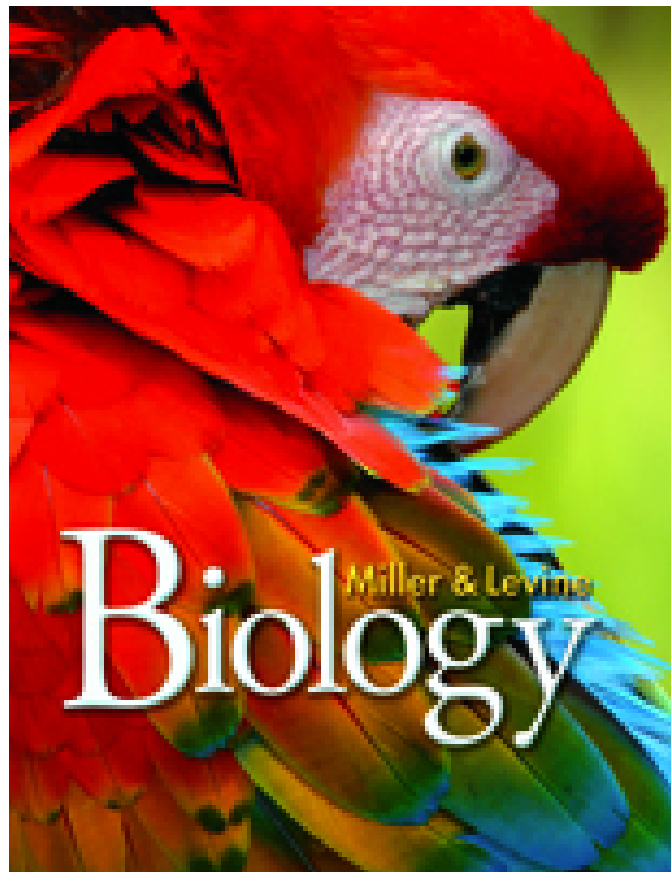


A Correlation of
**Miller & Levine Biology
Virtual BioLab**



to the
**Virginia Standards of Learning
for
Biology**

**A Correlation of Miller & Levine Virtual BioLab
to the
Virginia Standards of Learning Curriculum Framework for Biology
High School**

Virginia Standards of Learning Curriculum Framework Biology	Miller & Levine Virtual BioLab Unit/Lesson
Virginia Standards of Learning Curriculum Framework	
BIOLOGY	
BIO.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which	
a) observations of living organisms are recorded in the lab and in the field;	Virtual BioLab: Competition; Introduction to Ecology; Invasive Species; Keystone Species
b) hypotheses are formulated based on direct observations and information from scientific literature;	Virtual BioLab: Keystone Species; Odd Fish Out
c) variables are defined and investigations are designed to test hypotheses;	Virtual BioLab: Introduction to Ecology
d) graphing and arithmetic calculations are used as tools in data analysis;	Virtual BioLab: Introduction to Ecology; Invasive Species; DNA Profiling; Introduction to Genetics
e) conclusions are formed based on recorded quantitative and qualitative data;	Virtual BioLab: DNA Profiling; Shark Fin Forensics; Tiger Trade; Gene Linkage in Fruit Flies;
f) sources of error inherent in experimental design are identified and discussed;	For related content, please see: Virtual BioLab: Introduction to Systematics
g) validity of data is determined;	For related content, please see: Virtual BioLab: Sickle Cell Inheritance; Something's Fishy; Unicellular Eukaryotic Life
h) chemicals and equipment are used in a safe manner;	Virtual BioLab: Introduction to Molecular
i) appropriate technology including computers, graphing calculators, and probeware, is used for gathering and analyzing data, communicating results, modeling concepts, and simulating experimental conditions;	Virtual BioLab: Competition; Introduction to Ecology; Invasive Species; Keystone Species; Introduction to Molecular; Introduction to Genetics; Introduction to Microscopy
j) research utilizes scientific literature;	Virtual BioLab: Keystone Species; Land Plants; Something's Fishy
k) differentiation is made between a scientific hypothesis, theory, and law;	For related content, please see: Virtual BioLab: Keystone Species; Odd Fish Out;

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l) alternative scientific explanations and models are recognized and analyzed; and	Virtual BioLab: Introduction to Systematics; Unicellular Eukaryotic Life; Worms
m) current applications of biological concepts are used.	Virtual BioLab: DNA Profiling; Introduction to Molecular; TEM and Membranes
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;	For related content, please see: Virtual BioLab: Land Plants
b) the structure and function of macromolecules;	This objective falls outside the scope of this program.
c) the nature of enzymes; and	Virtual BioLab: DNA Profiling
d) the capture, storage, transformation, and flow of energy through the processes of photosynthesis and respiration	Virtual BioLab: Unicellular Eukaryotic Life
BIO.3 The student will investigate and understand relationships between cell structure and function. Key concepts include	
a) evidence supporting the cell theory;	Virtual BioLab: Unicellular Eukaryotic Life
b) characteristics of prokaryotic and eukaryotic cells;	Virtual BioLab: Unicellular Eukaryotic Life
c) similarities between the activities of the organelles in a single cell and a whole organism;	Virtual BioLab: TEM and Membranes; Unicellular Eukaryotic Life
d) the cell membrane model; and	Virtual BioLab: TEM and Membranes
e) the impact of surface area to volume ratio on cell division, material transport, and other life processes.	This objective falls outside the scope of this program.
BIO.4 The student will investigate and understand life functions of Archaea, Bacteria and Eukarya. Key concepts include	
a) comparison of their metabolic activities;	Virtual BioLab: Unicellular Eukaryotic Life
b) maintenance of homeostasis;	Virtual BioLab: Unicellular Eukaryotic Life
c) how the structures and functions vary among and within the Eukarya kingdoms of protists, fungi, plants, and animals, including humans;	Virtual BioLab: Unicellular Eukaryotic Life

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d) human health issues, human anatomy, and body systems;	For related content, please see: Virtual BioLab: Colorblindness Inheritance; Introduction to Genetics; Sickle Cell Inheritance
e) how viruses compare with organisms; and	For related content, please see: Virtual BioLab: Parasites
f) evidence supporting the germ theory of infectious disease.	For related content, please see: Virtual BioLab: Parasites
BIO.5 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include	
a) cell growth and division;	For related content, please see: Virtual BioLab: Introduction to Genetics
b) gamete formation;	Virtual BioLab: Gene Linkage in Fruit Flies
c) cell specialization;	For related content, please see: Virtual BioLab: Unicellular Eukaryotic Life; Worms
d) prediction of inheritance of traits based on the Mendelian laws of heredity;	Virtual BioLab: Canine Coat Color; Colorblindness Inheritance; Gene Linkage in Fruit Flies; Of Mice and Mendel; Sickle Cell Inheritance
e) historical development of the structural model of DNA;	For related content, please see: Virtual BioLab: DNA Profiling; Introduction to Molecular; Odd Fish Out; Shark Fin Forensics; Tiger Trade
f) genetic variation;	For related content, please see: Virtual BioLab: Colorblindness Inheritance; Gene Linkage in Fruit Flies; Introduction to Genetics; Of Mice and Mendel; Sickle Cell Inheritance
g) the structure, function, and replication of nucleic acids;	For related content, please see: Virtual BioLab: DNA Profiling; Introduction to Molecular
h) events involved in the construction of proteins;	For related content, please see: Virtual BioLab: DNA Profiling; Introduction to Genetics

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Virginia Standards of Learning Curriculum Framework Biology	Miller & Levine Virtual BioLab Unit/Lesson
i) use, limitations, and misuse of genetic information; and	Virtual BioLab: Colorblindness Inheritance; Sickle Cell Inheritance
j) exploration of the impact of DNA technologies.	Virtual BioLab: DNA Profiling
BIO.6 The student will investigate and understand bases for modern classification systems. Key concepts include	
a) structural similarities among organisms;	Virtual BioLab: Introduction to Systematics; Unicellular Eukaryotic Life;
b) fossil record interpretation;	For related content, please see: Virtual BioLab: Introduction to Systematics
c) comparison of developmental stages in different organisms;	For related content, please see: Virtual BioLab: Land Plants
d) examination of biochemical similarities and differences among organisms; and	Virtual BioLab: Introduction to Molecular; Odd Fish Out; Staining for Differences
e) systems of classification that are adaptable to new scientific discoveries.	Virtual BioLab: Seaweed; Something's Fishy; Unicellular Eukaryotic Life; Worms; Odd Fish Out; Bugs, Barnacles, and Bivalves; Introduction to Systematics
BIO.7 The student will investigate and understand how populations change through time. Key concepts include	
a) evidence found in fossil records;	For related content, please see: Virtual BioLab: Bugs, Barnacles, and Bivalves; Introduction to Systematics; Land Plants; Worms
b) how genetic variation, reproductive strategies, and environmental pressures impact the survival of populations;	Virtual BioLab: Competition; Introduction to Ecology
c) how natural selection leads to adaptations;	Virtual BioLab: Land Plants
d) emergence of new species; and	Virtual BioLab: Invasive Species
e) scientific evidence and explanations for biological evolution.	Virtual BioLab: Introduction to Systematics; Land Plants; Something's Fishy; Worms

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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;	Virtual BioLab: Competition; Introduction to Ecology
b) nutrient cycling with energy flow through ecosystems;	Virtual BioLab: Introduction to Ecology
c) succession patterns in ecosystems;	Virtual BioLab: Introduction to Ecology
d) the effects of natural events and human activities on ecosystems; and	Virtual BioLab: Introduction to Ecology
e) analysis of the flora, fauna, and microorganisms of Virginia ecosystems.	For related content, please see: Virtual BioLab: Invasive Species; Bugs, Barnacles, and Bivalves; Creepy Crawlies; Land Plants; Something's Fishy; Worms