

Middlesex County Schools Curriculum Pacing Guide

Grade/Course Pre-AP Biology

School Year 2012-2013

Time Frame	Unit/SOLs	SOL #	Strand
6 days (12 days are added to other units through labs)	<p style="text-align: center;">Unit 1: The Study of Biology</p> <p>A. Laboratory Safety B. Laboratory Equipment C. Using the SI System in Biology D. Designing Experiments E. Conducting Experiments F. Reporting Experimental Results G. Themes in Biology H. Traits of Life</p> <p>Bio.1 The student will demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting investigations in which:</p> <ul style="list-style-type: none"> a) observations of living organisms are recorded in the lab and in the field; b) hypotheses are formulated based on direct observations and information from scientific literature; c) variables are defined and investigations are designed to test hypotheses; d) graphing and arithmetic calculations are used as tools in data analysis; e) conclusions are formed based on recorded quantitative and qualitative data; f) sources of error inherent in experimental design are identified and discussed; g) validity of data is determined; h) chemicals and equipment are used in a safe manner; i) appropriate technology including computers, graphing calculators, and probeware, is used for gathering and analyzing data, communicating results, modeling concepts, and simulating experimental conditions; j) research utilizes scientific literature; k) differentiation is made between a scientific hypothesis, theory, and law; l) alternative scientific explanations and models are recognized and analyzed; and m) current applications of biological concepts are used. 	1	plan and conduct investigations (Scientific Investigation)

8 days	<p style="text-align: center;">Unit 2: The Chemistry of Biology</p> <p>A. Atoms and Bonding B. Traits of Water C. Structure and Function of Macromolecules D. Carbohydrates E. Lipids F. Proteins G. Nucleic Acids</p> <p>Bio.2 The student will investigate and understand the chemical and biochemical principles essential for life. Key concepts include: a) water chemistry and its impact on life processes; b) the structure and function of macromolecules;</p>	2	Chemical and biochemical principles essential for life (Life at the Molecular and Cellular Level)
10 days	<p style="text-align: center;">Unit 3: Interdependence of Biology</p> <p>A. Major Biomes B. Interdependence in Food Webs and Food Chains C. Interdependence in Biogeochemical Cycles D. Water, Carbon, Nitrogen and Oxygen Cycles E. Interdependence in Populations and Communities F. Population Growth G. Human Impact and Intervention</p> <p>Bio. 8 The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concepts include a) interactions within and among populations including carrying capacities, limiting factors, and growth curves; b) nutrient cycling with energy flow through ecosystems; c) succession patterns in ecosystems; d) the effects of natural events and human activities on ecosystems; and e) analysis of the flora, fauna, and microorganisms of Virginia ecosystems.</p>	8	dynamic equilibria within populations, communities, and ecosystems (Interactions of Life Forms)

10 days	<p style="text-align: center;">Unit 6: Genes, Gene Expression and Biotechnology</p> <p>A. Central Dogma B. DNA Structure and Replication C. RNA Structure and Types D. Transcription E. Translation F. Operon Theory G. Human Genome H. Electrophoresis I. Restriction Enzymes J. Recombinant DNA</p> <p>Bio.5 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include a) historical development of the structural model of DNA; b) the structure, function, and replication of nucleic acids; c) events involved in the construction of proteins; j) exploration of the impact of DNA technologies</p>	5	Mechanisms of inheritance and protein synthesis (Life at the Molecular and Cellular Level)
10 days	<p style="text-align: center;">Unit 7: Mitosis, Meiosis and Genetics</p> <p>A. Events of the Cell Cycle B. Events and Purpose of Mitosis C. Events and Purpose of Meiosis D. Contrasting Mitosis and Meiosis E. Mutations and Karyotyping F. Mendelian Laws G. Monohybrid Crosses H. Dihybrid Crosses I. Inheritance Patterns J. Human Genetics and Pedigrees</p> <p>Bio.5 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include a) cell growth and division; d) gamete formation; e) cell specialization; f) prediction of inheritance of traits based on the Mendelian laws of heredity; g) genetic variation;</p>	5 5d	Mechanisms of inheritance and protein synthesis (Life at the Molecular and Cellular Level) Predictions of inheritance of traits based on Mendelian laws of heredity (Life at Systems and Organisms Level)

