2023-2024
Jackson County Schools
9-12 Biology Pacing Guide

1st Quarter

Chemistry of Life

***Focus Standard 1 - Macromolecules** Proficiency Scale (AMSTI)
Use models to compare and contrast how the structural characteristics of carbohydrates, nucleic acids, proteins, and lipids define their function in organisms.

***Focus Standard 5 - Homeostasis and Water** Proficiency Scale (AMSTI) Proficiency Scale (APlus)
Plan and carry out investigations to explain feedback mechanisms (e.g., sweating and shivering) and cellular processes (e.g., active and passive transport) that maintain homeostasis.

Standard 5a - Proficiency Scale (AMSTI)
Plan and carry out investigations to explain how the unique properties of water (e.g., polarity, cohesion, adhesion) are vital to maintaining homeostasis in organisms.

Cells

***Focus Standard 2 - Organelles** Proficiency Scale (AMSTI)
Obtain, evaluate, and communicate information to describe the function and diversity of organelles and structures in various types of cells (e.g., muscle cells having a large amount of mitochondria, plasmids in bacteria, chloroplasts in plant cells).

Writing Component - Narrative
Example- You are a drop of water. Write a story about your adventures. Make sure that you include the properties of water in your story.

Additional Resources:
Hudson Alpha Resource
Compendium
APlus Learning Plan
AMSTI Learning Resources
ACT Sample Questions

2nd Quarter

Cells (cont.)

***Focus Standard 4 - Cell Cycle** Proficiency Scale (AMSTI)
Develop and use models to explain the role of the cell cycle during growth and maintenance in multicellular organisms (e.g., normal growth and/or uncontrolled growth resulting in tumors).

***Focus Standard 6 - Cell Energetics** Proficiency Scale (AMSTI) Proficiency Scale (APlus)
Analyze and interpret data from investigations to explain the role of products and reactants of photosynthesis and cellular respiration in the cycling of matter and the flow of energy

Standard 6a - Plan and carry out investigations to explain the interactions among pigments, absorption of light, and reflection of light.

***Focus Standard 3 - Central Dogma** Proficiency Scale (AMSTI) Proficiency Scale (APlus)
Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins.

Writing Component - Descriptive
Example- Describe in detail a part of the cell, and make sure that functions are explained in detail.

Example- You have become transported to the nucleus of the cell, explain in detail what you see happening inside.

Additional Resources:
Hudson Alpha Resource
AMSTI Formative Assessment Standard 3
APlus Learning Plan-1
APlus Learning Plan-2
Compendium
AMSTI Learning Resources
ACT Sample Questions

3rd Quarter

Genetics

***Focus Standard 11- Genetics** Proficiency Scale (AMSTI)
Analyze and interpret data collected from probability calculations to explain the variation of expressed traits within a population.

Standard 11a - Use mathematics and computation to predict phenotypic and genotypic ratios and percentages by constructing Punnett squares, including using both homozygous and heterozygous allele pairs.

Standard 11b - Develop and use models to demonstrate codominance, incomplete dominance, and Mendel's laws of segregation and independent assortment.

Standard 11c - Analyze and interpret data (e.g., pedigree charts, family and population studies) regarding Mendelian and complex genetic disorders (e.g., sickle-cell anemia, cystic fibrosis, type 2 diabetes) to determine patterns of genetic inheritance and disease risks from both genetic and environmental factors.

***Focus Standard 12 - Genetic Recombination** Proficiency Scale (AMSTI) Proficiency Scale (APlus)
Develop and use a model to analyze the structure of chromosomes and how new genetic combinations occur through the process of meiosis.

Standard 12a - Proficiency Scale (AMSTI)
Analyze data to draw conclusions about genetic disorders caused by errors in meiosis.

Standard 15 - Engage in argument from evidence (e.g., mathematical models such as distribution graphs) to explain how the diversity of organisms is affected by overpopulation of species, variation due to genetic mutations, and competition for limited resources.

Writing Component - Expository
Example- Explain the differences between dominant and recessive alleles and how they are related to the Hardy-Weinberg equation.

Additional Resources:
Hudson Alpha Resource
Compendium
AMSTI Learning Resources
APlus Heredity Overview
ACT Sample Questions

4th Quarter

Ecology

***Focus Standard 8 - Ecosystems** Proficiency Scale (AMSTI)
Develop and use models to describe the cycling of matter (e.g., carbon, nitrogen, water) and flow of energy (e.g., food chains, food webs, biomass pyramids, ten percent law) between abiotic and biotic factors in ecosystems.

***Focus Standard 9 - Population Growth** Proficiency Scale (AMSTI) Proficiency Scale (APlus)
Use mathematical comparisons and visual representations to support or refute explanations of factors that affect population growth (e.g., exponential, linear, logistic).

***Focus Standard 14 - Diversity** Proficiency Scale (AMSTI) Proficiency Scale (APlus)
Analyze and interpret data to evaluate adaptations resulting from natural and artificial selection that may cause changes in populations over time (e.g., antibiotic-resistant bacteria, beak types, peppered moths, pest-resistant crops)

Standard 7 - Develop and use models to illustrate examples of ecological hierarchy levels, including biosphere, biome, ecosystem, community, population, and organism.

Standard 10 - Construct an explanation and design a real-world solution to address changing conditions and ecological succession caused by density-dependent and/or density-independent factors.

Standard 13 - Obtain, evaluate, and communicate information to explain how organisms are classified by physical characteristics, organized into levels of taxonomy, and identified by binomial nomenclature (e.g., taxonomic classification, dichotomous keys).

Standard 16 - Analyze scientific evidence (e.g., DNA, fossil records, cladograms, biogeography) to support hypotheses of common ancestry and biological evolution.

Writing Component - Persuasive

Example- Persuade your local government to address a real world solution addressing an ecological succession problem of your choosing.

Additional Resources:

Hudson Alpha Resource
Compendium
AMSTI Learning Resources
APlus Standard 14 Overview
APlus Standard 8/9 Overview
ACT Sample Questions