sensory systems (eye). |
| 9 | Plants | <ul style="list-style-type: none"> • Transpiration • Flower dissection |

| | | |
|----|----------|---|
| | | <ul style="list-style-type: none"> • Plant project (Duke TIP) • A - "mazing" plants (students create a light tight maze with one opening where seedlings demonstrate phototropism and gravitropism) |
| 10 | Ecology | <ul style="list-style-type: none"> • Animal behavior • Dissolved oxygen and aquatic primary productivity (only done if time permits - otherwise done as an online simulation) |
| 11 | Taxonomy | <ul style="list-style-type: none"> • Taxonomy "Treasure Hunt" |

As part of the laboratory grade, students are asked to write up the lab by answering the conclusion questions and preparing any graphs asked for. There are presently four labs which ask for a formal laboratory write up.

Student Projects

There are several projects that are assigned throughout the course. Descriptions of three are offered here.

- Cell organelle "fashion show" - students need to present information on their assigned organelle and "dress" like it (holding a poster suffices) and make connections as to how its structure is determined by the function.
- Ecotravel brochure - students create a powerpoint for three biomes working in groups. Each student is then asked to create a brochure for one of those biomes that promotes an ecotravel vacation. They need to come up with activities that ecologically minded people would want to participate in or view while on a vacation. The brochure is printed in full color using the resources of the computer lab.
- Comparative Anatomy book - students are presented with the outline of a "book" that has all the body systems studied during the animals units as well as the key species referred to in the textbook. Simplified drawing for each of the organ systems showing the similarities and differences through the animal kingdom. They are given some time in class as I help model what their book should look like, then the remainder is finished on their own. We then refer to the book as we review and practice for the Free Response questions.
- Guess who's coming for dinner - students create a narrative of a dinner party with Darwin, 6 other evolutionary scientists and their family.

Methodology

Many different teaching strategies are incorporated to make the course engaging for the student. There is an emphasis placed on teacher centered lecture because the time restrictions that go with offering an exam for a year long course in mid May.

Strategies used aside from lecture include:

- computer simulations (especially effective for the important but invisible process of DNA replication, transcription, translation, cell membrane activities)
- computer simulations with guided questions that serve as notes.
- Chapter guides that help the student find important information from the text.
- Student Projects
- Labs
- Demonstrations (just a few)
- Use of molecular models for organic chemistry
- Review games
- Power point and skeleton notes provided for selected lectures
- Movies

Final Project

Students walk around our rural campus and surrounding areas to find wild flowers. We press, identify and compile our own herbarium using wild flower identification books. We were invited to work with a 4th grade class in our district to find, identify and press flowers for two days, requiring students to create cards for leaf and flower position identification. This was part of our final project as well, and I expect to do the same this year.

Examples

Examples of the items referred to can be sent upon request.