Biology Syllabus 2018-2019
Instructor: Chuck Dodson (chuck.dodson@tcsedu.net or 454-2620)
Textbook: ck12.org flexbook (plus biology textbooks in class for reference)

Instructions for Parents to Access Instructional Materials:

Here is a link to the ck12-based flexbook textbook that we will use: https://www.ck12.org/user%3Abwnrzw56as5myw5uaw5nqhrjc2vkds5uzxq./book/Biology-1/

Major Assignments: You will have one or more project/major assignments due each quarter, based on one or more of the standards covered that quarter. Information, links, and timelines for these will be posted on schoology. This includes rubrics that will detail project expectations and grading factors.

Classroom variety and the reasoning behind it:

This class utilizes many different methods of learning. These include class lecture (with feedback) and note taking of various types, games, drawings and other hands-on activities, and projects. There are many reasons for this, but two main ones are these: 1. This variety has students activate different areas of the brain. The more areas of the brain we use, the more likely students are to remember and understand, and we are also more likely to hit on strengths for each student. 2. Students are more engaged when they do a variety of activities.

Make-up work and work improvement:

The make-up work guidelines are stated in the student handbook. I often allow students to correct and/or improve assignments, if they have made a good effort in the first place and have completed the assignment in a timely manner. I allow students to improve work because the purpose of classes is learning, and sometimes students are still learning. That said, we do have a schedule to which we must try to stick, so improvements can't go on forever!

Homework:

Homework for my students will often be something like reading or studying or working on a project. They will rarely have classic homework, especially homework that takes a great deal of time. The deal I make with

my students is that if they give me really good effort in class, homework will be almost unnecessary and will be kept to a bare minimum.

Grading Policy
Tests and Projects - 50%
Quizzes - 30%
Classwork/Homework - 20%

BIOLOGY I: ACADEMIC STANDARDS

(*Quarter 1*)
BIO1.LS2: Ecosystems: Interactions, Energy, and Dynamics
1) Analyze mathematical and/or computational representations of population data that support explanations of factors that affect population size and carrying capacities of populations within an ecosystem. Examine a representative ecosystem and, based on interdependent relationships present, predict population size effects due to a given disturbance.
2) Create a model tracking carbon atoms between inorganic and organic molecules in an ecosystem. Explain human impacts on climate based on this model.
3) Analyze through research the cycling of matter in our biosphere and explain how biogeochemical cycles are critical for ecosystem function.
4) Analyze data demonstrating the decrease in biomass observed in each successive trophic level. Construct an explanation considering the laws of conservation of energy and matter and represent this phenomenon in a mathematical model to describe the transfer of energy and matter between trophic levels.
5) Analyze examples of ecological succession, identifying and explaining the order of events responsible for the formation of a new ecosystem in response to extreme fluctuations in environmental conditions or catastrophic events.

(*Quarter 2*)
BIO1.LS1: From Molecules to Organisms: Structures and Processes
1) Compare and contrast existing models, identify patterns, and use structural and functional evidence to analyze the characteristics of life. Engage in argument about the designation of viruses as non-living based on these characteristics.
2) Evaluate comparative models of various cell types with a focus on organic molecules that make up cellular structures.

3) Integrate evidence to develop a structural model of a DNA molecule. Using the model, develop and communicate an explanation for how DNA serves as a template for self-replication and encodes biological information.
4) Demonstrate how DNA sequence information is decoded through transcriptional and translational processes within the cell in order to synthesize proteins. Examine the relationship of structure and function of various types of RNA and the importance of this relationship in these processes.
5) Research examples that demonstrate the functional variety of proteins and construct an argument based on evidence for the importance of the molecular structure to its function. Plan and carry out a controlled investigation to test predictions about factors, which should cause an effect on the structure and function of a protein.
6) Create a model for the major events of the eukaryotic cell cycle, including mitosis. Compare and contrast the rates of cell division in various eukaryotic cell types in multicellular organisms.
7) Utilize a model of a cell plasma membrane to compare the various types of cellular transport and test predictions about the movement of molecules into or out of a cell based on the homeostasis of energy and matter in cells.
8) Create a model of photosynthesis demonstrating the net flow of matter and energy into a cell. Use the model to explain energy transfer from light energy into stored chemical energy in the product.
9) Create a model of aerobic respiration demonstrating flow of matter and energy out of a cell. Use the model to explain energy transfer mechanisms. Compare aerobic respiration to alternative processes of glucose metabolism.

(*Quarter 3*)

BIO1.LS3: Heredity: Inheritance and Variation of Traits

1) Model chromosome progression through meiosis and fertilization in order to argue how the processes of sexual reproduction lead to both genetic similarities and variation in diploid organisms. Compare and contrast the processes of sexual and asexual reproduction, identifying the advantages and disadvantages of each.
2) Explain how protein formation results in phenotypic variation and discuss how changes in DNA can lead to somatic or germ line mutations.
3) Through pedigree analysis, identify patterns of trait inheritance to predict family member genotypes. Use mathematical thinking to predict the likelihood of various types of trait transmission.

BIO1.ETS2: Links Among Engineering, Technology, Science, and Society

1) Obtain, evaluate, and communicate information on how molecular biotechnology may be used in a variety of fields.

2) Investigate the means by which karyotypes are utilized in diagnostic medicine.
3) Analyze scientific and ethical arguments to support the pros and cons of application of a specific biotechnology technique such as stem cell usage, in vitro fertilization, or genetically modified organisms.

(*Quarter 4*)
BIO1.LS4: Biological Change: Unity and Diversity
1) Evaluate scientific data collected from analysis of molecular sequences, fossil records, biogeography, and embryology. Identify chronological patterns of change and communicate that biological evolution is supported by multiple lines of empirical evidence that identify similarities inherited from a common ancestor (homologies).
2) Using a model that demonstrates the change in allele frequencies resulting in evolution of a population over many generations, identify causative agents of change.
3) Identify ecosystem services and assess the role of biodiversity in support of these services. Analyze the role human activities have on disruption of these services.