

## **Standard Biology**

Credit – 1

Term(s) – 1 Year

Text: Biology – Miller and Levine

Prerequisites: None

### **Course Description**

Standard biology is designed for all students entering the high school science curricular sequence. It is designed to fulfill the minimal science requirements for graduation, as well as accommodate college preparatory students. In addition, the class is designed to stimulate an interest in and promote the continued study of science.

### **Course Content**

Standard biology is an overview of life science including, but not limited to, the following topics: the scientific method, ecology, cell biology, heredity and genetics, evolution, classification, viruses, bacteria, protists, fungi, plants, animals, and human anatomy and physiology.

### **Course Format**

This course is a laboratory and discussion based class with demonstrations and visual aids throughout. Homework will consist of reading the text, completing section reviews, and maintaining a notebook. Tests are administered at the end of each unit. In addition, students will have a project each quarter that is applicable to the subject being studied at that time.

### **Course Expectations**

Students enrolled in standard biology are expected to be prepared for class with the textbook, writing utensil, and paper. They should take notes and complete homework in a timely manner. We also expect students to ask questions and seek help when appropriate. In addition, students are expected to attain passing test scores and complete required quarterly projects.

### **Grades**

Grades are determined on a total points earned basis. Tests are usually 100 points with homework and lab grades ranging from 10 to 70 points. Grades are not weighted in this class.

### **Course Objectives**

- 11A.501 Demonstrate appropriate laboratory skills and equipment usage, applying accepted practices
- 11A.502 Demonstrate the use of appropriate scientific tools to measure accurately using the metric system
- 11A.601 Evaluate data from experiments using graphs and other appropriate analytical tools
- 11A.602 Apply problem-solving skills to scientific situations
- 11A.603 Conduct research on science topics using a variety of accepted sources
- 11A.604 Communicate scientific understandings effectively in written and oral presentations

11A.701 Conduct an appropriate controlled scientific investigation  
11A.901 Differentiate between a scientific theory, hypothesis, opinion and fact.  
11A.902 Demonstrate an understanding of science as an ongoing process open to the collection of new data and the revaluation of existing data by critically analyzing scientific theories for supporting and non- supporting evidence or by explaining how theories are formulated, accepted, rejected, and changed over time  
11A.903 Design and conduct a controlled scientific investigation Ecology and Environmental Science  
12A.906 Demonstrate and describe the interdependence of organisms on each other and on their environment  
12A.907 Explain and assess how human influence effects balance in nature  
12A.908 Identify and describe the components that form an ecosystem  
12A.909 Demonstrate a knowledge of the organization of ecological levels within the living world  
12A.910 Define, use, and interpret the basic terms and concepts which relate to the fields of ecology and environmental science MHS Syllabus Science

### **Cells and the Cell Theory**

12A.911 Recognize the role of cells as the basic structural and functional unit of living things  
12A.912 Describe how cells function to produce proteins and other compounds  
12A.913 Describe how cells reproduce  
12A.914 Describe basic cellular processes  
12A.915 Describe the relationship between cells and disease  
12A.916 Identify, describe, and/or demonstrate an understanding of cells and how we have learned about cells and what our knowledge of cells may lead to in the future

### **Genetics and Heredity**

12A.917 Analyze and explain how the transmission of hereditary traits occurs according to the Gene/Chromosome Theory  
12A.918 Predict the probable result of selected genetic crosses  
12A.919 Interpret pedigree charts  
12A.920 Identify potential causes of mutations  
12A.921 Describe various practical applications to the principles of genetics  
12A.922 Recognize the role of heredity and environment in gene expression  
12A.923 Identify and describe some of the techniques used in genetic research  
12A.924 Describe examples of genetically related disorders  
12A.925 Describe the basic structure and functions of DNA and RNA and their relationship to genetics and heredity

### **Diversity and Similarity of Organisms**

12A.926 Describe and apply commonly accepted methods of biological classification and taxonomy  
12A.927 Identify organisms using a dichotomous key  
12A.928 Recognize and/or identify examples of organisms from different kingdoms  
12A.929 Classify organisms within a kingdom and identify what key characteristics are used to group them  
12A.930 Compare and contrast the similarities and differences between organisms within a given group  
12A.931 Account for why there is so much diversity among the organisms of the natural world  
12A.932 Compare and contrast the levels of complexity between organisms of the natural world  
12A.933 Recognize and describe the basic anatomy and physiology of organisms of differing complexity

### **Human Anatomy and Physiology**

12A.934 Recognize that humans are not unique in their performance of the functions necessary to

maintain homeostasis

12A.935 Determine the interrelationships among the human body systems

12A.936 Relate the structure of major organs in the human body to their function MHS Syllabus Science

### **Biology as a Science**

12B.937 Demonstrate an understanding of the nature of science and use the scientific method as it relates to biology and biological processes

12B.938 Identify and describe related fields of study, which include ecology, cytology, genetics, etc.

12B.939 Demonstrate an understanding of the relationship between science and technology by describing biological endeavors from the past, present, and the potential for the future

### **Evolution and Evolutionary Theory**

(The emphasis of this unit's instruction and assessment will be on microevolution)

12B.940 Explain how evolutionary theory is defined as a process of change over time

12B.941 Recognize that evolutionary theory is supported by observations and inferences from many branches of science

12B.942 Describe the scientific methods, data, and assumptions on which the theory of evolution is based and identify at least one piece of data, from those explained in class, that provides for differences in how the theory is interpreted

12B.943 Recount the historical development of evolutionary theory

### **Biochemical Composition of Living Things**

12C.944 Identify major biochemical compounds and some of the metabolic reactions in which these compounds are involved

12C.945 Demonstrate a knowledge of atoms and molecules and how they related to chemical reactions

12C.946 Interpret selected chemical reactions, equations, or processes which illustrate biological processes or metabolic reactions

### **Master**

13A.904 Demonstrate an understanding of ethical decision making in the sciences

13A.905 Demonstrate an understanding of the proper development and use of scientific information

13B.702 Demonstrate an understanding of the relationship between science and technology

13B.703 Demonstrate an understanding of the impact of science on our society