

Pompano Beach High School

AP BIOLOGY COURSE RULES & SYLLABUS

Course Overview:

The course is an introductory Biology course that is equivalent to two semesters of Biology in college. Students will obtain a solid foundation of biological principles and it is centered around the 4 big ideas, the enduring understandings and science practices. The course will emphasize the interconnectedness between biology, other sciences, mathematics, technology and society. The course is a combination of lectures, activities, labs that foster reflection, critical thinking, discovery and experimentation in order to experience biological issues and concepts.

Materials Required:

Starr, Cecie, et al., Biology The unit and Diversity of life (provided by the school)
4-5 pocket portfolios, loose-leaf notebook paper, dividers (recommended)
Pens, pencils, coloring pencils
Printing supplies
Calculator
Graph paper
Index cards

Lab:

Lab investigations are designed to illustrate the materials in a hands-on manner and can be very enjoyable. It is imperative that all safety rules and directions will be followed closely. Students that fail to do so will risk being excluded during lab activities and will be assigned written reports.

Student Evaluation:

Grades earned in this course will be based on classroom participation, attendance, quizzes, assignments, tests, labs, projects, and silent sustained reading. The Grading Scale is as follows:

90-100	A	67-69	D+
87- 89	B+	60-67	D
80- 86	B	0-59	F
77- 79	C+		
70- 76	C		

Academic Honesty:

Pompano Beach High School prides itself on preparing students for the rigors of college. It is therefore imperative that students do their own work so that they learn content accurately. The faculty expects academic integrity; therefore, students must abide by the PBHS Honor Code when they complete assignments, tests quizzes, projects, and all other work, both in class and out. Every violation of the Honor Code will result in an immediate referral to administration.

Keeping up with Grades:

Current Grades can be viewed via the Internet at all times. In order to do so, go to the school's website (<http://www.pompanobeachhigh.com>), click on Pinnacle viewer (on the left side of the screen) and follow the directions. **Parents are encouraged to e-mail/phone me with concerns about grades and student progress in class.**

Homework:

Students are encouraged to review the materials daily and complete all assigned homework in order to succeed in this class and in order to prepare for college classes.

There will be homework assigned every night. This will include reviewing notes, textbook reading, worksheets, preparing for interactive activities, Internet/research work, and extra credit or studying for upcoming quizzes or tests.

Make up Tests/Work:

It is the responsibility of the student to set up an appointment to make up any test, quiz, or other graded work due to excused absences. The student will have two days from the day after returning from being absent to make up the test or quiz. The same two-day policy applies for make-up homework and labs. The student is responsible for requesting this work.

All make-up exams and quizzes may be entirely essay, or any other form of test from the original.

Class Rules and Discipline:

1. Follow the Student Code of conduct.
2. Respect everybody: your teacher, your classmates and yourself
3. Bring all your materials with you each day
4. Follow your teacher's instructions promptly and courteously
5. Work to your best ability!

Discipline will consist of verbal warnings, parent notification, detention, and communication with coaches/club sponsors, etc. - depending on the offense.

The School Board of Broward County, Florida expressly prohibits bullying, including cyber bullying, by or towards any student or employee. See Policy 5.9: Anti-Bullying for additional information.

Parent/Guardian:

Parents/Guardians are encouraged to participate in the child's educational experience. Stressing good study and homework habits are a big help. Please stay abreast of your child's progress on a daily basis. We will be glad to answer any questions or to assist you and your child as much as we can.

Students and parents are encouraged to contact teacher with any questions and concerns. We are here to help in any way that will make the learning process of the student easier and more successful. It is easiest to reach us by e-mail (c.singkornrat@browardschools.com, and lalita.maharaj@browardschools.com).

You may also reach us by school by phone (754) 322-2000. We are looking forward to working with you.

Sincerely,

Mrs. Lalita Maharaj and Dr. Claudia Singkornrat

AP BIOLOGY PACING GUIDE

NOTE: This is an approximate guide of the schedule we will follow. Changes will be made to accommodate the class' knowledge base, progress and student's ability to process new information.

UNIT 1 GRAPHING AND THE EXPERIMENTAL METHOD

Standards:

- 1.1 The student can *create representations and models* of natural or man-made phenomena and systems in the domain.
- 1.2 The student can *describe representations and models* of natural or man-made phenomena and systems in the domain.
- 1.3 The student can *refine representations and models* of natural or man-made phenomena and systems in the domain.
- 1.4 The student can *use representations and models* to analyze situations or solve problems qualitatively and quantitatively.
- 1.5 The student can *reexpress key elements* of natural phenomena across multiple representations in the domain.

DAY 1: Graphing review and practice

DAYS 2-4: Experimental design review and application

UNIT 2: BIG IDEA 1

Big Idea 1: The process of evolution drives the diversity and unity of life.

Enduring understanding 1.A: Change in the genetic makeup of a population over time is evolution.	Essential knowledge 1.A.1: Natural selection is a major mechanism of evolution.
	Essential knowledge 1.A.2: Natural selection acts on phenotypic variations in populations.
	Essential knowledge 1.A.3: Evolutionary change is also driven by random processes.
	Essential knowledge 1.A.4: Biological evolution is supported by scientific evidence from many disciplines, including mathematics.
Enduring understanding 1.B: Organisms are linked by lines of descent from common ancestry.	Essential knowledge 1.B.1: Organisms share many conserved core processes and features that evolved and are widely distributed among organisms today.
	Essential knowledge 1.B.2: Phylogenetic trees and cladograms are graphical representations (models) of evolutionary history that can be tested.
Enduring understanding 1.C: Life continues to evolve within a changing environment.	Essential knowledge 1.C.1: Speciation and extinction have occurred throughout the Earth's history.
	Essential knowledge 1.C.2: Speciation may occur when two populations become reproductively isolated from each other.
	Essential knowledge 1.C.3: Populations of organisms continue to evolve.
Enduring understanding 1.D: The origin of living systems is explained by natural processes.	Essential knowledge 1.D.1: There are several hypotheses about the natural origin of life on Earth, each with supporting scientific evidence.
	Essential knowledge 1.D.2: Scientific evidence from many different disciplines supports models of the origin of life.

DAYS 1,2: Intro to Evolution, Darwin and Natural Selection

PPT

Pocket Mouse video

Activity 22.3: Evaluating Explanations of Darwin's Ideas

Study Guide Questions 1-6,8,9

Natural Selection Virtual Lab (rabbits and wolves)

2013 question (used in ppt) and 1 free response and

(Activity: I am looking over a white striped clover)

Book Pages:

Natural selection and Darwin: 260-265

Evidence of Evolution: 266 – 273

Processes of Evolution: Chapter 18

DAYS 3,4: a) Hardy Weinberg ; b)Other selective processes and evidence of evolution

a)PPT

Hardy Weinberg lab

Activity 23.1

Practice problems sheet

Study guide: 16,17, 47-49

2010 released essay question

PPT

Study guide: 10, 18-24

DAYS 5,6 : Phylogeny and Cladograms

PPT

BLAST from AP central

What did T Rex taste like?

Quick intro to cladograms

Practice handout

Study guide: 26-28, 51-53

Reinforcement: 2 sites from biology corner

Book: Chapter 19

DAYS 7,8: Speciation and Origin of Life

PPT

Study guide 31-31 (speciation) 41-45, 54/w graph (origin)

Book: Chapter 20

UNIT 3: BIG IDEA 2

Big Idea 2: Biological systems utilize free energy and molecular building blocks to grow, to reproduce and to maintain dynamic homeostasis.

Enduring understanding 2.A: Growth, reproduction and maintenance of the organization of living systems require free energy and matter.	Essential knowledge 2.A.1: All living systems require constant input of free energy.
	Essential knowledge 2.A.2: Organisms capture and store free energy for use in biological processes.
	Essential knowledge 2.A.3: Organisms must exchange matter with the environment to grow, reproduce and maintain organization.
Enduring understanding 2.B: Growth, reproduction and dynamic homeostasis require that cells create and maintain internal environments that are different from their external environments.	Essential knowledge 2.B.1: Cell membranes are selectively permeable due to their structure.
	Essential knowledge 2.B.2: Growth and dynamic homeostasis are maintained by the constant movement of molecules across membranes.
	Essential knowledge 2.B.3: Eukaryotic cells maintain internal membranes that partition the cell into specialized regions.
Enduring understanding 2.C: Organisms use feedback mechanisms to regulate growth and reproduction, and to maintain dynamic homeostasis.	Essential knowledge 2.C.1: Organisms use feedback mechanisms to maintain their internal environments and respond to external environmental changes.
	Essential knowledge 2.C.2: Organisms respond to changes in their external environments.
Enduring understanding 2.D: Growth and dynamic homeostasis of a biological system are influenced by changes in the system's environment.	Essential knowledge 2.D.1: All biological systems from cells and organisms to populations, communities and ecosystems are affected by complex biotic and abiotic interactions involving exchange of matter and free energy.
	Essential knowledge 2.D.2: Homeostatic mechanisms reflect both common ancestry and divergence due to adaptation in different environments.
	Essential knowledge 2.D.3: Biological systems are affected by disruptions to their dynamic homeostasis.
	Essential knowledge 2.D.4: Plants and animals have a variety of chemical defenses against infections that affect dynamic homeostasis.
Enduring understanding 2.E: Many biological processes involved in growth, reproduction and dynamic homeostasis include temporal regulation and coordination.	Essential knowledge 2.E.1: Timing and coordination of specific events are necessary for the normal development of an organism, and these events are regulated by a variety of mechanisms.
	Essential knowledge 2.E.2: Timing and coordination of physiological events are regulated by multiple mechanisms.
	Essential knowledge 2.E.3: Timing and coordination of behavior are regulated by various mechanisms and are important in natural selection.

DAYS 1,2: ENERGY

PPT

Study guide

WEEK 3,4: Photosynthesis and Cellular Respiration

PPT

Photosynthesis Lab

Cellular Respiration lab – virtual or my inquiry lab

Photosynthesis activity(biologycorner.com)

Study Guide

Compare and contrast cellular respiration and photosynthesis worksheet

My review sheet for cellular respiration and photosynthesis

Review sheet Calvin and Krebs

WEEK 5,6: Cell and Membrane

PPT

Study Guide

Osmosis and diffusion lab: http://www.biologycorner.com/worksheets/diffusion_lab_AP.html

Osmosis lab worksheet

Cell worksheet

Cell transport Worksheet

WEEK 7,8: Regulation by: Feedback Mechanisms, Response to environment

PPT

Biomagnification video: <https://www.youtube.com/watch?v=E5P-UoKLxIA> (2 min)

Biomagnification practice

Antarctic food chain handout

Immune system chart worksheet

Study guide

WEEK 9,10: Feedback (FINISH) & Growth, Reproduction & Homeostasis (2- 3DAYS)

PPT

Study Guide

Video (19 min): How Bacteria Talk – Bonnie Bassler

UNIT 4: BIG IDEA 3

Big Idea 3: Living systems store, retrieve, transmit and respond to information essential to life processes.

Enduring understanding 3.A: Heritable information provides for continuity of life.	Essential knowledge 3.A.1: DNA, and in some cases RNA, is the primary source of heritable information.
	Essential knowledge 3.A.2: In eukaryotes, heritable information is passed to the next generation via processes that include the cell cycle and mitosis or meiosis plus fertilization.
	Essential knowledge 3.A.3: The chromosomal basis of inheritance provides an understanding of the pattern of passage (transmission) of genes from parent to offspring.
	Essential knowledge 3.A.4: The inheritance pattern of many traits cannot be explained by simple Mendelian genetics.
Enduring understanding 3.B: Expression of genetic information involves cellular and molecular mechanisms.	Essential knowledge 3.B.1: Gene regulation results in differential gene expression, leading to cell specialization.
	Essential knowledge 3.B.2: A variety of intercellular and intracellular signal transmissions mediate gene expression.
Enduring understanding 3.C: The processing of genetic information is imperfect and is a source of genetic variation.	Essential knowledge 3.C.1: Changes in genotype can result in changes in phenotype.
	Essential knowledge 3.C.2: Biological systems have multiple processes that increase genetic variation.
	Essential knowledge 3.C.3: Viral replication results in genetic variation, and viral infection can introduce genetic variation into the hosts.
Enduring understanding 3.D: Cells communicate by generating, transmitting and receiving chemical signals.	Essential knowledge 3.D.1: Cell communication processes share common features that reflect a shared evolutionary history.
	Essential knowledge 3.D.2: Cells communicate with each other through direct contact with other cells or from a distance via chemical signaling.
	Essential knowledge 3.D.3: Signal transduction pathways link signal reception with cellular response.
	Essential knowledge 3.D.4: Changes in signal transduction pathways can alter cellular response.
Enduring understanding 3.E: Transmission of information results in changes within and between biological systems.	Essential knowledge 3.E.1: Individuals can act on information and communicate it to others.
	Essential knowledge 3.E.2: Animals have nervous systems that detect external and internal signals, transmit and integrate information, and produce responses.

DAYS 1,2: DNA History, Structure, Replication, Transcription & Translation

1. PPT
2. Study Guide
3. LAB: Chi Square analysis (folder)
4. DNA structure worksheet
5. Activity 16.2: How does DNA replicate?
6. DNA Replication Activity (figure steps out yourself)
7. Activity 17.1 Modeling transcription and translation (includes mutations)
8. Transcription Translation activity (lactotriptides)
9. DNA Replication graphic organizer

DAYS 3,4: Genetic Engineering

1. PPT
2. Study Guide
3. LAB: Bacterial transformation
4. Understanding PCR (virtual lab with crime scene)
5. Recombinant gene simulation:
http://www.biologycorner.com/worksheets/DNA_analysis_recombination.html
6. Torn at the Genes: Case study for GMOs:
http://sciencecases.lib.buffalo.edu/cs/files/torn_genes.pdf
7. Activity 20.1 Recombinant DNA, plasmids
8. Bacterial transformation worksheet

DAYS 4-7: Cell Cycle, mitosis & Meiosis

1. PPT
2. Study Guide
3. LAB Mitosis Virtual lab: onion root tip to calculate time of phases:
http://www.biologycorner.com/worksheets/mitosis_onion.html
4. Activity 12.1 mitosis (use questions, not pics, also has checkpoints)
5. Activity 13.1 Meiosis (use questions, not pics)
6. Activity 14.2 Meiosis and Mendelian genetics (use mainly questions p 65 WEEK 6:
Prokaryotic and Eukaryotic Gene Control
7. Mendelian Inheritance practice problems
8. Meiosis of a 6 chromosome cell
9. Meiosis worksheet with interactive sites:
http://www.biologycorner.com/worksheets/meiosis_internet.html
10. Mitosis worksheet with interactive sites:
<http://www.biologycorner.com/worksheets/mitosis.html>

DAYS 8,9: Mendelian Genetics and Pedigrees

1. PPT
2. Study Guide
3. Chi Square!!
4. LAB: Pipe Cleaner chromosome babies :
<http://biologycorner.com/worksheets/pipecleaner.html>
5. Activity 14.1 Mendelian vocab
6. Activity 14.3 14.4: Quick Guide to solving genetics problems
7. Activity 15.2: mapping genes determine if genes are linked
8. Pedigree practice
9. Pedigree homework

DAYS 10,11: Prokaryotic and Eukaryotic Gene control

1. PPT
2. Study Guide
3. LAB: http://www.biologycorner.com/worksheets/DNA_extraction.html
4. Study guide
5. Activity 18.1, 18.2 Gene expression in prokaryotes
6. Activity 19.2 Gene expression in eukaryotes
7. (Activity 21.1 control of development at zygote and cell division)

DAYS 12,13: Origin of Genetic Variation

1. PPT
2. Study Guide
3. Mutations worksheet
4. Virus worksheet

DAYS 14,15: Cell Signaling

1. PPT
2. Activity 11.1: Signal Transduction (model with clay/paper and answer questions)
3. Signal transduction worksheet (self tutoring!) :
<https://d3jc3ahdjad7x7.cloudfront.net/JJ4nn6pRBzhBATSI0AGiSrMo4ZUVnwEPipKHIjXVcKIWcbdx.pdf>

DAYS 16,17: Nervous System

1. PPT
2. Study Guide
3. Activity 48.1 Nervous signal transmission
4. Activity 48.2 Critical thinking questions NS
5. Nervous system worksheet

UNIT 5: BIG IDEA 4

Big Idea 4: Biological systems interact, and these systems and their interactions possess complex properties.

Enduring understanding 4.A: Interactions within biological systems lead to complex properties.	Essential knowledge 4.A.1: The subcomponents of biological molecules and their sequence determine the properties of that molecule.
	Essential knowledge 4.A.2: The structure and function of subcellular components, and their interactions, provide essential cellular processes.
	Essential knowledge 4.A.3: Interactions between external stimuli and regulated gene expression result in specialization of cells, tissues and organs.
	Essential knowledge 4.A.4: Organisms exhibit complex properties due to interactions between their constituent parts.
	Essential knowledge 4.A.5: Communities are composed of populations of organisms that interact in complex ways.
	Essential knowledge 4.A.6: Interactions among living systems and with their environment result in the movement of matter and energy.
Enduring understanding 4.B: Competition and cooperation are important aspects of biological systems.	Essential knowledge 4.B.1: Interactions between molecules affect their structure and function.
	Essential knowledge 4.B.2: Cooperative interactions within organisms promote efficiency in the use of energy and matter.
	Essential knowledge 4.B.3: Interactions between and within populations influence patterns of species distribution and abundance.
	Essential knowledge 4.B.4: Distribution of local and global ecosystems changes over time.
Enduring understanding 4.C: Naturally occurring diversity among and between components within biological systems affects interactions with the environment.	Essential knowledge 4.C.1: Variation in molecular units provides cells with a wider range of functions.
	Essential knowledge 4.C.2: Environmental factors influence the expression of the genotype in an organism.
	Essential knowledge 4.C.3: The level of variation in a population affects population dynamics.
	Essential knowledge 4.C.4: The diversity of species within an ecosystem may influence the stability of the ecosystem.

DAYS 1,2: interaction lead to complexity (macromolecules)

PPT

Folding protein activity

Lab: Chemical Food Analysis

DAYS 3,4: Emergent Properties

PPT

Bozeman biology video

Virtual lab: Populations Biology

DAYS 5,6: Competition Cooperation Enzymes

PPT

Worksheets to deepen knowledge

LAB: Effect of temperature of pH on enzymes

DAYS 7,8: Diversity affects interaction with environment

PPT

Lab: dissolved oxygen

Case study: The Fish Kill Mystery

Community Ecology reinforcement

Big Idea Review questions

UNIT 6: REVIEW AND PRACTICE FOR THE AP EXAM (6 DAYS)

UNIT 7: END OF THE YEAR PROJECT (6 DAYS)

Case studies

Labs

Research