Advanced Placement Biology – 2012-2013 Syllabus

■ Course Overview

Advanced Placement Biology is a lab-based science course presented at the introductory college level while being presented in high school. The goal of the course is to prepare students for the AP Biology exam given by the College Board. Successful completion of the course coupled with a score of 3 or higher on a 5 point scoring system may allow students to receive introductory-level university credit.

AP Biology is presented as not a mere accumulation of facts from topics, but a course that provides students with the conceptual knowledge to understand and explain how the individual topics in biology contribute to the formation of concepts. The students then begin to understand the relationships between the concepts in biology and the **major themes in biology (1. science as a process, 2. evolution, 3. energy transfer, 4. continuity and change, 5. relationships of structure to function, 6. regulation, 7. interdependence in nature, and 8. science, technology, and society). Throughout the course, students will discover how the theme of evolution provides the foundation of modern biological models and thought, providing a unifying theme across all topics.**

Students taking AP Biology need to be prepared for the rigor of the course. The curriculum is very broad, and as a result, students are expected to take responsibility for their learning. Students should be prepared to spend an average of one hour a night on reading the required section of text, as well as additional time for review, lab write-ups, etc. **Class will meet on a revolving A/B block, and students will be in class for three 90-minute periods one week, followed by two 90-minute periods the next. Students will spend an average of 90 minutes a week in the lab**, so *excellent attendance is mandator*y. In short, AP Biology requires tremendous dedication of time and students should take careful consideration of extra-curricular activities and work schedules before committing to the course.

■ Materials

- Life: The Science of Biology, 7th Edition by Purves/Sadava. (provided)
- Cliff's AP Biology Preparation Guide by Pack, A. (recommended)
- Lab Notebook (quad book or equivalent) (required)
- Scientific calculator (required)

■ Course Structure

I. Lecture

Most of the instruction in AP Biology will come in this format. Since this is a college-level class, the lectures will not be like traditional high school classes where notes are given in an outline format. Good note taking skills are definitely required.

II. Laboratory

The lab component of AP Biology is designed to provide students with the opportunity to observe several key concepts in biology and how those concepts are manipulated and controlled. There are 12 formal labs, in addition to numerous supplementary laboratory investigations. In addition to enhancing biological concepts, these labs are also designed to develop several important skills like: recording data accurately, thinking critically, analyzing data in many ways, creating experimental design, and using complex lab equipment. Some labs will need to be complete outside of class. The procedure for writing formal lab reports is on the last page of this syllabus.

■ Grade Policy

I. Grade Break Down

Since AP Biology is designed to be analogous to an entry-level college course, the bulk of the grade will come from exams. The grade breakdown is as follows:

Units Exams:	70%
Labs:	20%
Homework and Quizzes:	5%
Semester Projects:	5%

II. Grading Scale

A	-	90-100%	Worth a score of 4
B	-	80-89%	Worth a score of 3
C	-	70-79%	Worth a score of 2
D	-	60-69%	Worth a score of 1
F	-	Below 60%	Worth a score of 0

■ Make-up Work/Late Work

I. Make-up Work

This opportunity is only for students who had **EXCUSED** absences. Students shall receive in length no less than the number of days they were absent to turn in the assignment. All assignments can be found under the sign "homework center" in room 135. Extra copies of all assignments can be found in the blue bin titled "AP Biology". If a student is absent on the day of an exam, the student will take the exam on the first day back from the absence. For labs, students have 10 school days to reschedule a make-up lab.

II. Late Work

Late work will be accepted up to five calendar days from the date due to be turned-in. Each day late up the five-day limit will be penalized 10% off the correct score of the assignment. No assignments will be accepted after five calendar days.

■ Semester 1 Term Paper

Students may choose any topic that is related to a unit discussed in the first semester for this research paper. The criteria for this paper are listed below.

1. 6-8 pages, not including cover sheet, diagrams, graphs, or references
2. 12 pt. font, 1-1/2 spacing, one-inch margins
3. Minimum of 6 parenthetical citations, and works cited page in MLA format

Timeline for paper completion:

→ Topic proposal due week 8 of 1st quarter. A short paragraph stating what you want to research and why.
→ Photocopies and printouts of 6 sources are due for approval by week 3 of quarter 2.
→ Outline is due week 5 of quarter 2.
→ Final copy due 2 class periods before semester 1 final.

■ Semester 2 Project

Students will be given a project to complete during the second semester. Topic and timeline will be given in the first week of the second semester. Previous projects have included, making scientific videos, conducting outreach demonstrations at local grade schools, and conducting original scientific research.

■ 2012-2013 AP Biology Curriculum Guide - 90 minute revolving blocks

Legend
- (MT#): Major Theme #
- Blue: Lab Objectives

I. Molecules and Cells (Overarching Theme #1)

A. The Chemistry of Life

Day	Class Topic	Objectives	Purves Readings	Labs	Demos	Assignments
1	■ Orientation/Lab Tour ■ Core Themes of Biology ■ Elements and Compounds	• Identify evolution as the foundation of modern biological models and thought **(MT 2)** • List the elements necessary for life to exist • Explain ionic and covalent bonding • Describe how biological structure is related to function **(MT 5)** • Explain how conditions on early Earth set the stage for evolution of life **(MT 2)**	Ch. 1 (1-14) Ch. 2 (15-25)			
2	■ Properties of Water ■ Solutions and Molarity	• Explain how the special properties of water allow life to exist on our planet • Demonstrate how molarity is calculated • Create a solution of known molarity	Ch. 2 (26-28)	► Solution Lab (25 minutes)	► Water Tricks	
3	■ pH and Buffers	• Describe how the self ionization of water leads to the pH scale • Define an acid and base • Explain how buffers help maintain homeostasis **(MT 6)** • Determine the effectiveness of a biological buffer by creating a titration curve • Describe how acid rain poses a threat to the environment **(MT 8)**	Ch. 2 (28-30)	► Buffer Lab (50 minutes)		
4	■ Carbon and the Molecular Diversity of Life ■ Dehydration Synthesis and Macromolecules ■ Structure and Function of Macromolecules	• Explain how carbon's versatility leads to diverse carbon compounds **(MT 5)** • Describe isomerism and the medical importance of enantiomers **(MT 5)** • Explain how functional groups contribute to molecular diversity **(MT 5)** • Illustrate how biological polymers are formed • Describe the structure and function of different carbohydrates **(MT 5)**	Ch. 3 (35-60)		►The effect Thalidomide and other important medical enantiomers have on the body	Functional group flashcards
5	■ Structure and Function of Macromolecules	• Describe the structure and function of various lipids **(MT 5)** • Describe the structure of amino acids and the role of proteins in the body **(MT 5)**	Ch. 3 (35-60)		► Effects of pH and temp on protein structure	National Geographic Article on human evolution

5 Cont		• Describe the 4 levels of protein structure and how function depends on conformation **(MT 5)** • Describe the structure of nucleic acids and their role in the body **(MT 5)** • Explain how nucleic acids can be used to track evolution **(MT 2)**				Amino -Acid Prelab (overnight)
6	■ Structure and Function of Macromolecules ■ Article Discussion	• Separate amino acids in a solution using paper chromatography • Explain how scientists track human evolution using genetic markers (from article)	Ch. 3 (35-60)	► Separation of amino acids by paper chromatog. (90 minutes)		**EXAM 1 REVIEW**
7	**UNIT 1 EXAM (CH. 1-3)**					

B. Metabolism

Day	Class Topic	Objectives	Purves Readings	Labs	Demos	Assignments
8	■ Introduction to Metabolism	• Explain the role of free energy in biological systems **(MT 3)** • Describe how ATP couples exergonic and endergonic reactions **(MT 3)** • Explain how enzymes catalyze reactions • Describe how Enzyme action is regulated **(MT 6)**	Ch. 6 (106-124)		► Modeling enzyme activity with toothpicks	Enzyme Lab Prelab (overnight)
9	■ Introduction to Metabolism	• Determine the rates for enzymatically catalyzed reactions • Design an experiment to measure the effect on enzyme activity produced by temperature, pH, enzyme concentration, and substrate concentration	Ch. 6 (106-124)	► Enzyme Lab (AP #2) (90 minutes)		
10	■ Animal Nutrition	• Compare and contrast digestion by food vacuoles, gastrovascular cavities, and alimentary canals **(MT 5)** • Describe the structure and function of the major components of the human digestive system **(MT 5)** • List the major enzymes and their actions in digestion of carbs, lipids, and proteins	Ch. 50 (961-981)		► Digestion of protein in meat ► Action of bile	Comparative anatomy prelab (overnight)
11	■ Animal Nutrition	• Locate, compare, and contrast digestion by food vacuoles, gastrovascular cavities, and alimentary canals using representative organisms **(MT 5)** • Describe the evolutionary adaptations of vertebrate digestive systems **(MT 2)**	Ch. 50 (961-981)	► Comparative anatomy lab (Digestive system) (60 minutes)		

12	■ Plant Nutrition	• List nutrients essential to plants • Describe the effects of nutrient deficiency on plants • Describe the process of nitrogen fixation **(MT 3)**	Ch. 33 (716-728)		► Plant Hydroponic nutrient demo	
13	**UNIT 2 EXAM (CH 6, 50, 33)**					

C. Exchanging Materials with the Environment

Day	Class Topic	Objectives	Purves Readings	Labs	Demos	Assignments
14	■ Membrane Structure and Function	• Describe the evolution of membrane models **(MT 1)** • Describe the processes of diffusion and osmosis **(MT 3)** • Explain the role of water potential in biological systems **(MT 6)** • Explain the roles of membrane proteins in active transport **(MT 5/6)**	Ch. 5 (87-105)		► Gas and Liquid Diffusion	Diffusion / Osmosis Prelab (AP #1) (overnight)
15	■ Membrane Structure and Function	• Measure water potential of a solution in a controlled experiment • Relate osmotic potential to solute concentration and water potential • Design an experiment to measure the effect of solute concentration on water potential	Ch. 5 (87-105)	► Diffusion / Osmosis (AP #2) (90 minutes)		Comparative anatomy prelab (Circulatory system) (overnight)
16	■ Circulation and Gas Exchange	• Compare and contrast gastrovascular cavities, open, and closed circulatory systems **(MT 5)** • Describe the components and function of the vertebrate circulatory systems **(MT 5)** • Identify components of open and closed circulatory systems using representative organisms **(MT 6)**	Ch. 49 (940-984)	► Comparative anatomy lab (Circulatory system) (60 minutes)		Physiology of the circula-tory system Prelab (AP #10) (overnight)
17	■ Circulation and Gas Exchange	• Explain how a pressure differential is created in blood vessels **(MT 5)** • Measure heart rate and blood pressure on a human • Describe the effect of exercise and body position on blood pressure • Measure the effect of temperature on heart rate	Ch. 49 (940-984)	► Physiology of the circulatory system (AP #10) (60 minutes)		Comparative anatomy prelab (Respiratory system) (overnight)
18	■ Circulation and Gas Exchange	• Compare and contrast respiration through skin, gills, tracheae, and lungs **(MT 5)** • Explain how respiratory	Ch. 49 (940-984)	► Comparative anatomy lab (Respiratory system) (60 minutes)		

		organs have evolved to suit an organisms habitat **(MT 2)** • Locate and identify components of the respiratory systems of representative organisms				
19	■ Controlling the Internal Environment	• Describe osmoregulation in biological systems **(MT 6)** • Compare and contrast protonephridia, metanephridia, Malpighian tubes, and kidneys **(MT 5)** • Explain how the nephron regulates solute concentration and prevents water loss **(MT 6)** • Identify the osmoregulatory structures of representative organisms	Ch. 41 (780-798) Ch. 51 (985-1001)	► Comparative anatomy lab (Excretory system) (30 minutes)		
20	■ Controlling the Internal Environment	• Explain how evolution has provided variations of the vertebrate kidney **(MT 2)** • Describe different methods of thermoregulation **(MT 6)** • Compare the kidneys of representative vertebrate organisms	Ch. 41 (780-798) Ch. 51 (985-1001)	► Comparative anatomy lab (Excretory system) (60 minutes)		
21	■ Transport in Plants	• Describe the movement of water and solutes at the cellular, organ, and whole plant level **(MT 5)** • Describe the absorption of water by roots **(MT 5)** • Explain how transpiration is controlled **(MT 6)** • Describe bulk flow of phloem sap **(MT 5)**	Ch. 36 (701-715)		► Cohesion	Transpiration prelab (AP #9) (Overnight)
22	■ Transport in Plants	• Test the effects of environmental variables on rates of transpiration using a controlled experiment	Ch. 36 (701-715)	► Transpiration (AP #10) (90 minutes)		
23	**UNIT 3 EXAM (CH 5, 49, 41, 51, 36)**					

D. Energy Transformation

Day	Class Topic	Objectives	Purves Readings	Labs	Demos	Assignments
24	■ Photosynthesis	• Explain the significance of the discovery that chloroplasts split water **(MT 1)** • Describe the process of cyclic and noncyclic electron flow **(MT 3)**	Ch. 8 (145-163)		► "Bloody" chlorophyll	Photosynthesis prelab (AP #4) (Overnight)
25	■ Photosynthesis	• Describe the process of the Calvin cycle **(MT 3)** • Explain the evolution of different methods of carbon fixation **(MT 2)**	Ch. 8 (145-163)	► Photo-synthesis (AP #4) (60 minutes)		

		• Identify photosynthesis as the biospheres foundation **(MT 7)** • Separate pigments and calculate their R_f values • Compare photosynthetic rates at different light intensities or different wavelengths				
26	■ Photosynthesis ■ Cellular Respiration	• Explain why the rate of photosynthesis varies under different conditions • Explain cellular respiration in terms of redox **(MT 3)** • Describe the oxidation of glucose in glycolysis **(MT 3)** • Describe the Krebs cycle **(MT 3)** • Explain the role of the mitochondrial membrane in chemiosmosis **(MT 3)**	Ch. 8 (145-163) Ch. 7 (125-144)	► Photo-synthesis (AP #4) (15 minutes)		
27	■ Cellular Respiration	• Describe fermentation as an alternative to cellular respiration **(MT 3)** • Explain how glycolysis and the Krebs cycle connect to other metabolic pathways **(MT 3)** • Describe how cellular respiration is controlled **(MT 6)** • Describe the reaction of CO_2 and KOH	Ch. 7 (125-144)	► Cellular Respiration (AP #5) (20 minutes)		
28	■ Cellular Respiration	• Calculate the rate of cell respiration from experimental data • Test the rate of cellular respiration in germinating and nongerminated seeds	Ch. 7 (125-144)	► Cellular Respiration (AP #5) (90 minutes)		
29	**UNIT 4 EXAM (CH 7, 8)**					

E. Cells

Day	Class Topic	Objectives	Purves Readings	Labs	Demos	Assignments
30	■ A Tour of the Cell	• Compare and contrast eukaryotic and prokaryotic cells **(MT 5)** • Explain why cells must maintain a high surface area to volume ratio **(MT 5)** • Describe the structure and function of eukaryotic organelles and cytoskeleton **(MT 5)**	Ch. 4 (61-86)			
31	■ The Cell Cycle	• List the functions of cell division **(MT 5)** • Compare and contrast cell division in prokaryotes and eukaryotes **(MT 5)**	Ch. 9 (164-186)			

		• Describe the steps in the cell cycle in eukaryotes **(MT 5)**				
32	■ The Cell Cycle	• Describe how cell division is controlled **(MT 6)** • Recognize the stages of mitosis in a plant or animal cell • Calculate the relative duration of the cell cycle stages	Ch. 9 (164-176)	► Mitosis and Meiosis (AP #3A) (60 minutes)		
33	■ The Molecular Basis of Heredity	• Describe the experiments that led to the recognition of DNA as the material of heredity **(MT 1)** • Describe the process of DNA replication **(MT 4)**	Ch. 11 (213-232)			
34	**UNIT 5 EXAM (CH 4, 9, 11)**					

II. Genetics and Evolution (Overarching Theme #2)

A. Heredity

Day	Class Topic	Objectives	Purves Readings	Labs	Demos	Assignments
35	■ Meiosis and Sexual Life Cycles	• Describe the steps of meiosis **(MT 4)** • Explain how crossing over leads to genetic recombination **(MT 4)** • Use chromosome models to demonstrate the activity of chromosomes during meiosis I and II • Calculate the map distance of a particular gene from a chromosomes centromere	Ch. 9 (177-181)	► Mitosis and Meiosis (AP #3B) (50 minutes)		
36	■ Animal Reproduction	• Compare and contrast reproductive systems in invertebrates and vertebrates **(MT 5)** • Describe the process of spermatogenesis and oogenesis in terms of meiosis **(MT 4)** • Explain hormonal control of reproduction **(MT 6)**	Ch. 43 (820-843)			
37	■ Animal Reproduction ■ Animal Development	• Locate and compare reproductive systems in invertebrates and vertebrates • Explain how fertilization activates the egg and joins sperms and egg nucleus **(MT 4)**	Ch. 43 (820-843) Ch. 20 (408-428)	► Comparative Anatomy Lab (reproduction) (60 minutes)		
38	■ Animal Development	• Describe the role of cleavage and gastrulation in animal development **(MT 4)** • Explain how organs are derived from germ layers **(MT 4)**	Ch. 20 (408-428)		► Frog development slides	

		• Describe how environment, location, and cell-cell interactions determine the developmental fate of cells **(MT 6)**				
39	■ Plant Reproduction and Development	• Diagram the parts of a flower **(MT 5)** • Describe how pollination occurs **(MT 4)** • Explain seed and fruit development **(MT 4)** • Identify various classifications of fruits	Ch. 39 (749-764)	► Fruit Lab (30 minutes)		
39	■ Plant Reproduction and Development	• Describe evolutionary adaptations in seed germination **(MT 2)** • Describe vegetative reproduction **(MT 4)** • Explain how plant cells differentiate **(MT 6)**	Ch. 29 (570-587) Ch. 30 (588-602)		► Clones from cutting	
40	■ Mendelian Genetics	• Describe Mendel's experiments with pea plants **(MT 1)** • Explain Mendel's three laws **(MT 2)** • Explain the exceptions to Mendelian genetics **(MT 2)** • Describe human disorders that follow Mendel's laws of inheritance **(MT 2)** • List the tools scientists use to study genes **(MT 8)**	Ch. 10 (187-212)			Law of multi-plication problems Punnett Square problems Pedigree analysis questions
41	■ The Chromosomal Basis of Inheritance	• Describe Thomas Morgan's experiments with fruit flies that traced genes to chromosomes **(MT 1)** • Describe gene linkage **(MT 4)** • Explain how recombination frequencies can be used to create a gene map **(MT 8)** • Explain sex-linkage and sex-linked disorders **(MT 2)**	Ch. 10 (187-212)			Genetics of organisms prelab (Overnight)
42	■ The Chromosomal Basis of Inheritance	• Describe how changes in chromosome number lead to disorders **(MT 4)** • Investigate independent assortment of two genes and determine sex-linkage	Ch. 9 (182-184)	► Genetics of Organisms (AP #7) (45 minutes)		
43	**UNIT 6 EXAM (CH 9, 43, 20, 39, 29, 30, 10, 9)**					

B. Molecular Genetics

Day	Class Topic	Objectives	Purves Readings	Labs	Demos	Assignments
44	■ From Gene to Protein	• Explain the discovery that genes specify for proteins **(MT 1)** • Describe transcription and translation in eukaryotes **(MT 4)**	Ch. 12 (233-256)		► Protein synthesis party	

		• Describe RNA modification **(MT 6)** • Explain how point mutations effect protein products **(MT 2)**				
45	■ Microbial Models: genetics of viruses and bacteria	• Describe the discovery of viruses **(MT 1)** • Explain the steps, compare, and contrast the lytic and lysogenic cycle **(MT 4)** • Discuss the link between viruses and cancer **(MT 8)**	Ch. 13 (257-278)		► Virus slideshow	
46	■ Microbial Models: genetics of viruses and bacteria	• Describe the methods of genetic recombination in bacteria **(MT 4)** • Define transposons and explain their role in genetic recombination **(MT 4)** • Explain how gene expression is controlled in bacteria **(MT 6)**	Ch. 13 (257-278)	► Genetics of Organisms (AP #7) (20 minutes)		
47	■ Genome Organization and Expression in Eukaryotes	• Describe the levels of chromatin packing **(MT 5)** • Describe the points of eukaryotic control of gene expression **(MT 6)** • Explain how chemical modification of DNA can alter gene expression **(MT 6)** • Explain hoe abnormal gene expression can lead to cancer **(MT 6)**	Ch. 14 (279-300)			
48	■ DNA Technology	• Describe the process of gene cloning and its applications **(MT 8)** • Describe additional methods for analyzing and cloning nucleotide sequences **(MT 8)**	Ch. 16 (317-338) Ch. 17 (339-363)	► Genetics of Organisms (AP #7) (20 minutes)		
49	■ DNA Technology **(DNA Day Field Trip)** (480 minutes)	• Use plasmids as vectors to transform bacteria • Use gel electrophoresis to separate DNA fragments • Calculate transformation efficiency • Detect certain sequences in a DNA sample by hybridization	Ch. 16 (317-338) Ch. 17 (339-363)	► Molecular Biology (AP #6) ► Western Blotting ► Immuno Assay (360 minutes)	► DNA Video	
50	**UNIT 7 EXAM (CH 12, 13, 14, 16, 17)**					

C. Evolution

Day	Class Topic	Objectives	Purves Readings	Labs	Demos	Assignments
51	■ Descent with Modification: Darwin ■ Evolution of Populations	• Explain the observations and inferences that led to natural selection **(MT 1)** • Describe evidence that validates evolutionary views **(MT 2)** • Explain how the Hardy-	Ch. 23 (460-480)			

		Weinberg theorem describes nonevolving populations **(MT 2)** ● Define microevolution and the conditions that lead to it **(MT 2)**				
52	■ Evolution of Populations	● Describe the 5 causes of microevolution and the events that lead to them **(MT 1)** ● Explain how genetic variation is the substrate of natural selection **(MT 2)** ● Explain how natural selection is the mechanism for adaptive evolution **(MT 2)**	Ch. 24 (481-495)			Population genetics and evolution prelab (AP #8) (Overnight)
53	■ Evolution of Populations	● Calculate frequencies of alleles and genotypes in the gene pool of a population using hardy-Weinberg	Ch. 24 (481-495)	► Population Genetics and Evolution (AP #6) (90 minutes)		
54	■ The Origin of Species	● Describe reproductive barriers that separate species **(MT 2)** ● Explain allopatric and sympatric speciation **(MT 2)** ● Explain the theory of punctuated equilibrium **(MT 2)**	Ch. 24 (481-495)			
55	■ Phylogeny and Systematics	● Trace the geological time scale **(MT 2)** ● Describe the scientific basis for macroevolution **(MT 2)** ● Explain how molecular biology is changing systematics **(MT 2)**	Ch. 22 (442-458)			
56	**UNIT 8 EXAM (CH 23, 24, 22)**					

III. Organisms and Populations (Overarching Theme #3)

A. Survey of Organisms

Day	Class Topic	Objectives	Purves Readings	Labs	Demos	Assignments
57	■ Prokaryotes and the Origins of Metabolic Diversity (Microbiology Week)	● Describe the diverse adaptations to form and function in prokaryotes **(MT 4)** ● Explain how molecular systematics is leading to a phylogenic classification of prokaryotes **(MT 2)** ● Explain how molecular biology is changing systematics **(MT 2)**	Ch. 27 (524-542)	► Unknown bacteria lab Gram Stain (45 minutes)	► Bacterial slides	

58	■ Prokaryotes and the Origins of Metabolic Diversity (Microbiology Week)	• Describe the characteristics of medically important bacilli and cocci **(MT 8)** • Use diagnostic microbiology techniques to identify an unknown bacteria **(MT 8)**	Ch. 27 (524-542)	► Unknown bacteria lab Catalase OF Glucose (45 minutes)		
59	■ Prokaryotes and the Origins of Metabolic Diversity (Microbiology Week)	• Describe the characteristics of medically important bacilli and cocci **(MT 8)** • Use diagnostic microbiology techniques to identify an unknown bacteria **(MT 8)**	Ch. 27 (524-542)	► Unknown bacteria lab OF Glucose Endospore Acid-Fast (45 minutes)		
60	■ The Origins of Eukaryotic Diversity	• Explain the endosymbiotic theory as the proposed mechanism for the origin of eukaryotic cells **(MT 2)** • Describe the classification of major phyla of protists, and describe their form and function **(MT 5)**	Ch. 28 (543-569)	► Protist Lab (40 minutes)		
61	■ Plants and the Colonization of land	• Describe the structural and reproductive adaptations that made the colonization of land possible **(MT 2)** • Describe the life cycle of mosses, ferns, conifers, and angiosperms **(MT 4)**	Review of Ch. 29-30	► Plant Evolution Lab (School grounds) (90 minutes)		
62	■ Plant Structure and Growth	• Compare and contrast the root, shoot, and leaf structure of monocots and dicots **(MT 5)** • Describe the structure and function of plant tissues **(MT 5)** • Explain the function of meristems and apical dominance **(MT 6)**	Ch. 35 (682-700)	► Plant Leaf, Root, Shoot, Tissue Lab (45 minutes)		
63	■ Fungi	• Describe how fungi have evolved to a saprozoic form of nutrition **(MT 2)** • Describe the life cycle of various fungi **(MT 4)** • Identify key structures on representative fungi	Ch. 31 (603-618)	► Fungi Lab (60 minutes)		
64	■ Invertebrates and the Origins of Animal Diversity	• Identify the major splits in the phylogeny of animals **(MT 2)** • Explain the evolutionary significance of cephalization **(MT 2)** • Describe the structure and function of acoelomate organisms **(MT 5)** • Identify key structures and function of acoelomate organisms	Ch. 32 (619-640)	► Acoelomate lab (sponges, cnidarians, flatworms) (45 minutes)		
65	■ Invertebrates and the Origins of Animal Diversity	• Describe the evolutionary significance of a body cavity **(MT 2)** • Describe the structure and	Ch. 32 (619-640)	► Protostome lab (mollusks and annelids) (45 minutes)	► Nematode slideshow	

		function of nematodes, and protostomes **(MT 5)** • Identify key structures and function of protostome organisms				
66	■ Invertebrates and the Origins of Animal Diversity	• Describe the structure and function of arthropods **(MT 5)** • Describe the structure and function of deuterostomes **(MT 5)** • Identify key structures and function of protostome and deuterostome organisms	Ch. 33 (641-654)	► Protostome and deuterostome lab (arthropods and echinoderms) (45 minutes)		
67	■ The Vertebrate Genealogy	• List the four hallmark characteristics of chordates **(MT 5)** • Describe the structure and function of the major classes of fish **(MT 5)** • Identify key structures and function of fish	Ch. 34 (655-681)	► Fish Lab (60 minutes)		
68	■ The Vertebrate Genealogy	• Describe the structure and function of the amphibians, reptiles, and birds **(MT 5)** • Identify key structures and function of amphibians, reptiles, and birds	Ch. 34 (655-681)	► Amphibian, Reptile, and Bird Lab (60 minutes)		
69	■ The Vertebrate Genealogy	• Describe the evolution of mammals **(MT 2)** • Use primate development to explain human origins **(MT 2)**	Ch. 34 (655-681)			
Survey of Organisms Packet Due						

B. Responding to the Environment

Day	Class Topic	Objectives	Purves Readings	Labs	Demos	Assignments
70	■ The Body's Defenses	• Describe nonspecific mechanisms of defense **(MT 5)** • List the key features of the immune system **(MT 6)** • Describe clonal selection of lymphocytes **(MT 6)** • Explain the process of humoral immune response **(MT 4)**	Ch. 18 (364-389)			
71	■ The Body's Defenses	• Explain the process of the cell-mediated immune response **(MT 4)** • List the key features of the immune system **(MT 6)** • Describe the role of complement proteins in the immune system **(MT 5)** • Describe how abnormal immune function leads to disease states **(MT 6)**	Ch. 18 (364-389)			
72	■ Nervous Systems	• Describe the structure and function of a neuron	Ch. 44 (844-864)			

		(MT 5) • Explain how action potentials care created and propagated **(MT 6)** • Describe the role of neurotransmitters **(MT 5)**				
73	■ Nervous Systems	• Describe the hierarchy of the vertebrate nervous system **(MT 5)** • Describe the evolution of the human brain and its structure and function **(MT 2)**	Ch. 44 (844-864)			
74	■ Sensory and Motor Mechanisms	• Describe the function of photoreceptors **(MT 5)** • Explain the relationship between hearing and balance **(MT 5)** • Explain how taste and smell are related **(MT 5)** • Explain the contraction of muscles **(MT 5)**	Ch. 45 (865-884)			
75	■ Chemical Signals in Animals	• Describe how hormones signal mechanisms at the cellular level **(MT 5)** • Explain the role of secondary messengers and protein kinases **(MT 6)** • Identify control systems in invertebrates and the integration of the endocrine and nervous systems **(MT 5)**	Ch. 42 (799-819)			
76	■ Chemical Signals in Animals	• Describe the key components of the vertebrate endocrine systems and their functions **(MT 5)**	Ch. 42 (799-819)			
77	■ Control Systems in Plants	• Describe the role of plant hormones in the control of growth, development, and response **(MT 6)** • Define photoperiodism and its role in seasonal change **(MT 4)** • Identify control systems in plants **(MT 6)**	Ch. 38 (729-748)			
78	■ Behavior	• Compare and contrast between innate behavior and learned behavior **(MT 2)** • Describe how competitive behaviors represent contests for resources **(MT 2)** • Relate inclusive fitness and altruism **(MT 2)**	Ch. 52 (1002-1023)			
79	■ Behavior	• Describe some aspects of observed animal behavior **(MT 2)**	Ch. 52 (1002-1023)	► Animal Behavior (AP #11) (90 minutes)		

80	**UNIT 10 EXAM (CH 18, 44, 45, 42, 38, 52)**

C. Interactions and Interdependence

Day	Class Topic	Objectives	Purves Readings	Labs	Demos	Assignments
81	■ Population Ecology	• Explain how demography is used to study factors that affect birth and death rates **(MT 7)** • Describe variation of life histories among organisms **(MT 7)** • Compare and contrast exponential and logistic population growth models **(MT 7)**	Ch. 54 (1037-1054)			
82	■ Community Ecology	• Identify community interactions that are selection factors in evolution **(MT 2/7)** • Compare and contrast predation, parasitism, commensalism, and mutualism **(MT 7)** • Explain the process of succession in ecosystems **(MT 7)**	Ch. 55 (1055-1068)			
85	■ Ecosystems	• Explain the trophic structure of ecosystems **(MT 7)** • Relate available energy to primary productivity **(MT 7)** • Explain how human activity is disrupting chemical cycles **(MT 8)**	Ch. 55 (1055-1068)			
86	■ Ecosystems	• Measure primary productivity based on changes in dissolved oxygen • Investigate the effects of changing light intensity on primary productivity	Ch. 55 (1055-1068)	► Dissolved Oxygen and Aquatic primary Productivity (AP #12) (90 minutes)		
87	■ Species Scavenger Hunt					
88	■ Species Scavenger Hunt					

Time Totals

Total Class Time → 8310 Minutes (Including 480 minutes field trip)
Total Lab Time → 2490 Minutes

Total Percentage of Time Spent in Lab → 29.9% = **30%**