

Advanced Biology

Teacher: MASTER MAP *****

Month	Essential Questions/Competencies	Content	Skills/Proficiencies	Assessment	Materials/Resources
August 2012	<p><u>Introduction and Behavior Unit</u></p> <p>A. What are the expectations for students with regards to learning and their safety in advanced biology</p> <p>B. What are the 10 Themes studied in biology?</p> <p><u>Advanced Biology Competencies:</u></p> <p>C1. Understand and apply science process skills and scientific habits of mind.</p> <p>C3. Apply science process skills in a variety of situations using appropriate available technology to collect and display data.</p> <p>C4. Understand that all living organisms have identifiable structures and cellular processes that allow for survival.</p> <p>C6. Understand that DNA and hereditary events control the passage of structural and functional information from one generation to the next.</p> <p>C7. Understand that Living things are classified by their degree of relatedness through cellular structure, biochemical pathways, and molecular genetics</p> <p>C8. Understand that organisms</p>	<p>A. Class Expectations/syllabus Textbook Introduction</p> <p>A. Laboratory Safety Contract</p> <p>A. Safety Equipment</p> <p>A. Emergency Procedures</p> <p>A. Collective Responsibility</p> <p>A. Consequences for Behavior</p> <p>A. Learning by mistake/problems</p> <p>A. Common sense approach</p> <p>B. Characteristics of Life</p> <p>Homeostasis, Metabolism</p> <p>B. Organization of Life</p> <p>B. Evolution Review: Darwin and Natural Selection.</p>	<p>A. Access online web resources</p> <p>A. Describe specific behavioral expectations pertaining to lab safety.</p> <p>A. Critique lab scenerios (Learning by Accident) for safety issues.</p> <p>A. Restate lab safety rules and apply to new situations.</p> <p>A. Locate and identify safety equipment available.</p> <p>A. Define vocabulary used in LSC.</p> <p>A. Describe and practice emergency exit and secure classroom procedures.</p> <p>A. Identify problems that could occur while in lab, in order to reduce occurrence.</p> <p>A. Recognize that most PRHS rules are applicable to another area (kitchen, garage) requiring safety and are based on common sense.P</p> <p>B. Identify characteristics of life from examples provided.</p> <p>B. Apply hierarchy (organization) of life to varied organisms. (molecules, organelles, cells, tissues,organs,organism)</p> <p>B.Restate Cell Theory</p> <p>B. Distinguish between prokaryotes and eukaryotes</p> <p>B. List characteristics of the domains and kingdoms of life</p> <p>B. Categorize Humans in the hierarchy of life (species through kingdoms)</p> <p>B. Describe the Theory of Evolution by natural selection and state its connection to diversity of life</p> <p>PP</p>	<p>A. Room Diagram of safety equipment.</p> <p>CA</p> <p>A. Pick 5 "Learning by Accidents" and find a PRHS rule relating to it. CA</p> <p>A. Lab Safety Test (80% mastery) mutliple choise, true false, open response map, diagrams CA(50% CKS 50%performance)</p> <p>B.Quiz: Identify and define 10 vocabulary words from chapter 1. CA</p> <p>B. Unit Test: multiple choice, true false, open response, essay (combined scientific method and behavior in September)CA (70% CKS 30% performance)</p>	<p>A. Web access: online prentice hall/pearson</p> <p>A. www.yourhomework</p> <p>A. Powerpoint: Lab Safety you know everything</p> <p>A. Learning by Accidents</p> <p>B. Campbell <u>Biology</u></p> <p>B. Powerpoint: What Chapter 1 ---10 The</p>

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	<p>are dependent on one another and their environment.</p> <p>C9. Understand that matter and energy cycle through organisms and their environment.</p> <p>C11. Understand that evolution and natural selection will result in organisms changing over time in their structures, behavior and biochemistry.</p> <p>C12. Understand that humans are similar to other species in many ways and yet are unique among earth's life forms.</p> <p>C13. Understand that the growth of knowledge in biology has been advanced through technology and is used to identify, understand and solve local and global issues</p> <p>C14. Explain how the study of living material depends on the study of chemistry.</p>				
September 2012	<p><u>Introduction and Behavior Unit</u></p> <p>A. How is the scientific method applied in advanced biology?</p> <p>B. What behaviors influence studying animals in biology?</p> <p></p>	<p>A. Scientific Method Review </p> <p>A. Scientific Writing Styles: Introduction, Procedure, Graphs, Tables, Conclusion</p> <p>A. Problems with living things in an experiment</p> <p>A. Statistics</p>	<p>A. Compare inductive reasoning method to hypothetico-deductive method.</p> <p>A. Critique an experiment (Yeast Lab) for variables, errors, procedural flaws.</p> <p>A. Complete a Chi Square analysis example. (after behavior)</p> <p>A. Identify variables through Experimental Design Diagram (EDD)</p> <p>A. Write and critique procedures for improvement to reduce error.</p>	<p>A. Lab: Yeast Fermentation "Bubbling about yeast"</p> <p>Write a formal introduction, procedure, graph, and conclusion </p> <p> (100% performance)</p> <p>B. From NG video: Identify animal behavior, classify by type; determine if innate or learned  </p>	<p>A. Campbell, <u>Biology</u></p> <p>A. Yeast Lab: bromo yeast, flasks, timers</p>

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	<p>Advanced Biology Competencies:</p> <p>C1. Understand and apply science process skills and scientific habits of mind.</p> <p>C3. Apply science process skills in a variety of situations using appropriate available technology to collect and display data.</p> <p>C4. Understand that all living organisms have identifiable structures and cellular processes that allow for survival.</p> <p>C8. Understand that organisms are dependent on one another and their environment.</p> <p>C9. Understand that matter and energy cycle through organisms and their environment.</p> <p>C11. Understand that evolution and natural selection will result in organisms changing over time in their structures, behavior and biochemistry.</p> <p>C12. Understand that humans are similar to other species in many ways and yet are unique among earth's life forms.</p> <p>C13. Understand that the growth of knowledge in biology has been advanced through technology and is used to identify, understand and solve local and global issues</p> <p>C14. Explain how the study of living material depends on the</p>	<p>inBiology-purpose </p> <p>A. Chi Square Analysis (after behavior)</p> <p>B. Classic Animal Behavior Studies</p> <p>B. Terms</p> <p>B. Innate vs. Learned Response</p> <p>B. Common behaviors:</p> <p>Foraging, Navigation, Territorial</p> <p>Agnostic, Reproductive, Courtship, Migration, Hibernation, Taxis, Kinesis</p> <p>Communication, Social, Biorhythms</p>	<p>A. Identify components of a scientific paper: introduction and conclusion </p> <p>B Identify common behavioral responses from video clips or descriptions of animal behavior.</p> <p>B Conduct Pill Bug Lab regarding wet vs. dry environment.</p> <p>B. Develop unique experiment to select a preferred environment.</p> <p>B Apply Chi Square Analysis to original Data.</p> <p>B. Critique variables in pill bug taxis and use original data to draw conclusions.</p> <p>B. Apply animal behavior terms to pill bug behavior. </p>	<p>B. Worksheet: What is happening here? (various animal behaviors to evaluate </p> <p>B. Quiz: Behavior terms.  (100%CKS)</p> <p>A/B. Formal Lab Report: Pill Bugs:EDD introduction, procedure, table, graph, Chi Square, conclusion and work cited.   (100% performance)</p> <p>A,B: Test multiple choice, true/false, open response, problem solving  (70% CKS 30% performance)</p>	<p>B. Campbell, <u>Biology</u></p> <p>B. Pill Bug Lab (AP1 to change environment)</p> <p>B. National Geographic Wildlife.</p> <p>B. Worksheet: What is</p>

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	study of chemistry.				
October 2012	<p><u>Biochemistry</u></p> <p>A. What is the role of atomic interactions in the metabolism of living things?</p> <p>B. What are the roles of the major macromolecules of living things</p> <p>C. How are elements cycled through the environment and through living things?</p> <p>D. How do living things relate to the Laws of Thermodynamics</p> <p>G</p> <p>Advanced Biology Competencies:</p> <p>C1. Understand and apply science process skills and scientific habits of mind.</p> <p>C3. Apply science process skills in a variety of situations using appropriate available technology to collect and display data.</p> <p>C4. Understand that all living organisms have identifiable structures and cellular processes that allow for survival.</p> <p>C6. Understand that DNA and</p>	<p>A. Chemistry Review Atomic Structure Bonding: Covalent, Ionic, Hydrogen Polarity Water pH Buffers</p> <p>B. Biochemistry Carbon Functional Groups Dehydration Synthesis and Hydration Reactions Carbohydrates Proteins Lipids Nucleic Acids Chemical Analysis</p> <p>C. Environmental Chemistry Carbon Cycle Water Cycle Phosphorus Cycle Nitrogen Cycle Nitrogen Fixation Dissolved Oxygen</p> <p>D. Enzymatic Reactions (may be moved to energy unit) D. Thermodynamics</p>	<p>A. Identify the common and trace elements in living things by both name and symbol. A. Draw Bohr atoms A. Draw Bohr atoms bonding ionically and covalently A. Explain why water is polar. A. Describe the properties of water and explain their impact upon living things. A. Describe the pH scale and identify acid, base and neutral solutions. A. Explain how H⁺ concentration is interpreted in the pH scale. A. Describe how a buffer helps to maintain homeostasis in living things. A. Use pH test tape A. Calibrate and use pH probe</p> <p>B. Identify functional groups in macromolecules. B. Determine the molecular formula of a organic molecule represented by a skeletal drawing. B. Identify Carbohydrates, Proteins, Lipids and Nucleic Acids from drawings molecular structure B. Explain the process of dehydration synthesis and hydrolysis in macromolecules formation and degradation. B. Differentiate between the functions of proteins, lipids, carbohydrates and nucleic acids. B. Use Qualitative tests to identify nutrients within controls and unknown solutions</p> <p>C. Draw the biogeochemical cycles</p>	<p>A. Chapter 2/3 Study Guide C A A. Stations: Water, Water Everywhere...but not a drop to drink C A A. Quiz: Basic chemistry and water properties C (70% CKS 30% performance) A. pH Lab: Testing with paper and using probes to look at buffer stability. Tables, EDD, Graph, Formal Conclusion. C A (100% performance)</p> <p>B. Flash Cards (25) of macromolecules B. Lab: Organic Chemistry--testing of nutrients in food; Questions, Table and Formal Conclusion, EDD, C A (100% performance) B. Quiz: Carbon Chemistry - carbohydrates(multiple choice, drawings, fill in) C A (80% CKS, 20% performance) B. Study Guide: Chapter 4 and 5 C B. Quiz: lipids, nucleic acids, proteins C A</p> <p>C. DO Lab: data collection, observations questions, EDD C A (100% performance)</p> <p>A,B,C: Unit Test (multiple choice, t/f, short answer, identifications, open response, diagrams) C A (60% CKS 40% performance)</p> <p>D. Campbell Chapter 6 D. Quiz: enzymes C A D. Activity: Toothpickase C D. Lab: Catalase Enzyme C A (100% performance)</p>	<p>A. Campbell, <u>Biology</u> A. Models: Ice, Mag A. Periodic Tables A. Powerpoint: chem A. Water Activities: cylinders, several bea food coloring, small a thermometers, cornsy A. pH Lab supplies: t materials to test, 6pl and graphing calculat A. Video: World of C</p> <p>B. Campbell, <u>Biology</u> B. Paper amino acids synthesis activity. B. Powerpoint: Bioch B. Video: World of C B. Video: World of C B. Models: cholester chain B: Organic test reage biurets, sudanIII, iodi fructose, eggwhite, h Hotplates, various gla</p> <p>A, B, Video: Chemis (to be used as a review</p>

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	<p>hereditary events control the passage of structural and functional information from one generation to the next.</p> <p>C7. Understand that Living things are classified by their degree of relatedness through cellular structure, biochemical pathways, and molecular genetics</p> <p>C8. Understand that organisms are dependent on one another and their environment.</p> <p>C9. Understand that matter and energy cycle through organisms and their environment.</p> <p>C12. Understand that humans are similar to other species in many ways and yet are unique among earth's life forms.</p> <p>C13. Understand that the growth of knowledge in biology has been advanced through technology and is used to identify, understand and solve local and global issues</p> <p>C14. Explain how the study of living material depends on the study of chemistry.</p>	<p>D. First and Second Laws</p> <p>D. ATP</p> <p>D. Activation Energy</p> <p>D. Enzymes</p>	<p>affecting living things: water, carbon, phosphurs, and nitrogen</p> <p>C. Explain how nitrogen fixation involves a symbiotic relationship.</p> <p>C. Explain the relationship between DO and organisms within an water body.</p> <p>C. Explain the relationship between abiotic factors (temperature, depth) and DO</p> <p>PP</p> <p>D. State the two laws of thermodynamics.</p> <p>D. Describe how ATP is recycled as an energy intermediate within a cell.</p> <p>D. Define: Metabolism, Anabolism, Catabolism</p> <p>D. Differentiate between positive and negative feedback systems.</p> <p>D. Explain how enzymes lower the activation energy of chemical reactions.</p> <p>D. Describe how the active site of an enzyme may be affected by environmental factors: pH, temperature</p> <p>D. Differentiate between Vmax and Kmax of an enzyme.</p> <p>D. Graph Enzyme rate</p> <p>PP</p>		<p>C. Campbell, <u>Biology</u></p> <p>C. Overheads (textbook)</p> <p>C. DO tablets, water containers</p> <p>D. Toothpicks (6 boxes)</p> <p>D. Catalase enzyme (HCL, NaOH)</p>
<p>November 2012</p>	<p><u>Cellular Design</u></p> <p>A. What does take to be a biologist?</p> <p>B. How are the microscopes essential tools for biological studies.</p>	<p>A. Famous Biologists and their contributions to modern understanding of concepts</p> <p>B. Microscope Terms</p>	<p>A. Research biologist and describe their educational background, turning points in their life, research, and other contributions.</p> <p>B. Explain the relationship between magnification, resolution, brightness, contrast, field of view and depth of field</p> <p>B. Demonstrate proper technique for</p>	<p>A. Poster Presentation CA(100% performance)</p> <p>B. Microscope Lab with cellular identification CA (100% performance)</p> <p>B. Quiz I: parts/rules/types of microscopes CA</p> <p>B. Quiz: II parts/rules/types of microscopes</p>	<p>A. Online and Library</p> <p>B. Campbell, <u>Biology</u></p> <p>B. Compound microscopes</p> <p>students,</p> <p>B. Stereoscope</p>

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	<p>C. How is the cell the basic unit of structure and function of all living things, even though not all cells look alike? (Some of this was continued into December map)</p> <p></p> <p>Advanced Biology Competencies: C1. Understand and apply science process skills and scientific habits of mind. C3. Apply science process skills in a variety of situations using appropriate available technology to collect and display data. C4. Understand that all living organisms have identifiable structures and cellular processes that allow for survival. C6. Understand that DNA and hereditary events control the passage of structural and functional information from one generation to the next. C7. Understand that Living things are classified by their degree of relatedness through cellular structure, biochemical pathways, and molecular genetics C8. Understand that organisms are dependent on one another and their environment. C9. Understand that matter and energy cycle through</p>	<p>Types of Microscopes Preparation Microscopic size</p> <p>C. Cell Structure C. Techniques: cell fractionation, microscopy, cell culture</p> <p>C. What influences the size and shape of cells? C. Classification: Domains, Prokaryotic vs. Eukaryotic, Plant, Animal, Fungi, Protista (cell aspects) C. Endosymbiosis-evidence with mitochondria, chloroplasts, flagellum, and motor proteins C. Common organelles in all cells C. Cytoskeleton role and components C. Endomembranous system description and purpose C. Similarities in cilia and flagella construction C. Extracellular matrix- contents and role C. Components of plant cell wall</p>	<p>focusing a slide on 4x, 10x and 40x objective B. Make a wet mount slide. B. Identify microscope parts and state function. B. Differentiate between preparation for compound and electron microscopes. B. Differentiate between transmission, scanning, STEM + atomic microscopes with regards to image produced, energy source, magnification, preparation B. Calculate the size of a cell under 4x, 10x, and 40x objectives using measurement tools. B. Differentiate between various staining techniques: vital, primary, differential, immunofluorescence, B. Define: micrograph, electromagnetic lens, freeze fracture, fixation, embedding, sectioning, B. Demonstrate proper techniques for using stereoscope.</p> <p>C. State the three domains of living things and provide classification guidelines for each. C. Describe techniques used to identify structure and function of cells. C. Describe how changes in technology affect our understanding of structure and function of cellular components. C. Describe basic components of all cells (regardless of domains) C. Describe endosymbiosis and how prokaryotes lead to eukaryotes. C. State cellular evidence for endosymbiosis. C. Describe function for major organelles in both plant and animal cells. C. Differentiate between organelles of representatives of plant, animal, fungi and bacteria and representative protista. C. Describe 9+2 pattern found in cilia and</p>	<p></p> <p>C. Domains of life worksheet (based on video) C. Coloring packet: prokaryote, animal, plant, mitochondria, chloroplast, endomembranous system.  C. Quiz: Domains of life, endosymbiosis, prokaryote vs. eukaryote  C. Quiz: Eukaryotic organelles </p> <p>A,B,C Unit Test: multiple choice, true/false, short answer  (80% CKS 20% performance)</p>	<p>B. Slides, coverslips, colored thread slides, B. Various preparation EM(Tedeschi) B. PP: Microscope A B. Plymouth State University (Prinze)</p> <p>C. Campbell, <u>Biology</u> C. Video: Domains of life C. PP: Cells C. Coloring book diagrams of organelles.</p>

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	<p>organisms and their environment. C11. Understand that evolution and natural selection will result in organisms changing over time in their structures, behavior and biochemistry. C12. Understand that humans are similar to other species in many ways and yet are unique among earth's life forms. C13. Understand that the growth of knowledge in biology has been advanced through technology and is used to identify, understand and solve local and global issues C14. Explain how the study of living material depends on the study of chemistry.</p>	<p>(primary, secondary and middle lamella) C. Intercellular junctions</p>	<p>flagella </p>		
<p>December 2012</p>	<p><u>Cellular Communication</u> A. How are specific tissues in animals specialized to do their job more efficiently? B. How does the plasma membrane function as a transport mechanism, communicator, containment mechanism and identifier for the cell?  Advanced Biology Competencies: C1. Understand and apply science process skills and</p>	<p>A. Histological review of animal tissues epithelial, muscular, nervous and connective tissues. B. Plasma membrane Structure B. Plasma membrane Functions B. Passive Transport Mechanisms B. Active Transport Mechanisms B. Electrogenic pumps</p>	<p>A Using the compound microscope, identify cellular features and extracellular matrix of the following animal tissue types: Epithelium: simple squamous, stratified squamous, cuboidal, columnar, goblet cells, pseudostratified Connective: adipose, blood, bone, hyaline cartilage, fat, areolar Muscle: cardiac, skeletal, smooth. Nervous: neuron smear, motor nerve endings B. Describe the Fluid Mosaic Model of the Plasma Membrane and the the role of each component. B. Describe how the plasma membrane is involved as a barrier, in chemical communication, extracellular connections,</p>	<p>A. Lab: Animal Tissues  (100% performance) A. Lab Practical- Identify common tissues and cellular features through microscopic evaluation  (100% performance) A. Quiz: Animal Tissues.  (100% CKS) A. Campbell Chapter 40 B. Campbell Chapter 8 B. Coloring: Fluid Mosaic Model (Part of Cell packet) B. Quiz: Cell membrane  B. Lab: Diffusion across a membrane (questions, graph, data collection)  (100% performance) B. Lab: Water potential (abbreviated form: potato vs. apples in varying concentrations</p>	<p>A. Campbell, <u>Biology</u> A. Various slides (see A. 1 compound micro students B. Campbell, <u>Biology</u> B. glucose starch solu membrane 3 ft/group (various concentratio balance B. potato, apple cork solutions (various cor electronic balance B. Powerpoint: Mem across a membrane B. Holt Laser Disc: S Pump</p>

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	<p>scientific habits of mind.</p> <p>C3. Apply science process skills in a variety of situations using appropriate available technology to collect and display data.</p> <p>C4. Understand that all living organisms have identifiable structures and cellular processes that allow for survival.</p> <p>C6. Understand that DNA and hereditary events control the passage of structural and functional information from one generation to the next.</p> <p>C7. Understand that Living things are classified by their degree of relatedness through cellular structure, biochemical pathways, and molecular genetics</p> <p>C12. Understand that humans are similar to other species in many ways and yet are unique among earth's life forms.</p> <p>C13. Understand that the growth of knowledge in biology has been advanced through technology and is used to identify, understand and solve local and global issues</p> <p>C14. Explain how the study of living material depends on the study of chemistry.</p>	<p>B. Water potential</p> <p>B. Osmoregulation-survival mechanisms</p>	<p>antigen identification, and biochemical pathways</p> <p>B. Describe transport mechanisms including: passive transport, cotransport, carriers, transport inhibition, role of receptor molecule in gated channels, ion channels,</p> <p>B. Differentiate between passive and active transport mechanisms.</p> <p>B. Describe the sodium potassium pump and its relationship to transport of other molecules (example glucose).</p> <p>B. Describe proton pumps</p> <p>B. Describe how channel proteins are involved in regulating a electrochemical message along a neuron. (brief-exchange of + ions)</p> <p>B. Calculate water potential.</p> <p>B. Predict the movement of water based on concentration and water potential.</p> <p>B. Predict the movement of glucose starch solution across a selectively permeable membrane.</p> <p>B. Describe how the movement through plant phloem is based upon water potential.</p> <p>B. Describe mechanisms living things maintain water balance: contractile vacuoles, kidney, gills,</p> <p>PP PPP</p>	<p>of sucrose solution). (Questions, graph, data collection, one calculation of WP)</p> <p>CA (100% performance)</p> <p>B. Quiz: Membrane Transport Mechanisms, Diffusion, Osmosis CA (100% CKS)</p> <p>B. Quiz: Water potential AC (100% CKS)</p>	<p>B. Membrane model</p> <p>B. PP: Membranes S</p> <p>B. Membrane Model</p>
January	<u>Thermodynamics Unit</u>	A. Energy in	A. Define: autotrophic, heterotrophic,	-----Midterm Exam CA (100% CKS)	A. Campbell, <u>Biology</u>

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2013	<p>A. How are living things designed to release energy from stored in organic molecules?</p> <p>B. How do living things transform light energy into a chemical form?</p> <p>G</p> <p>C1. Understand and apply science process skills and scientific habits of mind.</p> <p>C3. Apply science process skills in a variety of situations using appropriate available technology to collect and display data.</p> <p>C4. Understand that all living organisms have identifiable structures and cellular processes that allow for survival.</p> <p>C7. Understand that Living things are classified by their degree of relatedness through cellular structure, biochemical pathways, and molecular genetics</p> <p>C8. Understand that organisms are dependent on one another and their environment.</p> <p>C9. Understand that matter and energy cycle through organisms and their environment.</p> <p>C12. Understand that humans are similar to other species in many ways and yet are unique among earth's life forms.</p>	<p>Ecosystems</p> <p>A. Carbon Cycle(CO₂ production and use)</p> <p>A. ATP chemiosmosis</p> <p>A. Substrate level phosphorylation general scheme</p> <p>A. Generalized equation compared to photosynthesis</p> <p>A. Oxidative Phosphorylation Glycolysis, KrebsCyle, Electron Transport</p> <p>A. Fermentation Lactic Acid, Alcoholic</p> <p>B.Photosynthesis General Equation</p> <p>B. Photoautotrophs vs. Chemoautotrophs</p> <p>B. Historical studies</p> <p>B. Generalized Equation</p> <p>B. Plant structure (leaf structure)</p> <p>B. Light Reaction</p> <p>B. Electromagnetic spectrum</p> <p>B. Role of pigments</p> <p>B. Photosystems I and II</p> <p>B. Calvin Cycle (C3/Dark)-Carbon Fixation</p> <p>B. Plant adaptations</p>	<p>consumer, producer, decomposer, trophic level, ecological pyramid, Food chain, food web</p> <p>A. Describe why the number of trophic levels in an ecosystem is limited to 4 or 5 levels.</p> <p>A. Describe the carbon cycle and the role of photosynthesis and cellular respiration in regulating carbon dioxide.</p> <p>A. Relate excess CO₂ to global warming</p> <p>A. Describe the structure of ATP and explain how energy is stored and released using this molecule.</p> <p>A. Describe how chemiosmosis generates ATP across a cell/mitochondria/chloroplast membrane</p> <p>A. Describe how the processes of cellular respiration and photosynthesis are related to each other in living things.</p> <p>A. Describe substrate level phosphorylation</p> <p>A. Write the summarized chemical reaction formula for oxidative cellular respiration.</p> <p>A. Identify the components of the cell and mitochondria responsible for each step of oxidative respiration.</p> <p>A. Summarize the steps of Glycolysis.</p> <p>A. State the function of NAD⁺ and FAD⁺⁺</p> <p>A. Summarize the Krebs Cycle</p> <p>A. Summarize the movement of electrons through the electron transport chain.</p> <p>A. Explain the role of oxygen in the electron transport chain.</p> <p>A. Differentiate between oxidative respiration and fermentation processes.</p> <p>A. Differentiate between alcoholic fermentation and lactic acid fermentation.</p> <p>A. Hypothesize which sugar would have greater production of carbon dioxide through alcoholic fermentation.</p> <p>P P</p>	<p>A. Campbell Chapter 6 + 9</p> <p>A. Quiz: Energy in theEcosystem C A</p> <p>A. Mini-Lab: Fermentation using different sugars C A(100% performance)</p> <p>A. Quiz: Cell respiration C A (100% CKS)</p> <p>B. Campbell Chapter 10</p> <p>B. Worksheet: Englemann's data</p> <p>B. Lab: AP Photosynthesis (parts A and B): data collection, questions C A (100% performance)</p> <p>B. Computer Simulation: 5C-Photosynthesis, data collection, graphs, questionsC A</p> <p>B. Quiz: photosynthesis.C A(100% CKS)</p>	<p>A. Notesheet: Energy</p> <p>A. PP: Cellular Respiration</p> <p>A. Fermentation tubes starch, sucrose, yeast</p> <p>B. Campbell <u>Biology</u></p> <p>B. Spectrophotometer spinach, sucrose solution, spec20 cuvet (group)Chromatography paper, Jar with lid, graduated tubes,</p> <p>B. Mac or PC: Exploratory Biology - Photosynthesis graph paper.</p>

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	<p>C13. Understand that the growth of knowledge in biology has been advanced through technology and is used to identify, understand and solve local and global issues</p> <p>C14. Explain how the study of living material depends on the study of chemistry.</p>	<p>for photosynthesis</p> <p>B. CAM and C4 pathways</p>	<p>B. Write the summarized equation for photosynthesis..</p> <p>B. Compare equation to oxidative respiration.</p> <p>B. State where in a plant photosynthesis occurs (primary and secondary organs, organelle)</p> <p>B. State jobs of xylem, phloem, stomata, mesophyll, cuticle.</p> <p>B. Summarize the experiments of Von Helmont, Priestly, Engelman</p> <p>B. Describe results of experiments using oxygen isotopes as carbon dioxide and water to determine the source of oxygen in product.</p> <p>B. Explain why multiple pigments are beneficial to plants.</p> <p>B. Identify components of electromagnetic spectrum and indicate which light plants favor..</p> <p>B. State the relationship between photon wavelength, frequency and energy.</p> <p>B. Summarize the movement of electrons through photosystems I and II.</p> <p>B. Summarize how ATP is produced during the light cycle.</p> <p>B. Describe the role of water in maintaining chlorophyll's integrity.</p> <p>B. State the products of the light cycle and relate their role to the Calvin/C3 Dark cycle</p> <p>B. Summarize the steps of the Calvin/C3/Dark Cycle.</p> <p>B. Define Carbon Fixation.</p> <p>B. Name the products of the Calvin/C3/Dark cycle</p> <p>B. State adaptations between plants of C3, C4 and CAM metabolism.</p> <p>B. Identify plants that have C4 and CAM metabolism.</p>		

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			B. Extract the pigments from spinach through paper chromatography and calculate RF values. B. Use basic lab skills to evaluate the role of chloroplasts and light on photosynthesis. B. Predict the effect of boiling chloroplasts extracted from spinach on its ability to photosynthesize B. Use the spectrophotometer to determine percentage transmittance. B. Using computer simulation, predict the rate of photosynthesis based on change in wavelength and intensity of light. PP		
February 2013	<u>Reproductive Strategies Unit</u> A. How do generations of cells maintain consistency with their genetic code between generations, yet alter it when necessary to create variation? <u>Genetics Unit (introduced for fly work)</u> B. What is the probability of the offspring of receiving a specific trait from its parental cells? G Advanced Biology Competencies: C1. Understand and apply science process skills and scientific habits of mind. C3. Apply science process skills in a variety of situations using appropriate available technology to collect and display data. C4. Understand that all living	A. Cell Division A. Chromosome structure A. Mitosis A. Cancer A. Meiosis A. Crossing over and other variation possibilities. A. Role of Mitosis and Meiosis with regard to genetic stability or variation A. Spermatogenesis and Oogenesis in plants and animals A. Reproductive Strategies of fungi and plants. A. Alternation of Generations A. Cloning and forms of asexual reproduction B. Mendelian	A. Distinguish between stages of mitosis between plant and animal A. Using the compound microscope, identify stages of mitosis in plant and animal. A. Calculate time in each stage A. Explain how genetic mutation and environment influences affect the cell cycle and mitosis and as a result increase the chances of developing cancer A. Define cancer terms: benign, tumor, metastasize, malignant A. Distinguish between mitosis and meiosis with regard to purpose and process. A. Explain how crossing over increases variation. A. Using a compound microscope identify locations and specific structures within angiosperms and mammals where meiosis occurs. A. Compare division and outcomes of spermatogenesis and oogenesis A. Compare the reproductive strategies of asexual and sexual reproduction with regard to diversity, variation, advantages and disadvantages A. Cite specific examples of asexual	A. Campbell Chapter 12, 13 A. Lab: Mitosis CA (100% performance) A. Quiz: Cell Cycle, Cancer and Mitosis CA A. Lab: Meiosis in Animals and Plants CA (100% performance) A. Activity: Meiosis (using pop it beads) C A. Lab: Reproductive Strategies (rhizopus, hydra, ulthroxix, moss, fern) A. Lab: Planaria Regeneration CA A. Unit Test chapters 12 and 13 (60% CKS, 40% performance) A B. Campbell Chapter 14 B. Lab: Sordaria (relate to crossing over and test cross for mapping purposes with genetics) (can do with Genetics Unit) CA B. Lab: AP Fruit Fly Genetics CA (100% performance) Must start before Feb Vacation	A. Compound Micros A. Slides: White fish Sordaria, Mammalian Follicles, Ascaris, Lili anthers A. PP: Mitosis and th A. PP: Asexual vs. Se A. PP: Meiosis A. Campbell, <u>Biolog</u> A. Sodaria Cross plat Carolina Biological); slides. A. Chromosomal Kit: A. Slides: Fern Game Antheridia, Archegon A. Living Hydra, Liv A. Watch classes, Sc B. AP Lab materials: Carolina Biologica B. Article: Chromoso Drosophila Melanog

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	<p>organisms have identifiable structures and cellular processes that allow for survival.</p> <p>C6. Understand that DNA and hereditary events control the passage of structural and functional information from one generation to the next.</p> <p>C7. Understand that Living things are classified by their degree of relatedness through cellular structure, biochemical pathways, and molecular genetics</p> <p>C11. Understand that evolution and natural selection will result in organisms changing over time in their structures, behavior and biochemistry.</p> <p>C12. Understand that humans are similar to other species in many ways and yet are unique among earth's life forms.</p> <p>C13. Understand that the growth of knowledge in biology has been advanced through technology and is used to identify, understand and solve local and global issues</p> <p>C14. Explain how the study of living material depends on the study of chemistry.</p>	<p>Genetics Quick Review (for Understanding fly work)</p> <p>B. Common Experiments: Fruit Fly (Began before vacation to set up F1 flies).</p>	<p>reproduction.</p> <p>A. Describe Life Cycle of Fungi in terms of diploid and haploid cells.</p> <p>A. Identify reproductive structures for rhizopus (fungi) and ulthroxix,</p> <p>A. Prepare a slide of Sordaria (can be done with genetics unit)</p> <p>A. Describe the Alternation of Generations pattern within moss and fern and identify structures.</p> <p>A. Describe reproductive strategies for Hydra and Planaria</p> <p>A. Design and carry out regeneration study using Planaria.</p> <p>PP</p> <p>B. Define terms associated with genetics.</p> <p>B. Describe why fruit flies are the ideal experimental organism for studying genetics</p> <p>PP</p>		
<p>March 2013</p>	<p><u>Genetics and Evolution Unit</u></p> <p>A. What is the probability of the offspring of receiving a specific trait from its parental</p>	<p>A. Mendalian Genetics</p> <p>A. Vocabulary</p> <p>A. Monohybrid,</p>	<p>A. Apply genetic terms to solving problems for monohybrid, dihybrid, multiple allele and sexlinked problems.</p> <p>A. Use both Punnet Square and Rules of</p>	<p>A. Translation of Mendel's paper and answer questions CA</p> <p>A. Quiz: genetics vocabulary CA</p> <p>A. Problems: Monohybrid and Dihybrid</p>	<p>A. PP Genetics 14+1</p> <p>A. Campbell, <u>Biology</u></p> <p>A. Lab: Simulated BL and RH factors</p>

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	<p>cells?</p> <p>A. How can changes in DNA result in no changes, minor changes or major changes in the organism.</p> <p>A. How are genetics related to evolution?</p> <p>G</p> <p>Advanced Biology Competencies: C1. Understand and apply science process skills and scientific habits of mind. C3. Apply science process skills in a variety of situations using appropriate available technology to collect and display data. C4. Understand that all living organisms have identifiable structures and cellular processes that allow for survival. C6. Understand that DNA and hereditary events control the passage of structural and functional information from one generation to the next. C7. Understand that Living things are classified by their degree of relatedness through cellular structure, biochemical pathways, and molecular genetics C11. Understand that evolution and natural selection</p>	<p>Dihybrid and Trihybrid crosses (Rules of multiplication and Addition) A. Incomplete or codominance traits A. Pedigree analysis A. Multiple alleles, polygenetic inheritance A. Sexlinked traits A. Linked traits A. Chromosomal Maps (Data analysis and Sordaria) A. Common Experiments: Sordaria A. Hardy-Weinberg Population Genetics and Evolution A. Natural Selection A. Speciation and Microevolution</p>	<p>Multiplication and Addition to solve genetic problems A. Identify mode of inheritance when provided a pedigree (for all combinations of being autosomal, sexlinked. dominant, resessive and codominant A. Identify blood types by antigen specificity using simulated blood type kit. A. Apply problem solving skills to unknown fruit fly culture to identify trait and its mode of inheritance. A. Use Chi-Square analysis on data collected from Indian Corn and Fruit Flies. A. Write a formal conclusion regarding Fruit Fly experiment with reference to Chi Square analysis and mapping A. Calculate percent recombinants for linked genes and draw a chromosomal map A. Calculate percent recombination for Sordaria. A. Identify if traits are linked by looking at data collected A. Compare the basic mapping strategies: linkage, DNA analysis, staining of chromosome A. State how Hardy Weinberg Equation affects Population Genetics and evolution of a species. A. Using population data, predict genotype and phenotypes using HW equation. A. State the Theory of Evolution by Natural</p> <p>PE</p>	<p>Blood Types, Sex-linked CA A. Lab: Blood Testing with questions C A(100% performance) A. Computer Lab: Heredity in Families, pedigree analysis. CA A. Quiz: Basic Genetics (Multiple choice and problems) CA (40% CKS 60% performance) A. Lab: Indian Corn- Chi Square Analysis of data. CA A. Lab: Fruit Fly AP version. Packet and formal conclusion CA (100% performance) A. Quiz: Mendelian Exceptions and Sex linkage. CA A. Linkeage problem set CA A. Quiz: Linkeage problems CA A. Lab: Sordaria (analysis of data) Sordaria (relate to crossing over and test cross for mapping purposes with genetics) CA A. Lab: Hardy Weinberg analysis/ Population Genetics CA A. Quiz: Hardy Weinberg and Evolution CA A. Test: Genetics CA(46% CKS 54% performance)</p>	<p>A. Lab: Carolina AP A. Sordaria Cross pla (Carolina Biological) A. Indian Corn samp A. Index cards for Ha A. PTC and Control t</p>

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	<p>will result in organisms changing over time in their structures, behavior and biochemistry.</p> <p>C12. Understand that humans are similar to other species in many ways and yet are unique among earth's life forms.</p> <p>C13. Understand that the growth of knowledge in biology has been advanced through technology and is used to identify, understand and solve local and global issues</p> <p>C14. Explain how the study of living material depends on the study of chemistry.</p>				
April 2013	<p>Biotechnology Unit</p> <p>A. How can changes in DNA result in no changes, minor changes or major changes in the organism</p> <p>A. How are the processes of gene expression different among prokaryotes and eukaryotes</p> <p>B. How has biotechnology changed our ability to study the structure and function of DNA and the interrelatedness of organisms</p> <p>B. How have naturally occurring phenomenon been modified to enhance agriculture, medicine,</p>	<p>A. Historical Developments</p> <p>A. DNA Structure</p> <p>A. DNA replication</p> <p>A. Transcription</p> <p>A. Translation</p> <p><u>Done with transformationlab.</u></p> <p>A. Control of Expression</p> <p>A. Prokaryotic vs. Eukaryotic</p> <p>B. Biotechnology Issues</p> <p>B. Cloning methods: plant and bacterial</p> <p>B. Genetic Engineering</p> <p>B. DNA Sequencing</p> <p>B. Gel</p>	<p>A. Identify people involved in developing the model of DNA.</p> <p>A. Describe research methods used by Rosalind Franklin, Maurice Wilkins, James Watson and Francis Crick</p> <p>A. Describe classic experiments that determined DNA as the genetic material.</p> <p>A. Identify specific contributions of Franklin, Watson, Crick and Wilkins with regard to DNA structure</p> <p>A. Describe nucleotide structure and antiparallel construction.</p> <p>A. Describe Replication in terms of points of origin and enzyme involvement.</p> <p>A. Explain role of Okazaki Fragments in replication.</p> <p>A. Compare prokaryotic and eukaryotic replication.</p> <p>A. Describe the steps of Transcription and translation.</p> <p>A. Decode DNA into mRNA, tRNA and</p>	<p>A. Race for the Double Helix - open response questions regarding DNA researchers C A</p> <p>A. Read articles by Watson/Crick, Franklin, Wilkins. Identify structural evidence and techniques used. C A</p> <p>A. Quiz: DNA history and structure and replication C A</p> <p>A. Quiz: RNA and Gene Expression C A</p> <p>A. Worksheet: Using Codon boxes to determine amino acid sequences C</p> <p>B. Lab: DNA Separation from Spinach C A</p> <p>B. Lab: Cloning of African Violets C A</p> <p>B. Activity: DNA sequencing C A</p> <p>B. Lab: Biorad DNA Fingerprinting C A (100% performance)</p> <p>B. Lab: Edvotek- PCR Simulation C A</p> <p>B. Lab: Bacterial Transformation C A (100% performance)</p> <p>B. Reading: Evolutionary changes in</p>	<p>A. Campbell Biology 18, 19</p> <p>A. Textbook video clips</p> <p>A. DNA model Kit</p> <p>A. Video: Race for the Helix</p> <p>A. Video: RNAi (Howard Hughes Medical Institute)</p> <p>A. PP: What is DNA?</p> <p>A. PP From gene to protein</p> <p>B. Campbell Biology</p> <p>B. PP: Biotechnology</p> <p>B. Spinach Lab: cloning</p> <p>95% ethanol, spinach leaves, glass hooks, Wisk Lab</p>

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	<p>forensics and nutrition?</p> <p>Advanced Biology Competencies:</p> <p>C1. Understand and apply science process skills and scientific habits of mind.</p> <p>C3. Apply science process skills in a variety of situations using appropriate available technology to collect and display data.</p> <p>C4. Understand that all living organisms have identifiable structures and cellular processes that allow for survival.</p> <p>C6. Understand that DNA and hereditary events control the passage of structural and functional information from one generation to the next.</p> <p>C7. Understand that Living things are classified by their degree of relatedness through cellular structure, biochemical pathways, and molecular genetics</p> <p>C11. Understand that evolution and natural selection will result in organisms changing over time in their structures, behavior and biochemistry.</p> <p>C12. Understand that humans are similar to other species in many ways and yet are unique among earth's life forms.</p> <p>C13. Understand that the growth of knowledge in</p>	<p>Electrophoresis</p> <p>B. DNA fingerprinting</p> <p>B. Polymerase Chain Reaction.</p> <p>B. Transformation of bacterial cells</p> <p>B. Evolutionary changes with DNA</p>	<p>amino acid sequence</p> <p>A. Compare prokaryotic and eukaryotic transcription</p> <p>A. Describe role of transcription factors in gene expression of eukaryotes</p> <p><u>Done with Transformation lab</u></p> <p>A. Describe <i>Lac</i> operon</p> <p>A. Describe role of operators, promoters, suppressors, and inducers in gene expression of prokaryotes</p> <p>A. Explain how the the pGlo gene represents a operon system.</p> <p>A. Describe how transposons may alter genetic information.</p> <p>B. Describe ethical issues posed by biotechnology.</p> <p>B. Use appropriate lab skills for plant culture/cloning of african violets</p> <p>B. Use restriction enzymes/RFLP/ and gel electrophoresis to analyze DNA</p> <p>B. Describe the use of PCR</p> <p>B. Describe vectors used for genetic engineering.</p> <p>B. Use appropriate skills in microbiology to transform glow in dark gene into E.coli culture.</p> <p>B. Model method for DNA sequencing</p> <p>B. Describe new technology for mitochondrial and nuclear DNA analysis</p> <p>B. Compare DNA and amino acid sequences between varying organism to create a evolutionary "clock"</p> <p>PP</p>	<p>DNA C</p> <p>A/B Test: Biotechnology CA (50% CKS 50% performance)</p>	<p>B. Cloning Kit: African Violets</p> <p>B. DNA Fingerprinting Kit</p> <p>Gel Equipment, Microcentrifuge</p> <p>B. PCR simulation Kit</p> <p>Equipment</p> <p>B. Bacterial Transformation Kit (Biotech)</p> <p>Waterbath</p> <p>B. Large Plastic mod</p> <p>and genes</p> <p>B. PSU Biotechnology Kit</p> <p>B. PP: Regulating Ge</p>

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	<p>biology has been advanced through technology and is used to identify, understand and solve local and global issues</p> <p>C14. Explain how the study of living material depends on the study of chemistry.</p>				
May 2013	<p><u>Classification (miniunit)</u> A. How can living things classified based on structure, biochemistry and habitats?</p> <p><u>Microbiology, Parasitology and Immunology</u> B/D. How might you protect yourself from common microbes, antibiotic resistant bacteria, and parasites that you may encounter in your life?</p> <p>C. How does the Immune system respond to invasion of microorganisms and other parasites.</p> <p> Advanced Biology Competencies: C1. Understand and apply science process skills and scientific habits of mind. C3. Apply science process skills in a variety of situations using appropriate available technology to collect and display data. C4. Understand that all living organisms have identifiable</p>	<p>A. Classifying Life A. Review of Binomial Nomenclature A. Kingdoms/Domains A. Dicotomous Keys A. Systemics and Phylogeny A. Constructing a Cladogram A. History of Life on Earth (review appearance of major kingdoms) A. Major animal phyla</p> <p>B. Microbiology B. Characteristics of Viruses B. Characteristics of Bacteria B. Genetic Changes among viruses and bacteria. B. Superbugs and antibiotic resistance B. Culturing techniques and staining techniques</p>	<p>A. Identify the distinguishing characteristics of each kingdom and domain A. State the levels of the classification system used in studying organisms. A. Identify the appropriate level for human. A. Describe the evidence that organisms are related to each other. A. Use a dicotomous key to identify plants. A. Differentiate between phylogeny and systemics A. Explain the relationships between organisms on a cladogram A. Indicate on a time line major appearances of organisms. A. Trace on a graphic organizer (phylogenetic tree) major animal phyla. </p> <p>B. Identify common viruses and bacteria that cause disease. B. Identify vaccines required for entrance in schools. B. Classify viruses by shape and nucleic acid composition B. Classify bacteria by shape and colony. B. Explain how gram staining is used to identify bacteria B. Produce slides using gram stain technique. B. Evaluate lab data of antibiotic on bacteria. why viruses are not living.</p>	<p>A.Lab: Plant Classification- using a key for conifers.  (100% performance) A. Quiz: Classification and phylogenetics  (70% CKS 30% performance)</p> <p>B. Lab: spontaneous generation - analysis (set up in April)  B. Lab: Gram Staining  (100% performance) B. Lab: antibiotic disc on culture.  B. Quiz: Microbiology  (70% CKS 30% performance) B. Reading: "Super bugs" questions answered from Biotechnology Magazine </p> <p>C. Lab: Antibody and Antigen reaction plates  C. Computer Simulation: HIV and the immune system.  (100% performance)</p> <p>B/C/D Ticket to Leave: Describe three things you can do to reduce your chances of developing a "superbug" or parasitic worm infection. </p> <p>Final Exam: Cummulative from September</p>	<p>A. Various branches A. Drawing of PTree A. Campbell Biology</p> <p>B. Campbell Biology 31 B. Biotechnology Magazine article with questions B. PP: microbiology B. Antibiotic Discs and Welch)</p> <p>C. Computer simulation Human Biology (MA) C. Simulated antibody C. Campbell Chapter</p> <p>D. PP: Parasitology D. Preserved animals spiders, tapeworm</p>

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	<p>structures and cellular processes that allow for survival.</p> <p>C6. Understand that DNA and hereditary events control the passage of structural and functional information from one generation to the next.</p> <p>C7. Understand that Living things are classified by their degree of relatedness through cellular structure, biochemical pathways, and molecular genetics</p> <p>C8. Understand that organisms are dependent on one another and their environment.</p> <p>C11. Understand that evolution and natural selection will result in organisms changing over time in their structures, behavior and biochemistry.</p> <p>C12. Understand that humans are similar to other species in many ways and yet are unique among earth's life forms.</p> <p>C13. Understand that the growth of knowledge in biology has been advanced through technology and is used to identify, understand and solve local and global issues</p> <p>.</p>	<p>B. Pathogenic Protista and Fungi</p> <p>B. Protection against microbes and epidemics</p> <p>C. Immune System Response and Vaccines</p> <p>C. Primary and Secondary Responses</p> <p>D. Other parasites of the world</p> <p>D. Roundworms</p> <p>D. Nematodes</p> <p>D. Arthropods</p>	<p>B. Distinguish between transformation, transduction and conjugation and describe how these may be methods to transfer genetic information.</p> <p>B. Describe how "superbugs" may have developed.</p> <p>B. List pathogenic protista and fungi PP</p> <p>C. Summarize how the immune system functions to control infection.</p> <p>C. Differentiate between primary and secondary response.</p> <p>C. Describe how a vaccine works in fighting disease.</p> <p>C. Explain why new vaccines are required for certain viruses more frequently than others.</p> <p>C. Explain how bacteria may be used in a "positive sense" by humans</p> <p>C. Distinguish between viruses, viroids and prions.</p> <p>C. Evaluate lab data of antibody on antigen.</p> <p>C. Summarize how HIV affects the immune response. PP</p> <p>D. Name specific animals that cause parasitic disease.</p> <p>D. Explain how sanitation and water supply issues are important aspects of controlling parasitic worms.</p> <p>D. Describe how the life cycle of parasitic worms are an evolutionary adaptation.</p> <p>D. Describe how malaria is transmitted and steps to prevent infection.</p> <p>PP</p>	<p>to end of May with the majority of the questions coming from Semester II materials. Senior Exemption if A for each of the three quarters and a B/A for progress report. Also must have passing midterm grade CA ((100% CKS)</p>	
<p>June 2013</p>	<p>Advanced Biology Competencies:</p> <p>C1. Understand and apply</p>	<p>Senior class - not likely to go past 5/31. Depending on</p>			

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	<p>science process skills and scientific habits of mind. C3. Apply science process skills in a variety of situations using appropriate available technology to collect and display data. C4. Understand that all living organisms have identifiable structures and cellular processes that allow for survival. C6. Understand that DNA and hereditary events control the passage of structural and functional information from one generation to the next. C7. Understand that Living things are classified by their degree of relatedness through cellular structure, biochemical pathways, and molecular genetics C8. Understand that organisms are dependent on one another and their environment. C9. Understand that matter and energy cycle through organisms and thier environment. C11. Understand that evolution and natural selection will result in organisms changing over time in their structures, behavior and biochemistry. C12. Understand that humans are similar to other species in many ways and yet are unique among earth's life forms.</p>	<p>available time, Juniors can choose among the following videos to watch: Double Helix (If not done during DNA) Gorrillas in the Mist Anneberg Series on Microbes</p>			

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	C13. Understand that the growth of knowledge in biology has been advanced through technology and is used to identify, understand and solve local and global issues C14. Explain how the study of living material depends on the study of chemistry.				