# *Company Name Here Correlation Services*

**Provider: MOP Name Here**

**Grades:** 9 - 12

**States:** Virginia Standards of Learning

**Subjects:** Science - Biology

**Virginia Standards of Learning**

**Science - Biology**

**Grades 9 - 12 - Adopted 2010**

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| **STRAND / TOPIC** | **VA.9-12.** | Virginia 2010 Science Standards of Learning |
| **STANDARD / STRAND** | | BIOLOGY |
| **INDICATOR / STANDARD** | **BIO.1.** | The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which |
| **INDICATOR** | **BIO.1.a)** | Observations of living organisms are recorded in the lab and in the field.<br><br>Lab 01: Curdled Milk<br>Lab 02: Plant Pigments<br>Lab 03: Extracting DNA<br>Lab 04: Natural Selection Simulation<br>Lab 05: Ecosystem Disruption<br>Lesson 01: Introduction<br>Project 03: Heredity |
| **INDICATOR** | **BIO.1.b)** | Hypotheses are formulated based on direct observations and information from scientific literature.<br><br>Lab 01: Curdled Milk<br>Lab 02: Plant Pigments<br>Lab 03: Extracting DNA<br>Lab 04: Natural Selection Simulation<br>Lab 05: Ecosystem Disruption<br>Project 02: Cell Size<br>Project 03: Heredity |
| **INDICATOR** | **BIO.1.c)** | Variables are defined and investigations are designed to test hypotheses. |

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| | | Lab 01: Curdled Milk<br>Lab 02: Plant Pigments<br>Lab 03: Extracting DNA<br>Lab 04: Natural Selection Simulation<br>Lab 05: Ecosystem Disruption<br>Project 03: Heredity |
| **INDICATOR** | **BIO.1.d)** | Graphing and arithmetic calculations are used as tools in data analysis.<br><br>Lab 01: Curdled Milk<br>Lab 02: Plant Pigments<br>Lab 03: Extracting DNA<br>Lab 04: Natural Selection Simulation<br>Lab 05: Ecosystem Disruption<br>Lesson 02: Atoms and Bonding<br>Lesson 05: Enzymes<br>Lesson 14: Basic Genetics<br>Lesson 16: Concepts of Evolution<br>Project 02: Cell Size<br>Project 03: Heredity |
| **INDICATOR** | **BIO.1.e)** | Conclusions are formed based on recorded quantitative and qualitative data.<br><br>Lab 01: Curdled Milk<br>Lab 02: Plant Pigments<br>Lab 03: Extracting DNA<br>Lab 04: Natural Selection Simulation<br>Lab 05: Ecosystem Disruption<br>Lesson 01: Introduction<br>Project 01: Food Diary<br>Project 02: Cell Size<br>Project 03: Heredity<br>Project 04: Viruses |

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| | | Project 05: Green Roof Design |
| **INDICATOR** | **BIO.1.g)** | Validity of data is determined.<br><br>Lab 01: Curdled Milk<br>Lab 02: Plant Pigments<br>Lab 03: Extracting DNA<br>Lab 04: Natural Selection Simulation<br>Lab 05: Ecosystem Disruption<br>Project 01: Food Diary<br>Project 02: Cell Size<br>Project 03: Heredity<br>Project 04: Viruses<br>Project 05: Green Roof Design |
| **INDICATOR** | **BIO.1.h)** | Chemicals and equipment are used in a safe manner.<br><br>Lab 01: Curdled Milk<br>Lab 02: Plant Pigments<br>Lab 03: Extracting DNA<br>Lab 04: Natural Selection Simulation<br>Lab 05: Ecosystem Disruption<br>Project 03: Heredity |
| **INDICATOR** | **BIO.1.i)** | Appropriate technology including computers, graphing calculators, and probeware, is used for gathering and analyzing data, communicating results, modeling concepts, and simulating experimental conditions.<br><br>Lab 03: Extracting DNA<br>Lab 04: Natural Selection Simulation<br>Project 02: Cell Size |
| **INDICATOR** | **BIO.1.j)** | Research utilizes scientific literature.<br><br>Lab 01: Curdled Milk<br>Lesson 01: Introduction<br>Lesson 02: Atoms and Bonding |

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| | | Lesson 03: Water<br>Lesson 04: Bio-Molecules<br>Lesson 05: Enzymes<br>Lesson 06: Cell Theory<br>Lesson 07: Inside Cells<br>Lesson 08: Cell Transport<br>Lesson 09: Photosynthesis<br>Lesson 10: Cell Respiration and Fermentation<br>Lesson 11: DNA and RNA<br>Lesson 12: Cell Cycle<br>Lesson 13: Meiosis<br>Lesson 14: Basic Genetics<br>Lesson 15: DNA Technology<br>Lesson 16: Concepts of Evolution<br>Lesson 17: Morphology<br>Lesson 18: Taxonomy<br>Lesson 19: Fossils and Time<br>Lesson 20: The Human Animal<br>Lesson 21: Ecology<br>Lesson 22: Biogeochemical Cycles<br>Lesson 23: Artificial Selection<br>Lesson 24: Global Disruption<br>Lesson 25: Sustainability<br>Project 01: Food Diary<br>Project 02: Cell Size<br>Project 03: Heredity<br>Project 04: Viruses<br>Project 05: Green Roof Design |
| **INDICATOR** | **BIO.1.k)** | Differentiation is made between a scientific hypothesis, theory, and law.<br><br>Lab 01: Curdled Milk<br>Lab 02: Plant Pigments |

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| | | Lab 03: Extracting DNA<br>Lab 04: Natural Selection Simulation<br>Lab 05: Ecosystem Disruption<br>Lesson 01: Introduction<br>Lesson 06: Cell Theory<br>Lesson 14: Basic Genetics<br>Lesson 16: Concepts of Evolution<br>Lesson 17: Morphology<br>Lesson 20: The Human Animal<br>Lesson 21: Ecology<br>Project 02: Cell Size<br>Project 03: Heredity |
| **INDICATOR** | **BIO.1.I)** | Alternative scientific explanations and models are recognized and analyzed.<br><br>Lab 04: Natural Selection Simulation<br>Lab 05: Ecosystem Disruption<br>Lesson 01: Introduction<br>Lesson 02: Atoms and Bonding<br>Lesson 03: Water<br>Lesson 04: Bio-Molecules<br>Lesson 05: Enzymes<br>Lesson 06: Cell Theory<br>Lesson 07: Inside Cells<br>Lesson 08: Cell Transport<br>Lesson 09: Photosynthesis<br>Lesson 10: Cell Respiration and Fermentation<br>Lesson 11: DNA and RNA<br>Lesson 12: Cell Cycle<br>Lesson 13: Meiosis<br>Lesson 14: Basic Genetics<br>Lesson 15: DNA Technology<br>Lesson 16: Concepts of Evolution |

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| | | Lesson 17: Morphology<br>Lesson 18: Taxonomy<br>Lesson 19: Fossils and Time<br>Lesson 20: The Human Animal<br>Lesson 21: Ecology<br>Lesson 22: Biogeochemical Cycles<br>Lesson 23: Artificial Selection<br>Lesson 24: Global Disruption<br>Lesson 25: Sustainability<br>Project 01: Food Diary<br>Project 02: Cell Size<br>Project 03: Heredity<br>Project 04: Viruses<br>Project 05: Green Roof Design |
| **INDICATOR** | **BIO.1.m)** | Current applications of biological concepts are used.<br><br>Lesson 15: DNA Technology<br>Lesson 23: Artificial Selection<br>Project 05: Green Roof Design |
| **STRAND / TOPIC** | **VA.9-12.** | Virginia 2010 Science Standards of Learning |
| **STANDARD / STRAND** | | BIOLOGY |
| **INDICATOR / STANDARD** | **BIO.2.** | The student will investigate and understand the chemical and biochemical principles essential for life. Key concepts include |
| **INDICATOR** | **BIO.2.a)** | Water chemistry and its impact on life processes.<br><br>Lesson 03: Water<br>Lesson 08: Cell Transport<br>Lesson 22: Biogeochemical Cycles |
| **INDICATOR** | **BIO.2.b)** | The structure and function of macromolecules.<br><br>Lab 01: Curdled Milk<br>Lab 02: Plant Pigments |

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| | | Lab 03: Extracting DNA<br>Lesson 02: Atoms and Bonding<br>Lesson 03: Water<br>Lesson 04: Bio-Molecules<br>Lesson 05: Enzymes<br>Lesson 06: Cell Theory<br>Lesson 07: Inside Cells<br>Lesson 09: Photosynthesis<br>Lesson 10: Cell Respiration and Fermentation<br>Lesson 11: DNA and RNA<br>Lesson 14: Basic Genetics<br>Lesson 15: DNA Technology<br>Project 01: Food Diary<br>Project 02: Cell Size |
| **INDICATOR** | **BIO.2.c)** | The nature of enzymes.<br><br>Lesson 05: Enzymes<br>Lesson 10: Cell Respiration and Fermentation |
| **INDICATOR** | **BIO.2.d)** | The capture, storage, transformation, and flow of energy through the processes of photosynthesis and respiration.<br><br>Lab 02: Plant Pigments<br>Lesson 07: Inside Cells<br>Lesson 09: Photosynthesis<br>Lesson 10: Cell Respiration and Fermentation |
| **STRAND / TOPIC** | **VA.9-12.** | Virginia 2010 Science Standards of Learning |
| **STANDARD / STRAND** | | BIOLOGY |
| **INDICATOR / STANDARD** | **BIO.3.** | The student will investigate and understand relationships between cell structure and function. Key concepts include |
| **INDICATOR** | **BIO.3.a)** | Evidence supporting the cell theory.<br><br>Lesson 01: Introduction<br>Lesson 06: Cell Theory |

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| **INDICATOR** | **BIO.3.b)** | Characteristics of prokaryotic and eukaryotic cells.<br><br>Lesson 06: Cell Theory<br>Lesson 07: Inside Cells |
| **INDICATOR** | **BIO.3.c)** | Similarities between the activities of the organelles in a single cell and a whole organism.<br><br>Lab 02: Plant Pigments<br>Lab 03: Extracting DNA<br>Lesson 01: Introduction<br>Lesson 06: Cell Theory<br>Lesson 09: Photosynthesis<br>Lesson 10: Cell Respiration and Fermentation<br>Lesson 11: DNA and RNA<br>Lesson 12: Cell Cycle<br>Lesson 13: Meiosis<br>Lesson 14: Basic Genetics<br>Lesson 15: DNA Technology |
| **INDICATOR** | **BIO.3.d)** | The cell membrane model.<br><br>Lab 02: Plant Pigments<br>Lab 03: Extracting DNA<br>Lesson 06: Cell Theory<br>Lesson 07: Inside Cells<br>Lesson 08: Cell Transport<br>Lesson 12: Cell Cycle<br>Lesson 13: Meiosis |
| **INDICATOR** | **BIO.3.e)** | The impact of surface area to volume ratio on cell division, material transport, and other life processes.<br><br>Lesson 12: Cell Cycle<br>Lesson 13: Meiosis |
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| **STANDARD / STRAND** | | BIOLOGY |
| **INDICATOR / STANDARD** | **BIO.4.** | The student will investigate and understand life functions of Archaea, Bacteria and Eukarya. Key concepts include |
| **INDICATOR** | **BIO.4.a)** | Comparison of their metabolic activities.<br><br>Lesson 09: Photosynthesis<br>Lesson 10: Cell Respiration and Fermentation |
| **INDICATOR** | **BIO.4.b)** | Maintenance of homeostasis.<br><br>Lab 02: Plant Pigments<br>Lesson 05: Enzymes<br>Lesson 06: Cell Theory<br>Lesson 08: Cell Transport<br>Lesson 09: Photosynthesis<br>Lesson 10: Cell Respiration and Fermentation<br>Lesson 12: Cell Cycle<br>Lesson 20: The Human Animal |
| **INDICATOR** | **BIO.4.c)** | How the structures and functions vary among and within the Eukarya kingdoms of protists, fungi, plants, and animals, including humans.<br><br>Lesson 01: Introduction<br>Lesson 08: Cell Transport<br>Lesson 18: Taxonomy |
| **INDICATOR** | **BIO.4.d)** | Human health issues, human anatomy, and body systems.<br><br>Lab 03: Extracting DNA<br>Lesson 20: The Human Animal<br>Project 01: Food Diary |
| **INDICATOR** | **BIO.4.e)** | How viruses compare with organisms.<br><br>Project 04: Viruses |
| **INDICATOR** | **BIO.4.f)** | Evidence supporting the germ theory of infectious disease. |

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| | | Lesson 20: The Human Animal |
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| **STANDARD / STRAND** | | BIOLOGY |
| **INDICATOR / STANDARD** | **BIO.5.** | The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include |
| **INDICATOR** | **BIO.5.a)** | Cell growth and division.<br><br>Lesson 12: Cell Cycle<br>Lesson 13: Meiosis |
| **INDICATOR** | **BIO.5.b)** | Gamete formation.<br><br>Lesson 13: Meiosis |
| **INDICATOR** | **BIO.5.d)** | Prediction of inheritance of traits based on the Mendelian laws of heredity.<br><br>Lesson 14: Basic Genetics<br>Lesson 16: Concepts of Evolution<br>Project 03: Heredity |
| **INDICATOR** | **BIO.5.e)** | Historical development of the structural model of DNA.<br><br>Lesson 14: Basic Genetics<br>Lesson 15: DNA Technology |
| **INDICATOR** | **BIO.5.f)** | Genetic variation.<br><br>Lab 04: Natural Selection Simulation<br>Lesson 16: Concepts of Evolution<br>Lesson 20: The Human Animal<br>Lesson 21: Ecology |
| **INDICATOR** | **BIO.5.g)** | The structure, function, and replication of nucleic acids.<br><br>Lab 03: Extracting DNA<br>Lesson 04: Bio-Molecules<br>Lesson 06: Cell Theory |

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| | | Lesson 07: Inside Cells<br>Lesson 11: DNA and RNA<br>Lesson 14: Basic Genetics<br>Lesson 15: DNA Technology<br>Project 02: Cell Size |
| **INDICATOR** | **BIO.5.h)** | Events involved in the construction of proteins.<br><br>Lesson 04: Bio-Molecules<br>Lesson 11: DNA and RNA |
| **INDICATOR** | **BIO.5.i)** | Use, limitations, and misuse of genetic information.<br><br>Lesson 15: DNA Technology<br>Lesson 23: Artificial Selection |
| **INDICATOR** | **BIO.5.j)** | Exploration of the impact of DNA technologies.<br><br>Lesson 15: DNA Technology<br>Lesson 23: Artificial Selection |
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| **STANDARD / STRAND** | | BIOLOGY |
| **INDICATOR / STANDARD** | **BIO.6.** | The student will investigate and understand bases for modern classification systems. Key concepts include |
| **INDICATOR** | **BIO.6.a)** | Structural similarities among organisms.<br><br>Lesson 17: Morphology |
| **INDICATOR** | **BIO.6.b)** | Fossil record interpretation.<br><br>Lesson 17: Morphology<br>Lesson 19: Fossils and Time<br>Lesson 20: The Human Animal |
| **INDICATOR** | **BIO.6.c)** | Comparison of developmental stages in different organisms.<br><br>Project 04: Viruses |

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| **INDICATOR** | **BIO.6.d)** | Examination of biochemical similarities and differences among organisms.<br><br>Lesson 16: Concepts of Evolution<br>Lesson 20: The Human Animal |
| **INDICATOR** | **BIO.6.e)** | Systems of classification that are adaptable to new scientific discoveries.<br><br>Lesson 01: Introduction<br>Lesson 18: Taxonomy<br>Project 04: Viruses |
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| **STANDARD / STRAND** | | BIOLOGY |
| **INDICATOR / STANDARD** | **BIO.7.** | The student will investigate and understand how populations change through time. Key concepts include |
| **INDICATOR** | **BIO.7.a)** | Evidence found in fossil records.<br><br>Lesson 17: Morphology<br>Lesson 19: Fossils and Time<br>Lesson 20: The Human Animal |
| **INDICATOR** | **BIO.7.b)** | How genetic variation, reproductive strategies, and environmental pressures impact the survival of populations.<br><br>Lab 04: Natural Selection Simulation<br>Lesson 16: Concepts of Evolution<br>Lesson 17: Morphology |
| **INDICATOR** | **BIO.7.c)** | How natural selection leads to adaptations.<br><br>Lab 04: Natural Selection Simulation<br>Lesson 16: Concepts of Evolution<br>Lesson 17: Morphology |
| **INDICATOR** | **BIO.7.d)** | Emergence of new species.<br><br>Lesson 21: Ecology |
| **INDICATOR** | **BIO.7.e)** | Scientific evidence and explanations for biological evolution. |

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| | | Lesson 16: Concepts of Evolution<br>Lesson 17: Morphology<br>Lesson 20: The Human Animal |
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| **STANDARD / STRAND** | | BIOLOGY |
| **INDICATOR / STANDARD** | **BIO.8.** | The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concepts include |
| **INDICATOR** | **BIO.8.a)** | Interactions within and among populations including carrying capacities, limiting factors, and growth curves.<br><br>Lab 04: Natural Selection Simulation<br>Lab 05: Ecosystem Disruption<br>Lesson 21: Ecology<br>Lesson 25: Sustainability |
| **INDICATOR** | **BIO.8.b)** | Nutrient cycling with energy flow through ecosystems.<br><br>Lesson 21: Ecology<br>Lesson 22: Biogeochemical Cycles |
| **INDICATOR** | **BIO.8.c)** | Succession patterns in ecosystems.<br><br>Lesson 21: Ecology |
| **INDICATOR** | **BIO.8.d)** | The effects of natural events and human activities on ecosystems.<br><br>Lab 05: Ecosystem Disruption<br>Lesson 21: Ecology<br>Lesson 22: Biogeochemical Cycles<br>Lesson 23: Artificial Selection<br>Lesson 24: Global Disruption<br>Lesson 25: Sustainability<br>Project 05: Green Roof Design |
| **INDICATOR** | **BIO.8.e)** | Analysis of the flora, fauna, and microorganisms of Virginia ecosystems. |

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| | | Lab 05: Ecosystem Disruption<br>Lesson 21: Ecology |