Curriculum: AP Biology

Curricular Unit: Biochemistry

Instructional Unit: A. Gain a basic understanding of biochemistry as it relates to living cells, enzyme systems, organisms and ecosystems as a whole

Standard Alignments (Section 2)

SCCLE: SC3.2.D,F; SC4.1.A,B; SC4.2.B; SC7.1.A-D; SC8.3.B,C
Knowledge: (SC) 3,4,7,8
CCSS: 11-12.RST.1; 11-12.RST.2; 11-12.RST.3; 11-12.RST.4; 11-12.RST.8; 11-12.RST.9; 11-12.WHST.4; 11-12.WHST.5; 11-12.WHST.6; 11-12.WHST.7; 11-12.WHST.8; 11-12.WHST.9
NETS: 1b,d; 2a,b,d; 3b; 4c; 5b
Performance: 1.6, 1.8, 1.10, 2.1, 2.2, 3.5

Unit (Section 3)

Learning Targets:

- List the basic elements basic to life
- Distinguish between organic and inorganic substances
- Explain the functions of covalent and hydrogen bonds
- Distinguish among the types of organic compound classes: lipids, carbohydrates, protein, and nucleic acids
- Construct the monomers and polymers of each type
- Distinguish between fats, waxes, and phospholipids
- Explain the operations of the energy carrier molecules within the cell
- List and describe the steps in protein synthesis
- Predict and measure the impact of environmental factors on rates of enzyme reactions
- Explain how an enzyme system works regarding structure and function
- Explain the functions of the various types of proteins

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Instructional Strategies:

- The teacher will:
  - present written information and lectures for students to take notes over biochemistry to gain baseline knowledge for proper application in lab settings
  - model an experimental design, as it relates, to determine interactions between:
    - enzymes and substrates
    - compounds, organisms and ecosystems
- Students will:
  - develop investigations to:
    - analyze the impact of N in aquatic systems
    - determine factors that affect reaction rates and enzyme efficacy
  - read:
    - their textbook to gain exposure to the content material
    - the teacher-provided updated supplements regarding recent discoveries

Assessments/Evaluations:

- Formative assessments using teacher-created:
  - online Socrative quizzes
  - unit tests
- Assessed using a scoring guide:
  - Nitrogen Lab lab report
  - Liver Lab activity reports
  - Small group presentation

Sample Assessment Questions:

- Using information presented in class, external readings, or experiments, explain how chemicals released into the environment may have unintended or indirect effects on community structure. Relate your discussion to any relevant current event.

Instructional Resources/Tools:

- Ipads
- 3-D enzyme models
- LabQuests
- O2 sensors
- Spectra vis
- pH sensor
- 3-D molecular model

Cross Curricular Connections:

- ELA:
  - Written lab reports
  - Oral presentations
  - Reading of background information

Depth of Knowledge (Section 5)

DOK: 4

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Curriculum: AP Biology

Curricular Unit: Cellular Energetics

Instructional Unit: B. Photosynthesis – Gain a basic understanding of cellular energy transfer as it pertains to photosynthesis, respiration, fermentation and other metabolic reactions

Standard Alignments (Section 2)

SCCLE: SC3.1.C; SC3.2.A,C,D,F; SC7.1.A
Knowledge: (SC) 3,7
CCSS: 11-12.RST.1; 11-12.RST.2; 11-12.RST.3; 11-12.RST.4; 11-12.RST.8; 11-12.RST.9; 11-12.WHST.4; 11-12.WHST.5; 11-12.WHST.6; 11-12.WHST.7; 11-12.WHST.8; 11-12.WHST.9
NETS: 2b
Performance: 1.6, 1.8, 3.5

Unit (Section 3)

Learning Targets:

- Distinguish between the wave theory and particle theory of light
- Explain ways chlorophyll acts in trapping light energy
- List the compounds necessary as raw materials and products
- Explain how chromatography works and is used
- Relate the functions of ATP and NADPH in the reaction
- Explain why the terms of light and dark reactions are falling into disfavor in explaining photosynthesis
- Discuss the interrelationships between the matter and energy in Photosystems I and II
- Relate the structure to the function of the substructures within the chloroplast
- Analyze the effects of light intensity, wavelength, carbon dioxide concentration and temperature on the rate of photosynthesis; measure the impact of temperature on photosynthesis rate
- Evaluate the importance of photosynthetic phosphorylation
- Explain how carbon dioxide is fixed in the Calvin cycle
- Distinguish between the C-3 and C-4 pathways

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- Trace the flow of energy from light through an ecosystem to the decay of a dead animal

- Identify the possible consequences of the increased atmospheric levels of carbon dioxide

- Name the possible fates of glyceraldehyde phosphate

Instructional Strategies:

- Demonstration of wave frequency and energy level
- The teacher will:
  - lecture material based on teacher-created PowerPoint notes providing students with baseline knowledge to understand the biological process of photosynthesis
  - model and students will produce an investigation, determining factors that affect photosynthetic rate
- With teacher input, students will construct a concept map detailing the steps of photosynthesis
- Students will read:
  - their textbook to gain exposure to the content material
  - the teacher-provided updated supplements regarding recent discoveries

Assessments/Evaluations:

- Formative assessments using teacher-created:
  - online Socrative quizzes
  - Unit tests
- Assessed using a scoring guide:
  - Photosynthesis Rate lab report
  - Concept map
  - Plant Pigment Extraction

Sample Assessment Questions:

- Assume that due to weakening of the Clean Air Act, several new contaminants have been released into the air. One binds to and inhibits RuBP from reacting with CO_2. How would this affect the Calvin Cycle?

Instructional Resources/Tools:

- Ipads
- 3-D enzyme models
- LabQuests
- CO2 sensors
- O2 sensors
- Spectra vis
- Concept map
- Light sensor

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Cross Curricular Connections:

- ELA:
  - Written lab reports
  - Oral presentations
  - Reading of background information

Depth of Knowledge (Section 5)

DOK: 4

Curriculum: AP Biology

Curricular Unit: Cellular Energetics

Instructional Unit: C. Respiration – Demonstrate an understanding of cellular energy transfer as it pertains to photosynthesis, respiration, fermentation and other metabolic reactions. Identify the relationships between energy related processes observed among living things

Standard Alignments (Section 2)

SCCLE: SC3.1.C; SC3.2.A,C,D,F; SC7.1.A
Knowledge: (SC) 3,7
CCSS: 11-12.RST.1; 11-12.RST.2; 11-12.RST.3; 11-12.RST.4; 11-12.RST.8; 11-12.RST.9; 11-12.WHST.4; 11-12.WHST.5; 11-12.WHST.6; 11-12.WHST.7; 11-12.WHST.8; 11-12.WHST.9
NETS: 2b
Performance: 1.6, 1.8, 3.5

Unit (Section 3)

Learning Targets:

- Recognize the steps of glycolysis and explain how energy is transferred in each step
- Differentiate between aerobic and anaerobic reactions
- Explain the importance of the ADP/ATP cycle to cellular activities
- List the activities in which ATP energy is used by living cells
- Explain the complementary relationship between photosynthesis and respiration
- Describe the role of the Krebs's cycle in respiration
- Explain how a respirometer works and calculate the rate of respiration from collected data
- Describe the role of the electron transport in respiration
- Infer what would happen to steps of respiration if enzymes were removed
- Distinguish between the supply of energy and the supply of matter, in the form of molecules, to the cell for structural and functional purposes
- Differentiate between lactic acid and alcoholic fermentation
- Describe the inter-relationships among the catabolic and anabolic reactions within an organism's metabolism

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Instructional Strategies:

- The teacher will:
  - demonstrate and students will generate their own model of the ATP/ADP cycle
  - model and students will produce an investigation determining factors that affect:
    - fermentation rate
    - respiration rate
  - lecture material based on teacher-created PowerPoint notes providing students with baseline knowledge to understand the biological process of respiration
- Students will:
  - construct their own concept map illustrating the steps and interconnectedness of the stages of respiration
  - compare their concept maps of photosynthesis and respiration to determine the relationship between the two processes. The teacher will provide feedback
  - investigate the importance of fermentation and respiration in society and economics
  - read:
    - their textbook to gain exposure to the content material
    - the teacher-provided updated supplements regarding recent discoveries
- The teacher and students will:
  - act out the process of the electron transport chain
  - construct a system in which yeast can be used to produce carbonation

Assessments/Evaluations:

- Formative assessments using teacher-created:
  - online Socrative quizzes
  - Unit tests
- Assessed using a scoring guide:
  - Lab reports:
    - Respiration Rate Lab
    - Fermentation Rate Lab
  - Concept map
  - ATP Keynote

Sample Assessment Questions:

- Explain the relationship between photosynthesis and cellular respiration. What makes the two processes different? What makes them similar? Make sure to include salient inputs and outputs.

Instructional Resources/Tools:

- iPads
- 3-D enzyme models
- LabQuests
- CO2 sensors
- O2 sensors
- Spectra vis
- Concept map
- Candy (used to construct ATP Model)

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- Fermentators
- Yeast cultures
- Small and large group discussion

Cross Curricular Connections:

- ELA:
  - Written lab reports
  - Oral presentations
  - Reading of background information

Depth of Knowledge (Section 5)

DOK: 4

Curriculum: AP Biology

Curricular Unit: Unifying Themes of Biology

Instructional Unit: D. Identify and describe the biofeedback mechanisms that maintain a dynamic balance in the biological hierarchy: molecules, cells, tissues, organs, systems, organisms, ecosystems, and biosphere

Standard Alignments (Section 2)

SCCLE: SC3.2.A,F; SC7.1.A-D; SC8.3.C,D
Knowledge: (SC) 3,7,8
CCSS: 11-12.RST.1; 11-12.RST.2; 11-12.RST.3; 11-12.RST.4; 11-12.RST.8; 11-12.RST.9; 11-12.WHST.4; 11-12.WHST.5; 11-12.WHST.6; 11-12.WHST.7; 11-12.WHST.8; 11-12.WHST.9
NETS: 1c; 2b; 3d
Performance: 1.4, 1.6, 1.8, 1.10, 3.3-3.5

Unit (Section 3)

Learning Targets:

- Apply hypothesis-based inquiry as it relates to biological systems
- Demonstrate an understanding of homeostasis as it relates to positive and negative feedback loops
- Model the scientific process by planning, conducting, collecting/analyzing data, observing patterns, identifying relationships, evaluating evidence and presenting ideas in a formal report or presentation
- Generate and use representations and models to communicate scientific phenomena and solve scientific problems
- Select and use appropriate mathematical models or processes to estimate, quantify and analyze natural phenomena

Instructional Strategies:

- The teacher will:
  - demonstrate and students will generate their own model of a positive and negative feedback mechanism
  - model and students will produce an investigation, determining:
    - factors affecting mate-choice in the fancy guppy
    - the relationship between morphology and the method of pollen dispersal
  - lecture material based on teacher-created PowerPoint notes providing students with baseline knowledge to understand biological processes

- Students will:
  - generate a keynote identifying the main structures of a neuron and how the nervous impulse is a prime example of a positive feedback loop
  - read:
    - their textbook to gain exposure to the content material
    - the teacher provided updated supplements regarding recent discoveries

Assessments/Evaluations:

- Formative assessments using teacher-created:
  - online Socrative quizzes
  - Unit tests
- Assessed using a scoring guide:
  - Guppy Sexual Selection Lab lab report
  - Pollen Morphology Lab
  - Nerve Impulse Keynote

Sample Assessment Questions:

- After reading the case study involving king snakes in the Carolinas, develop an experiment testing the "value" of mimicry. Please describe what mimicry is. Include how the various snakes discussed in the case study employed mimicry. Remember to state the hypothesis, identify the dependent and independent variables, clearly describe the experiment, supply what the expected results would be, indicate how you would present the data, and what conclusions could be drawn.

Instructional Resources/Tools:

- iPads
- LabQuests
- CO2 sensors
- O2 sensors
- Statistica analysis software
- Stopwatch
- Model organisms (used to conduct animal behavior experiment)
- Small and large group discussion

Cross Curricular Connections:

- ELA:
  - Written lab reports
  - Oral presentations
  - Reading of background information
- Math:
  - Mathematical analysis
  - Statistical analysis of data

Depth of Knowledge (Section 5)

DOK: 4

Curriculum: AP Biology

Curricular Unit: Cytology – Cell Biology

Instructional Unit: E. Differentiate between prokaryotic and eukaryotic cells and their subcellular structures, functions and cell cycles

Standard Alignments (Section 2)

SCCLE: SC3.1.B,C; SC3.2.A,B; SC4.3.A; SC8.1.B
Knowledge: (SC) 3,4,8
CCSS: 11-12.RST.1; 11-12.RST.2; 11-12.RST.3; 11-12.RST.4; 11-12.RST.8; 11-12.RST.9; 11-12.WHST.4; 11-12.WHST.5; 11-12.WHST.6; 11-12.WHST.7; 11-12.WHST.8; 11-12.WHST.9
NETS: 2a,b,d
Performance: 1.6, 1.8, 1.10, 3.5

Unit (Section 3)

Learning Targets:

- Identify the structures of the cell as seen with a light microscope
- Discuss the functions, at the biochemical level, of cell structures
- List and explain the tenets of the Cell Theory
- Distinguish between prokaryotic and eukaryotic cells
- Relate the use of energy by the cell within various organelles
- Distinguish the differences between cells of the five kingdoms
- Explain diffusion and osmosis as it relates to the plasma membrane
- Explain the relationships between solute concentrations, pressure potential and selectively permeable membranes

Instructional Strategies:

- Students will:
  - read:
    - their textbook to gain exposure to the content material
    - the teacher provided updated supplements regarding recent discoveries (i.e., endosymbiotic theory)
  - produce Keynote explaining endosymbiotic theory

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- The teacher will lecture material based on teacher-created PowerPoint notes providing students with baseline knowledge to understand:
  - cell theory
  - cell type
  - organelle structure and function
  - cell to cell communication
- Laboratory investigation regarding osmosis and diffusion rates

Assessments/Evaluations:

- Assessed using a scoring guide:
  - Endosymbiotic theory keynote
  - Osmosis and Diffusion Lab
  - Virtual Lab – cell structures
  - Electron microscope digital lab
- Formative assessments using teacher-created:
  - online Socrative quizzes
  - Unit test

Sample Assessment Questions:

- A blood cell that is surrounded by fresh water will burst b/c the osmotic pressure causes:
  a. water to move into the cell, flowing from high to low concentration
  b. water to move out of the cell, flowing from low to high concentration
  c. solutes to move into the cell, flowing from low to high concentration
  d. solutes to move out of the cell, flowing from high to low concentration

Instructional Resources/Tools:

- iPads
- Computers
- Dialysis tubing
- Stopwatch
- Model organisms
- Small and large group discussion
- Microscope
- Wet mount slides
- Prepared slides
- Textbook

Cross Curricular Connections:

- ELA:
  - Written lab reports
  - Oral presentations
  - Reading of background information
- Art: Drawing

Depth of Knowledge (Section 5)

DOK: 4

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Curriculum: AP Biology

Curricular Unit: Heredity

Instructional Unit: F. Obtain an understanding of heredity and the mechanisms of molecular and hereditary genetics as it applies to evolution

Standard Alignments (Section 2)

SCCLE: SC3.2.G; SC3.3.A-E; SC8.1.A
Knowledge: (SC) 3
CCSS: 11-12.RST.1; 11-12.RST.2; 11-12.RST.3; 11-12.RST.4; 11-12.RST.6; 11-12.RST.8; 11-12.RST.9; 11-12.WHST.4; 11-12.WHST.5; 11-12.WHST.6; 11-12.WHST.7; 11-12.WHST.8; 11-12.WHST.9
NETS: 1a,c; 2b; 3b,c; 6a,b
Performance: 1.6, 1.8, 1.10, 2.2, 3.5

Unit (Section 3)

Learning Targets:

- Defend positions on bioethical issues and impact on society
- Predict the impact of recombinant organisms in their ecosystem
- Differentiate between the stages and purposes of mitosis and meiosis
- Calculate the time spent in the stages of the cell cycle
- Relate the functions of mitosis and meiosis to the life cycle of the cell and the multicellular organism
- Explain the relationship between DNA and cell division
- Compare and contrast genotype and phenotype using Punnett squares and ratios
- Explain the criteria used in selecting a species for genetic work and why
- Demonstrate the use of test crosses
- Explain intermediate inheritance
- Explain how epistasis works using Punnett squares and ratios
- After doing fruit fly crosses, analyze data using Chi square techniques
- Compare and contrast autosomal linkage and sex linkage
- Discuss the significance of genetic mutations to evolution

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- Given an unknown mutation, carry out various crosses with fruit flies to determine how the mutation is inherited

Instructional Strategies:

- Students will:
  - read their textbook to gain exposure to the content material
  - the teacher provided updated supplements regarding recent discoveries (i.e., epigenetics)
  - produce a Keynote explaining a human genetic disorder
  - generate a Keynote describing a GMO system and the benefits and risks associated with the technology
  - read a supplemental book: *Immortal Life of Henrietta Lacks*
- The teacher will lecture material based on teacher-created PowerPoint notes providing students with baseline knowledge to understand mendelian genetics, stages of the cell cycle theory, impact of mutations, and evolution
- Digital fruit fly investigation
- Microscope lab investigating and identifying stages of mitosis and meiosis
- Laboratory investigation:
  - regarding osmosis and diffusion rates
  - reinforcing Chi square statistic

Assessments/Evaluations:

- Assessed using a scoring guide:
  - Lab results
  - M&M lab
  - Corn monhybrid and dihybrid lab exercises
  - Keynote presentations
- Unit tests
- *Immortal Life of Henrietta Lacks* reading tests

Sample Assessment Questions:

- If cells in the process of dividing are subjected to colchicines, a drug that interferes with the functioning of the spindle apparatus, at which state will mitosis be arrested?
  a. anaphase b. prophase c. telophase d. metaphase e. interphase

Instructional Resources/Tools:

- iPads
- Computers
- Small and large group discussion
- Microscope
- Wet mount slides
- Prepared slides
- Textbooks
- *Immortal Life of Henrietta Lacks* books
- Digital fruit fly lab
- Monohybrid and dihybrid crossed corn

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Cross Curricular Connections:

- ELA:
  - Written lab reports
  - Oral presentations
  - Reading of background information
- Math: Mathematical analysis and statistical analysis of data
- Recent and Historical bio-medical ethical issues

Depth of Knowledge (Section 5)

DOK: 4

Curriculum: AP Biology

Curricular Unit: Molecular Basis of Inheritance

Instructional Unit: G. Master information relating to the molecular basis of inheritance of living cells and its relationship to enzyme systems, organisms and ecosystems as a whole

Standard Alignments (Section 2)

SCCLE: SC3.2.E,G; SC3.3.B-E; SC8.1.A,B; SC8.2.A
Knowledge: (SC) 3,8
CCSS: 11-12.RST.1; 11-12.RST.2; 11-12.RST.3; 11-12.RST.4; 11-12.RST.8; 11-12.RST.9; 11-12.WHST.4; 11-12.WHST.5; 11-12.WHST.6; 11-12.WHST.7; 11-12.WHST.8; 11-12.WHST.9
NETS: 1a,c; 2b; 3b,c; 6a,b
Performance: 1.6, 1.8, 1.10, 2.2, 3.5

Unit (Section 3)

Learning Targets:

- Identify the sub-units of the DNA molecule
- Build the nucleotides and indicate knowledge of their functions by demonstrating the formation of hydrogen bonds
- Explain the steps of the central dogma as it relates to protein synthesis
- Explain the consequences of DNA mutation and effects on evolution of a species
- Explain RNA processing
- Describe the role and importance of RNAi as a tool for molecular geneticists
- Explain how DNA fingerprinting techniques are used in research and in medicine
- Model control of gene expression using either the lac or trp operon

Instructional Strategies:

- Students will:
  - produce an Incrediflix stop motion animation of transcription translation and DNA replication
  - use a Jigsaw activity regarding historical investigations of molecular genetics
  - read:
    - their textbook to gain exposure to the content material
    - the teacher provided updated supplements regarding recent discoveries (i.e., RNAi)

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- The teacher will:
  - lecture material based on teacher-created PowerPoint notes providing students with baseline knowledge
  - provide NOVA Science Now video clip explaining RNAi
- Lac Operon Lab activity – modeling gene expression
- BRACA analysis Breast Cancer lab results activity

Assessments/Evaluations:

- Unit tests
- Teacher created formative Socrative quizzes
- Assessed using a scoring guide:
  - Incrediflix stop motion
  - Lac Operon
  - BRACA analysis

Sample Assessment Questions:

- For a science fair project, two students decided to repeat the Hershey and Chase experiment, with modifications. They decided to label the nitrogen of the DNA, rather than the phosphate. They reasoned that each nucleotide has only one phosphate and two to five nitrogens. Thus, labeling the nitrogens would provide a stronger signal than labeling the phosphates. Why won't this experiment work?
  a. There is no radioactive isotope of nitrogen
  b. Radioactive nitrogen has a half-life of 100,000 years, and the material would be too dangerous for too long
  c. Avery et al., have already concluded that this experiment showed inconclusive results. Extra neutrons; therefore, they are more radioactive
  d. Although there are more nitrogens in a nucleotide, labeled phosphates actually have 16 extra neutrons; therefore, they are more radioactive
  e. Amino acids (and thus proteins) also have nitrogen atoms; thus, the radioactivity would not distinguish between DNA and proteins

Instructional Resources/Tools:

- iPads
- Computers
- Small and large group discussion
- Lac Operon Model
- Nova Science Now video clip

Cross Curricular Connections:

- ELA:
  - Written lab reports
  - Reading of background information
- Recent and historical bio-medical ethical issues as it relates to Breast Cancer Test Ant treatments
- Historical impact of scientific research

Depth of Knowledge (Section 5)

DOK: 4

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Curriculum: AP Biology

Curricular Unit: Natural Selection and Evolution

Instructional Unit: H. Obtain a clear understanding of Evolutionary Theory, along with the processes and mechanisms that shape genetic diversity among living things

Standard Alignments (Section 2)

SCCLE: SC3.3.B,D,E; SC4.3.A-C; SC7.1.D; SC8.1.B; SC8.2A,B; SC8.3.B,D
Knowledge: (SC) 3,4,7,8
CCSS: 11-12.RST.1; 11-12.RST.2; 11-12.RST.3; 11-12.RST.4; 11-12.RST.8; 11-12.RST.9; 11-12.WHST.4; 11-12.WHST.5; 11-12.WHST.6; 11-12.WHST.7; 11-12.WHST.8; 11-12.WHST.9
NETS: 1b, 2a,b, 3c
Performance:1.6, 1.8, 1.10, 3.5

Unit (Section 3)

Learning Targets:

- Assess the historical contribution of scientists over time regarding the theory of evolution
- Distinguish between homology, biogeography, fossil record, DNA, which all support the theory of evolution by natural selection
- Connect the concept of speciation, selection pressures and natural selection to the Theory of Evolution
- Construct and appropriately use phylogenetic trees and/or cladograms
- Demonstrate and apply the principles of Hardy-Weinberg Equilibrium through the study of fluctuations in gene frequency in populations

Instructional Strategies:

- Jigsaw activity in which teams of students investigate and present in small groups the historical contributions of scientists throughout time regarding the theory of evolution
- Teacher-led discussion
- Lecture using teacher-created PowerPoints
- Primate DNA or Camicules Phylogenetic Tree activity
- Teacher created Ringneck snake case study
- Teddy Graham lab

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Assessments/Evaluations:

- Unit tests
- Teacher created formative Socrative quizzes
- Assessed using scoring guide:
  - Ringneck snake case study
  - Small group presentation
  - Venn diagram of speciation
  - Phylogeny activity
  - Teddy Graham lab
  - Hardy-Weinberg practice worksheets

Sample Assessment Questions:

- DDT was once considered a "silver bullet" that would permanently eradicate insect pests. Today, instead, DDT is largely useless against many insects. Which of these would have been required for this pest eradication effort to be successful in the long run?
  a. Larger doses of DDT should have been applied
  b. All habitats should have received applications of DDT at about the same time
  c. The frequency of DDT application should have been higher
  d. None of the individual insects should have possessed genomes that made them resistant to DDT
  e. DDT application should have been continual

Instructional Resources/Tools:

- iPads
- Computers
- Reading the textbook
- Small and large group discussion
- Case study reading
- Video clips
- Guppy Behavior lab

Cross Curricular Connections:

- ELA:
  - Written lab reports
  - Reading of background information
- Recent and historical evolutionary issues
- Math: Hardy-Weinberg mathematical calculations
- Historical impact of scientific research

Depth of Knowledge (Section 5)

DOK: 4

Curriculum: AP Biology

Curricular Unit: Plant Growth and Reproduction

Instructional Unit: I. Develop skills need to classify, identify and describe the development of plants

Standard Alignments (Section 2)

SCCLE: SC3.1.B,C,E
Knowledge: (SC) 3
CCSS: 11-12.RST.1; 11-12.RST.2; 11-12.RST.3; 11-12.RST.4; 11-12.RST.8; 11-12.RST.9
NETS: 2b
Performance: 1.6, 1.10, 2.2, 3.5

Unit (Section 3)

Learning Targets:

- Distinguish between angiosperms and gymnosperms
- Distinguish between monocots and dicots
- Explain the functions of each of the plant organs
- Explain the role of mitosis and meiosis in the flower organ
- Distinguish between pollination, fertilization and germination
- Explain water movement in vascular tissues in terms of water potential and physical properties of water
- Describe the impact of environmental variables on transpiration
- Compare and contrast the various types of flower ovaries
- Identify flower parts and functions using actual specimens
- Trace the development of specific flower parts through development to its destiny and function in the fruit and seed
- Identify various simple, aggregate, and multiple fruits
- Demonstrate the use of dichotomous keys in fruit identification
- Explain the role of hormones in fruit and seed development

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Instructional Strategies:

- Teacher-led discussion
- Lecture using teacher created PowerPoints
- Plant phylogenetic concept map activity
- Teacher created:
  - Evolution of Fruit lab
  - Plant Identification lab
- Small group discussions over importance of plants and methods of pollination

Assessments/Evaluations:

- Unit tests
- Teacher created formative Socrative quizzes
- Assessed using a scoring guide:
  - Evolution of Fruit lab
  - Small group presentation
  - Plant Identification lab
  - Plant Phylogeny Concept Map activity

Sample Assessment Questions:

- Which stage of a non-flowering plant would be most adversely affected by a toxin that damaged the production of sperm?
  a. the sporophyte stage b. the gametophyte stage c. bryophyte stage d. seed

Instructional Resources/Tools:

- iPads
- Computers
- Reading the textbook
- Small and large group discussion
- Case study reading
- Video clips
- Evolution of fruit lab
- Microscope

Cross Curricular Connections:

- ELA:
  - Written lab reports
  - Reading of background information

Depth of Knowledge (Section 5)

DOK: 4

Curriculum: AP Biology

Curricular Unit: Survey of the Chordata

Instructional Unit: J. Gain a basic understanding of the morphological and physiological characteristics of living organisms and the interdependence demonstrated among all living things

Standard Alignments (Section 2)

SCCLE: SC3.1.B,C
Knowledge: (SC) 3
CCSS: 11-12.RST.1; 11-12.RST.2; 11-12.RST.3; 11-12.RST.4; 11-12.RST.8; 11-12.RST.9
NETS: 2b
Performance: 1.6, 1.10, 2.2, 3.5

Unit (Section 3)

Learning Targets:

- Differentiate between the five/six currently accepted Kingdoms
- Describe the criteria used to classify organisms in the modern system
- Classify animals into the proper chordate phyla based on evolutionary relationships
- Distinguish one chordate class from another using the dissected specimens to show the actual physical differences, both externally and internally
- Compare the 10 major systems of the vertebrate body plan and relate the evolutionary advancements from one class to the next
- Relate the interactions, which occur among systems such as the role of the immune system as it relates to cellular recognition or hormones as they relate to the endocrine system
- Identify organs to the correct systems and give their functions
- Model the movement of oxygen and CO_2 through the circulatory system of the fetal pig
- After measuring, explain the factors affecting blood pressure

Instructional Strategies:

- Teacher-led discussion
- Lecture using teacher created PowerPoints
- Animal Phylogenetic Concept Map activity
- Teacher created:
  - blood pressure lab
  - specimen identification lab
- Small group dissections of a fetal pig

Assessments/Evaluations:

- Unit tests
- Teacher produced formative Socrative quizzes
- Assessed using a scoring guide:
  - Independent Investigation of Factors Impacting Blood Pressure lab
  - Small group dissections
  - Animal Identification lab
  - Animal Phylogeny Concept Map activity

Sample Assessment Questions:

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Instructional Resources/Tools:

- iPads
- Computers
- Reading the textbook
- Small and large group discussion
- Lab dissection kits
- Video clips
- LabQuest blood pressure cuff
- Microscope

Cross Curricular Connections:

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Depth of Knowledge (Section 5)

DOK: 4

Board Approved 8-3-15