

GENETICS (.5 CREDITS)

2021 – 2022 PACING GUIDE



WEST BOLIVAR
CONSOLIDATED SCHOOL DISTRICT

*If on block schedule, please note that this course should be completed at the halfway mark of the semester.

BIG GOAL: Students will explore the principles of classical and molecular genetics along with multiple, modern applications of biotechnology.

FIRST NINE WEEKS

PERFORMACNCE OBJ(S).	ACADEMIC FOCUS	OBJECTIVE STATEMENTS – MS CCRS
SEP(s)	1st Day Lessons The Nature of Science: Science and Engineering Practices (SEPs)	SCIENCE AND ENGINEERING PRACTICES 1. Asking questions and defining problems 2. Planning and carrying out investigations 3. Analyzing and interpreting data 4. Developing and using models 5. Constructing explanations and designing solutions 6. Engaging in argument from evidence 7. Using mathematics and computational thinking 8. Obtaining, evaluating, and communicating information
GEN.1B.3 GEN.2B.4 GEN.2B.3	Cell Cycle and Cell Division Cancer	1B.3 Microscopically observe and analyze the stages of the cell cycle (G1-S-G2-M) to describe the phenomenon, and identify methods at different cell cycle checkpoints through which the integrity of the DNA code is maintained. 2B.4 Investigate the role of mutations and the loss of cell cycle regulation in the development of cancers. 2B.3 Describe cellular mechanisms that can help to minimize mutations (e.g., cell cycle checkpoints, DNA polymerase proofreading, and DNA repair enzymes).
UNIT REVIEW; UNIT TEST		
GEN.5.1 GEN.2B.1 GEN.2B.2 GEN.5.6	Meiosis and Sexual Reproduction Mutations & Population Genetics	5.1 Model the inheritance of chromosomes through meiotic cell division and demonstrate how meiosis and sexual reproduction lead to genetic variation in populations. 2B.1 Identify factors that cause mutations (e.g. environmental, errors in replication, and viral infections). 2B.2 Explain how these mutations may result in changes in protein structure and function. <ul style="list-style-type: none"> Human Genetic Disorders 5.6 Enrichment: Apply the concept of natural selection to analyze differences in human populations (e.g. skin color, lactose persistence, sickle cell anemia, and malaria).*
UNIT REVIEW; UNIT TEST		
GEN.4.1 GEN.4.2 GEN.4.3 GEN.4.4	Mendelian Genetics and Other Patterns of Inheritance	4.1 Demonstrate Mendel's law of dominance and segregation using mathematics to predict phenotypic and genotypic ratios. 4.2 Illustrate Mendel's law of independent assortment by analyzing multi-trait cross data sets for patterns and trends. 4.3 Investigate traits that follow non-Mendelian inheritance patterns (e.g., incomplete dominance, codominance, multiple alleles, autosomal linkage, sex-linkage, polygenic, and epistasis). 4.4 Construct pedigrees from observed phenotypes. Analyze and interpret data to determine patterns of inheritance and disease risk.
UNIT REVIEW; UNIT TEST		
REVIEW – CELL CYCLE, MEIOSIS, AND MENDELIAN GENETICS		
1ST TERM ASSESSMENT		

ENVIRONMENTAL SCIENCE (.5 CREDITS) 2021 – 2022 PACING GUIDE



WEST BOLIVAR
CONSOLIDATED SCHOOL DISTRICT

*If on block schedule, please note that this course should be completed at the halfway mark of the semester.

BIG GOAL: Students will explore ways in which the environment shapes living communities through laboratory activities, research, and technology.

THIRD NINE WEEKS		
PERFORMACNCE OBJ(S).	ACADEMIC FOCUS	OBJECTIVE STATEMENTS – MS CCRS
SEP(s)	1st Day Lessons The Nature of Science: Science and Engineering Practices (SEPs)	SCIENCE AND ENGINEERING PRACTICES 1. Asking questions and defining problems 2. Planning and carrying out investigations 3. Analyzing and interpreting data 4. Developing and using models 5. Constructing explanations and designing solutions 6. Engaging in argument from evidence 7. Using mathematics and computational thinking 8. Obtaining, evaluating, and communicating information
GEN.1.1 GEN.1.2 GEN.1.3 GEN.1.4 GEN.1.5	Biosphere and Biodiversity Interdependence of Organisms Biogeochemical Cycles	1.1 Identify, investigate, and evaluate the interactions of the abiotic and biotic factors that determine the types of organisms that live in major biomes. 1.2 Evaluate evidence in nonfiction text to explain how biological or physical changes within biomes affect populations and communities and how changing conditions may result in altered ecosystems. 1.3 Use models to explain why the flow of energy through an ecosystem can be illustrated by a pyramid with less energy available at the higher trophic levels compared to lower levels. 1.4 Describe symbiotic relationships (e.g., mutualism, parasitism, and commensalism) and other coevolutionary (e.g., predator-prey, cooperation, competition, and mimicry) relationships within specific environments. 1.5 Develop and use models to diagram the flow of nitrogen, carbon, and phosphorus through the environment.
UNIT REVIEW; UNIT TEST		
GEN.1.6 GEN.1.7 GEN.1.8 GEN.1.9 GEN.1.10*	Population Ecology Weather and Natural Disasters Human Impact on Ecosystems	1.6 Use mathematics, graphics, and informational text to determine how population density-dependent and density-independent limiting factors affect populations and diversity within ecosystems. Use technology to illustrate and compare a variety of population-growth curves. 1.7 Analyze and interpret quantitative data to construct explanations of how the carrying capacity of an ecosystem may change as the availability of resources changes. 1.8 Utilize data to communicate changes within a given population and the environmental factors that may have impacted these changes (e.g., weather patterns, natural disasters) 1.9 Evaluate and communicate data that explains how human activity may impact biodiversity (e.g., introduction, removal, and reintroduction of an organism within an ecosystem; land usage) and genetic variations of organisms, including endangered and threatened species. 1.10 Enrichment: Engage in scientific argument from evidence the benefits versus harm of genetically modified organisms.*
UNIT REVIEW; UNIT TEST		
REVIEW – ALL TOPICS		
3RD TERM ASSESSMENT		

FOURTH NINE WEEKS

PERFORMACNCE OBJ(S).	ACADEMIC FOCUS	OBJECTIVE STATEMENTS – MS CCRS
GEN.2.1 GEN.2.2 GEN.2.3 GEN.2.4 GEN.2.5 GEN.2.6	Biosphere and Biodiversity Earth's Resources	<p>2.1 Differentiate between renewable and nonrenewable resources, and compare and contrast the pros and cons of using these resources.</p> <p>2.2 Investigate and research the pros and cons of using traditional sources of energy (e.g., fossil fuels) and alternative sources of energy (e.g., water, wind, geothermal, biomass/biofuels, solar).</p> <p>2.3 Compare and contrast biodegradable and nonbiodegradable wastes and their significance in landfills.</p> <p>2.4 Examine solutions for developing, conserving, managing, recycling, and reusing energy and mineral resources to minimize impacts in natural systems (e.g., agricultural soil use, mining for coal, construction sites, and exploration of petroleum and natural gas sources).</p> <p>2.5 Research various resources related to water quality and pollution (e.g., nonfictional text, EPA's Surf Your Watershed, MDEQ publications) and communicate the possible effects on the environment and human health.</p> <p>2.6 Enrichment: Obtain water from a local source (e.g., stream on campus, rainwater, ditch water) to monitor water quality over time, using a spreadsheet program to graphically represent collected data.*</p>
UNIT REVIEW; UNIT TEST		
GEN.3.1 GEN.3.2 GEN.3.3 GEN.3.4	Use of Natural Resources and Conservation	<p>3.1 Use a model to describe cycling of carbon through the ocean, atmosphere, soil, and biosphere and how increases in carbon dioxide concentrations have resulted in atmospheric and climate changes.</p> <p>3.2 Interpret data and climate models to predict how global and regional climate change can affect Earth's systems (e.g., precipitation, temperature, impacts on sea level, global ice volumes, and atmosphere and ocean composition).</p> <p>3.3 Use satellite imagery and other resources to analyze changes in biomes over time (e.g., glacial retreat, deforestation, desertification) and propose strategies to reduce the impact of human activities leading to these issues.</p> <p>3.4 Enrichment: Determine mathematically an individual's impact on the environment (carbon footprint, water usage, landfill contribution) and develop a plan to reduce personal contribution.*</p>
UNIT REVIEW; UNIT TEST		
GEN.4.1 GEN.4.2 GEN.4.3* GEN.4.4* GEN.4.5	Human Impact on the Environment	<p>4.1 Identify human impact and develop a solution for protection of the atmosphere, considering pollutants (e.g., acid rain, air pollution, smog, ozone layer, or increased levels of greenhouse gases) and the impacts of pollutants on human health (e.g., asthma, COPD, emphysema, and cancer).</p> <p>4.2 Evaluate data and other information to explain how key natural resources (e.g., water sources, fertile soils, concentrations of minerals, and fossil fuels), natural hazards, and climate changes influence human activity (e.g., mass migrations, human health).</p> <p>4.3 Enrichment: Research and analyze case studies to determine the impact of human-related and natural environmental changes on human health and communicate possible solutions to reduce/resolve the dilemma. *</p> <p>4.4 Enrichment: Explore online resources related to air pollution to determine air quality in a geographic area and communicate the possible effects on the environment and human health.</p> <p>4.3 Enrichment: Use an engineering design process to define a problem, design, construct, evaluate, and improve a device or method to reduce or prevent human impact on a natural resource (e.g., build a water filter, design an air purifier, develop a method to prevent parking lot pollution from entering a watershed).*</p>
UNIT REVIEW; UNIT TEST		
REVIEW – BIODIVERSITY; EARTH'S RESOURCES AND CONSERVATION; HUMAN IMPACT ON THE ENVIRONMENT		
4TH TERM ASSESSMENT/FINAL EXAM		
(CUMULATIVE)		

Note: "Enrichment" standards will be taught if time permits. Engineering standards are represented in some performance objectives with specific wording that will prompt students to approach learning and exploration using the engineering process. These performance objectives are marked with an * at the end of the statement.