



Guaranteed and Viable Curriculum (GVC) for: Biology

1st Quarter:

GVC #1: Living cells are composed of chemical elements and molecules that form macromolecules. The macromolecules in a cell function to carry out important reactions that allow cycling of matter and flow of energy within and between organisms. All organisms are made of one or more cells. The structure and function of a cell determines the cell's role in an organism. Multicellular organisms have systems of tissues and organs that work together to meet the needs of the whole organism. Cells grow, divide, and function in order to accomplish essential life processes. Feedback systems help organisms maintain homeostasis.

GVC #2:

Standard BIO.2.1

Construct an explanation based on evidence that all organisms are primarily composed of carbon, hydrogen, oxygen, and nitrogen, and that the matter taken into an organism is broken down and recombined to make macromolecules necessary for life functions.

2nd Quarter:

GVC #3:Standard BIO.2.4

Plan and carry out an investigation to determine how cells maintain stability within a range of changing conditions by the transport of materials across the cell membrane. Emphasize that large and small particles can pass through the cell membrane to maintain homeostasis. (LS1.A)

GVC #4:Standard BIO.2.5 Construct an explanation about the role of mitosis in the production, growth, and maintenance of systems within complex organisms. Emphasize the major events of the cell cycle including cell growth and DNA replication, separation of chromosomes, and separation of cell contents. (LS1.B)

3rd Quarter:

GVC #5: Heredity is a unifying biological principle that explains how information is passed from parent to offspring through deoxyribonucleic acid (DNA) molecules in the form of chromosomes. Distinct sequences of DNA, called genes, carry the code for specific proteins, which are responsible for the specific traits and life functions of organisms. There are predictable patterns of inheritance; however, changes in the DNA sequence and environmental factors may alter genetic expression. The variation and distribution of traits observed in a population depend on both genetic and environmental factors. Research in the field of heredity has led to the development of multiple genetic technologies that may improve the quality of life but may also raise ethical issues.

Standard BIO.3.1

Construct an explanation for how the structure of DNA is replicated, and how DNA and RNA code for the structure of proteins which regulate and carry out the essential functions of life and result in specific traits. Emphasize a conceptual understanding that the sequence of nucleotides in DNA determines the amino acid sequence of proteins through the processes of transcription and translation. (LS1.A, LS3.A)

GVC #6: Standard BIO.3.4

Plan and carry out an investigation and use computational thinking to explain the variation and patterns in distribution of the traits expressed in a population. Emphasize the distribution of traits as it relates to both genetic and environmental influences on the expression of those traits. Examples of variation and patterns in distribution of traits could include sickle-cell anemia and malaria, hemoglobin levels in humans at high elevation, or antibiotic resistance. (LS3.B)

4th Quarter:

GVC #7: The unity among species, as evidenced in the fossil record, similarities in DNA and other biomolecules, anatomical structures, and embryonic development, is the result of evolution. Evolution also explains the diversity within and among species. Evolution by natural selection is the result of environmental factors selecting for and against genetic traits. Traits that allow an individual to survive and reproduce are likely to increase in the next generation, causing the proportions of specific traits to change

within a population. Over longer periods of time, changes in proportions of traits due to natural selection and changes in selective pressures can cause both speciation and extinction. Changes in environmental conditions impact biodiversity in ecosystems affect the natural selection of species.

Standard BIO.4.1

GVC #8:The cycling of matter and flow of energy are part of a complex system of interactions within an ecosystem. Through these interactions, an ecosystem can sustain relatively stable numbers and types of organisms. A stable ecosystem is capable of recovering from moderate biological and physical changes. Extreme changes may have significant impact on an ecosystem's carrying capacity and biodiversity, altering the ecosystem. Human activities can lead to significant impacts on an ecosystem.

Standard BIO.1.1

Plan and carry out an investigation to analyze and interpret data to determine how biotic and abiotic factors can affect the stability and change of a population. Emphasize stability and change in populations' carrying capacities and an ecosystem's biodiversity. (LS2.A, LS2.C)