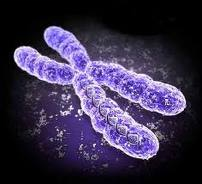
**2010**

Team Collaboration:

Joseph Mairo Kelly McMahon Cheryl Tucker

9/2010



Wall Township School District Biology Curriculum

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SEPTEMBER** | **OCTOBER** | **NOVEMBER** | **DECEMBER** | **JANUARY** |
| Living things share certain characteristics that differentiate them from the nonliving world. | Biological systems utilize energy and molecular building blocks to grow, reproduce, and maintain homeostasis. | Living organisms are composed of cellular units that carry out functions required for life. | All organisms require energy to perform the cellular functions necessary to support life. | Organisms interact with one another and with the environment in which they live. |
| **FEBRUARY** | **MARCH** | **APRIL** | **MAY** | **JUNE** |
| Living systems store, retrieve, transmit, and respond to information essential to life processes. | Organisms reproduce, develop, and have predictable life cycles. | Organisms contain genetic information that influence their traits, and they pass this onto their offspring during reproduction. | The development of technological applications for biology has resulted in advanced research and medicine. | The process of evolution drives the diversity and unity of life. |

**Big Idea: Living things share certain characteristics that differentiate them from the nonliving world. Month: September**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enduring Understandings** | **Essential Questions** | **Skills** | **Standards** | **Recommended Assessments** |
| There are specific characteristics that are common to all living things  Biologists classify living things into categories based on certain common characteristics  The survival of an organism is affected by interactions with each other and their environment  Survival can be altered by human manipulation | What is life?  What is science?  What is the best way for biologists to organize living things?  What role does science play in the study of life?  What is an animal?  Vocabulary:  Stimulus, asexual reproduction, sexual reproduction, homeostasis, hypothesis, controlled experiment, independent variable, dependent variable, control group, autotroph, heterotroph | Develop and apply mathematical, physical, and computational tools to build evidence-based models and to pose theories  Apply scientific principles and theories to build and refine standards for data collection, posing controls, and presenting evidence  Reflect on and revise observations as new evidence emerges  Apply data representations and new models to revise predictions and explanations  Engage in multiple forms of discussion in order to process, make sense of, and learn from others’ ideas, observations, and experiences  Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams  Demonstrate how to apply scientific tools and instruments and knowledge of how to handle animals with respect for their safety and welfare  Describe modern application of the regulation of cell differentiation and analyze the benefits as risks  Investigate and describe the complementary relationship between photosynthesis and cellular respiration | 5.1.12.A.2 Interpretation and manipulation of evidence based models are used to build and critique arguments/ explanations  5.1.12.A.3 Revisions of predictions and explanations are based on systematic observations, accurate measurements, and structured data/evidence  5.1.12.C.1 Refinements of understandings, explanations, and models occurs as new evidence is incorporated  5.1.12.C.2 Data and refined models are used to revise predictions and explanations  5.1.12.D.1 Science involves practicing productive social interaction with peers, such as partner talk, whole group discussions, and small group work  5.1.12.D.2 Science involves using language, both oral and written, as a tool for making thinking public  5.1.12.D.3 Ensure that instruments and specimens are properly cared for and that animals, when used, are treated humanely, responsibly, and ethically  5.3.12.A.5 Cell differentiation is regulated through expression of different genes during the development of complex multicellular organisms  5.3.12.B.5 In both plant and animal cells, sugar is a source of energy and can be used to make other carbon containing (organic) molecules | Pre/Post Tests  Living things writing assignment defining the characteristics used to determine if things are living  Microscope labs  Survey of living things  Formative Assessments  Do Now’s  Exit Passes  Group Work  Summative Assessments  Quiz  Test  Teacher created materials  Teacher created activities  Teacher Observation |

**Big Idea: Biological systems utilize energy and molecular building blocks to grow, reproduce, and maintain homeostasis Month: October**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enduring Understandings** | **Essential Questions** | **Skills** | **Standards** | **Recommended Assessments** |
| Living systems, from the organismal to the cellular level, demonstrate the complementary nature of structure and function | How does structure relate to function in living systems?  What is the matter in organisms made of?  Why are the properties of water important to organisms?  How do organisms use different types of carbon compounds?  How do chemicals combine and break apart inside living things?  Vocabulary:  hydrogen bond, cohesion, adhesion, mixture, solution, solute, solvent,  suspension, pH scale, acid, base, buffer, monomer, polymer,  carbohydrate,  monosaccharide,  lipid, nucleic acid,  nucleotide, protein,  amino acid | Apply scientific principles and theories to build and refine standards for data collection, posing controls, and presenting evidence  Revise predictions and explanations using evidence-based models using mathematical, physical and computational tools  Reflect on and revise observations as new evidence emerges  Apply data representations and new models to revise predictions and explanations  Engage in multiple forms of discussion in order to process, make sense of, and learn from others’ ideas, observations, and experiences  Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams  Represent and explain the relationship between the structure and function of each class of complex molecules using a variety of models  Demonstrate the properties and functions of enzymes by designing and carrying out an experiment | 5.1.12.A.3 Revisions of predictions and explanations are based on systematic observations, accurate measurements, and structured data/evidence  5.1.12.B.3 Empirical evidence is used to construct and defend arguments  5.1.12.C.1 Refinements of understandings, explanations, and models occurs as new evidence is incorporated  5.1.12.C.2 Data and refined models are used to revise predictions and explanations  5.1.12.D.1 Science involves practicing productive social interaction with peers, such as partner talk, whole group discussions, and small group work  5.1.12.D.2 Science involves using language, both oral and written, as a tool for making thinking public  5.3.12.A.1 Cells are made of complex molecules that consist mostly of a few elements. Each class of molecules has its own building blocks and specific function  5.3.12.A.2 Cellular processes are carried out by many different types of molecules, mostly by the group of proteins known as enzymes | EOC practice word problem  Cohesion/adhesion lab  Enzyme lab  Pre/Post Tests  Survey of living things  Formative Assessments  Do Now’s  Exit Passes  Group Work  Summative Assessments  Quiz  Test  Teacher created materials  Teacher created activities  Teacher Observation |

**Big Idea: Living organisms are composed of cellular units that carry out functions required for life. Month: November**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enduring Understandings** | **Essential Questions** | **Skills** | **Standards** | **Recommended Assessments** |
| Living systems demonstrate the complementary nature of structure and function.  Cells respond to their environment to maintain the proper conditions necessary for survival.  Multicellular organisms grow and develop from a single cell.  A cell is the basic unit of life: the processes that occur at the cellular level provide the energy and basic structure organisms need to survive | How does the structure of a molecule relate to its function in a living thing?  How do cells maintain conditions necessary for survival?  How do multicellular organisms grow and develop from a single cell?  Why is it important to study cells?  How are cell structures adapted to their functions?  Vocabulary: homeostasis, passive transport, diffusion, osmosis, active transport, ion pumps, differentiation, specialization, stem cells, cell theory, cell membrane, nucleus, prokaryote, eukaryote | Apply scientific principles and theories to build and refine standards for data collection, posing controls, and presenting evidence  Reflect on and revise observations as new evidence emerges  Apply data representations and new models to revise predictions and explanations  Engage in multiple forms of discussion in order to process, make sense of, and learn from others’ ideas, observations, and experiences  Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams  Predict a cell’s response in a given set of environmental conditions.  Distinguish between the processes of cellular growth (cell division) and development (differentiation).  Describe modern applications of the regulation of cell differentiation and analyze the benefits and risks (e.g. stem cells, sex determination). | 5.1.12.A.3 Revisions of predictions and explanations are based on systematic observations, accurate measurements, and structured data/evidence  5.1.12.C.1 Refinements of understandings, explanations, and models occurs as new evidence is incorporated  5.1.12.C.2 Data and refined models are used to revise predictions and explanations  5.1.12.D.1 Science involves practicing productive social interaction with peers, such as partner talk, whole group discussions, and small group work  5.1.12.D.2 Science involves using language, both oral and written, as a tool for making thinking public  5.3.12.A.3 Cellular function is maintained through regulation of cellular processes in response to internal and external environmental conditions  5.3.12.A.4 Cells divide through the process of mitosis, resulting in daughter cells that have the same genetic composition as the original cell  5.3.12.A.5 Cell differentiation is regulated through expression of different genes during the development of complex multicellular organisms | Pre/post tests  Osmosis and diffusion lab  Stem cell project  Formative assessments  Do nows  Class discussions  Exit passes  Summative assessments  Quizzes  Test  Teacher created activities  Teacher observation |

**Big Idea:** **All organisms require energy to perform the cellular functions necessary to support life Month: December**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enduring Understandings** | **Essential Questions** | **Skills** | **Standards** | **Recommended Assessments** |
| Plants have the capability to take energy from light to form sugar molecules containing carbon, hydrogen, and oxygen.  In both plant and animal cells, sugar is a source of energy and can be used to make other carbon-containing (organic) molecules. | What is the source of energy in living things?  How does light energy get converted to the chemical energy that organisms can use?  How do organisms store and carry energy?  Vocabulary:  Adenosine Triphosphate, heterotrophy, autotroph, photosynthesis, pigment, chlorophyll, | Apply scientific principles and theories to build and refine standards for data collection, posing controls, and presenting evidence  Reflect on and revise observations as new evidence emerges  Apply data representations and new models to revise predictions and explanations  Engage in multiple forms of discussion in order to process, make sense of, and learn from others’ ideas, observations, and experiences  Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams  Demonstrate how sunlight’s energy supports the vast majority of living things on the planet.  Describe the process of photosynthesis with special attention given to the light dependent and light independent reactions.  Describe the process of cellular respiration with special attention given to glycolysis, the Krebs Cycle, and the electron transport chain.  Construct and describe the function of Adenosine Triphosphate (ATP). | 5.1.12.A.3 Revisions of predictions and explanations are based on systematic observations, accurate measurements, and structured data/evidence  5.1.12.C.1 Refinements of understandings, explanations, and models occurs as new evidence is incorporated  5.1.12.C.2 Data and refined models are used to revise predictions and explanations  5.1.12.D.1 Science involves practicing productive social interaction with peers, such as partner talk, whole group discussions, and small group work  5.1.12.D.2 Science involves using language, both oral and written, as a tool for making thinking public  5.3.12. B.3 Continual input of energy from sunlight keeps matter and energy flowing through ecosystems  5.3.12.B.4 Plants have the capability to take energy from light to form sugar molecules containing carbon, hydrogen, and oxygen  5.3.12.B.5 In both plant and animal cells, sugar is a source of energy and can be used to make other carbon containing (organic) molecules  5.3.12.B.6 All organisms much break the high energy chemical bonds in food molecules during cellular respiration to obtain the energy needed for life processes | Pre/Post Tests  ATP Activity  Photosynthesis Lab  Cellular Respiration Lab  Formative Assessments  Do Now’s  Exit Passes  Group Work  Summative Assessments  Quiz  Test  Teacher created materials  Teacher created activities  Teacher Observation |

**Big Idea: Organisms interact with one another and with the environment in which they live.**   **Month: January**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enduring Understandings** | **Essential Questions** | **Skills** | **Standards** | **Recommended Assessments** |
| Continual input of energy from sunlight keeps matter and energy flowing through ecosystems.  Each recombination of matter and energy results in storage and dissipation of energy into the environment as heat.  As matter cycles and energy flows through different levels of organization chemical elements are recombined into different products.  Biological communities in ecosystems are based on stable interrelationships and interdependence of organisms.  Stability in an ecosystem can be disrupted by natural or human interactions. | How do we study life?  What is driving the flow of matter and energy through ecosystems?  Why is the cycling of energy and matter important to life on earth?  How are biological communities structured to ensure their stability through time?  Vocabulary:  Biosphere, species, population, community, ecology, ecosystem, biome, biotic factor, abiotic factor, herbivore, carnivore, scavenger, producer | Reflect on and revise observations as new evidence emerges  Apply data representations and new models to revise predictions and explanations  Engage in multiple forms of discussion in order to process, make sense of, and learn from others’ ideas, observations, and experiences  Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams  Cite evidence that the transfer and transformation of matter and energy links organisms to one another and to their physical setting.  Apply mathematical formulas to justify the concept of an efficient diet.  Predict what would happen to an ecosystem if an energy source was removed.  Analyze the interrelationships and interdependencies among different organisms, and explain how these relationships contribute to the stability of the ecosystem  Model how natural and human-made changes in the environment will affect individual organisms and the dynamics of populations. | 5.1.12.C.1 Refinements of understandings, explanations, and models occurs as new evidence is incorporated  5.1.12.C.2 Data and refined models are used to revise predictions and explanations  5.1.12.D.1 Science involves practicing productive social interaction with peers, such as partner talk, whole group discussions, and small group work  5.1.12.D.2 Science involves using language, both oral and written, as a tool for making thinking public  5.3.12.B.1 As matter cycles and energy flows through different levels of organization within living systems (cells, organs, organisms, communities), and between living systems and the physical environment, chemical elements are recombined into different products  5.3.12. B.2 Each recombination of matter and energy results in storage and dissipation of energy into the environment as heat.  5.3.12.B.3 Continual input of energy from sunlight keeps matter and energy flowing through ecosystems  5.3.12.C.1 Biological communities in ecosystems are based on stable interrelationships and interdependence of organisms  5.3.12.C.2 Stability in an ecosystem can be disrupted by natural or human interactions | Pre/Post Tests  Energy Transfer Activity  Nutrient Cycle Activities  Food Web Activity  Human Environmental Impact Project  Formative Assessments  Do Now’s  Exit Passes  Group Work  Summative Assessments  Quiz  Test  Teacher created materials  Teacher created activities  Teacher Observation |

**Big Idea: Living systems store, retrieve, transmit, and respond to information essential to life processes. Month: February**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enduring Understandings** | **Essential Questions** | **Skills** | **Standards** | **Recommended Assessments** |
| Living systems, from the organism to the cellular level, demonstrate the complementary nature of structure and function.  DNA contains the instructions for building the necessary materials that cells require for survival.  Changes in DNA lead to changes in traits that sometimes result in disease. | How is genetic information stored and how is it used to build proteins?  How is genetic information passed from one generation to the next?  How do changes in genetic information affect organisms?  Vocabulary: nucleic acids, DNA, RNA, nucleotides, replication, protein synthesis, transcription, translation, mutation | Apply scientific principles and theories to build and refine standards for data collection, posing controls, and presenting evidence  Reflect on and revise observations as new evidence emerges  Apply data representations and new models to revise predictions and explanations  Engage in multiple forms of discussion in order to process, make sense of, and learn from others’ ideas, observations, and experiences  Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams  Represent and explain the relationship between the structure and function of each class of complex molecules using a variety of models  Explain the value and potential applications of genome projects.  Predict the potential impact on an organism (no impact, significant impact) given a change in a specific DNA code, and provide specific real world examples of conditions caused by mutations.  Account for the appearance of a novel trait that arose in a given population. | 5.1.12.A.3 Revisions of predictions and explanations are based on systematic observations, accurate measurements, and structured data/evidence  5.1.12.C.1 Refinements of understandings, explanations, and models occurs as new evidence is incorporated  5.1.12.C.2 Data and refined models are used to revise predictions and explanations  5.1.12.D.1 Science involves practicing productive social interaction with peers, such as partner talk, whole group discussions, and small group work  5.1.12.D.2 Science involves using language, both oral and written, as a tool for making thinking public  5.3.12.A.1 Cells are made of complex molecules that consist mostly of a few elements. Each class of molecules has its own building blocks and specific functions.  5.3.12.D.1 Genes are segments of DNA molecules located into the chromosome of each cell. DNA molecules contain information that determines a sequence of amino acids, which result in specific proteins  5.3.12.D.2 Inserting, deleting, or substituting DNA segments can alter the genetic code. An altered gene may be passed on to every cell that develops from it. The resulting features may help, harm, or have little or no effect on the offspring’s success in its environment  5.3.12.E.1 New traits may result from new combinations of existing genes or from mutations of genes in reproductive cells within a population | Pre/post tests  DNA model building and replication lab  Constructing a model for protein synthesis lab  Formative assessments  Do nows  Class discussions  Exit passes  Summative assessments  Quizzes  Test  Teacher created activities  Teacher observation |

**Big Idea: Organisms reproduce, develop, and have predictable life cycles Month: March**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enduring Understandings** | **Essential Questions** | **Skills** | **Standards** | **Recommended Assessments** |
| Cells divide through the process of mitosis, resulting in daughter cells that have the same genetic composition as the original cell.  Cell differentiation is regulated through the expression of different genes during the development of complex multicellular organisms.  Sorting and recombination of genes in sexual reproduction result in a great variety of possible gene combinations in the offspring of any two parents.  New traits may result from new combinations of existing genes or from mutations of genes in reproductive cells within a population. | How do organisms grow and repair tissue?  How do cells differentiate into different cell types?  What are organs? How do they develop? What are organ systems and how do they work together to form a multicellular organism?  How does sexual reproduction produce more diversity within a population?  How do new traits affect an organism and a population?  Vocabulary:  Cell division, mutation, chromosome, cytokinesis, prophase, metaphase, anaphase, telophase | Reflect on and revise observations as new evidence emerges  Apply data representations and new models to revise predictions and explanations  Distinguish between the processes of cellular growth and development.  Describe modern applications of the regulation of cell differentiation and analyze the benefits and risks.  Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions.  Predict the potential impact on an organism given a change in a specific DNA code, and provide specific real world examples of conditions caused by mutations.  Demonstrate through modeling how the sorting and recombination of genes during sexual reproduction has an effect on variation in offspring.  Account for the appearance of a novel trait that arose in a given population. | 5.1.12.C.1 Refinements of understandings, explanations, and models occurs as new evidence is incorporated  5.1.12.C.2 Data and refined models are used to revise predictions and explanations  5.3.12.A.4 Cells divide through the process of mitosis, resulting in daughter cells that have the same genetic composition as the original cell  5.3.12.A.5 Cell differentiation is regulated through expression of different genes during the development of complex multicellular organisms  5.3.12. A.6 There is a relationship between the organization of cells into tissues and the organization of tissues into organs.  The structures and functions of organs determine their relationships within body systems of an organism.  5.3.12. D.2 Inserting, deleting, or substituting DNA segments can alter the genetic code.  An altered gene may be passed on to every cell that develops from it. The resulting features may help, harm, or have little or no effect on the offspring’s success in its environment.  5.3.12.D.3 Sorting and recombining of genes in sexual reproduction result in a great variety of possible gene combinations in the offspring of any two parents  5.3.12.E.1 New traits may result from new combinations of existing genes or from mutations of genes in reproductive cells within a population | Pre/Post Tests  Mitosis Lab  Cell Specialization Activity  Biological Organization Activity  Organ System Project  Meiosis Lab  Genetic Mutation Activity  Formative Assessments  Do Now’s  Exit Passes  Group Work  Summative Assessments  Quiz  Test  Teacher created materials  Teacher created activities  Teacher Observation |

**Big Idea: Organisms contain genetic information that influence their traits, and they pass this onto their offspring during reproduction Month: April**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enduring Understandings** | **Essential Questions** | **Skills** | **Standards** | **Recommended Assessments** |
| Living systems, from the organism to the cellular level, demonstrate the complementary nature of structure and function.  DNA mutations that cause disease can be passed from one generation to the next.  There are predictable patterns of inheritance, and the variation that exists within a species is related to its mode of reproduction (sexual or asexual). | How does the structure of a molecule relate to its function in a living thing?  How is genetic information passed from one generation to the next?  How do changes in genetic information affect organisms?  Vocabulary: inheritance, dominance and recessives, genotype, phenotype, point, frameshift, and chromosomal mutations, meiosis, crossing-over, nondisjunction, | Account for the appearance of a novel trait that arose in a given population.  Reflect on and revise observations as new evidence emerges  Apply data representations and new models to revise predictions and explanations  Engage in multiple forms of discussion in order to process, make sense of, and learn from others’ ideas, observations, and experiences  Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams  Predict the potential impact on an organism given a change in a specific DNA code, and provide specific real world examples of conditions caused by mutations.  Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions.  Demonstrate through modeling how the sorting and recombination of genes during sexual reproduction has an effect on variation in offspring (meiosis, fertilization). | 5.1.12.A.1 Mathematical, physical, and computational tools are used to search for an explain core scientific concepts and principles  5.1.12.C.1 Refinements of understandings, explanations, and models occurs as new evidence is incorporated  5.1.12.C.2 Data and refined models are used to revise predictions and explanations  5.1.12.D.1 Science involves practicing productive social interaction with peers, such as partner talk, whole group discussions, and small group work  5.1.12.D.2 Science involves using language, both oral and written, as a tool for making thinking public  5.3.12.D.2 Inserting, deleting, or substituting DNA segments can alter the genetic code. An altered gene may be passed on to every cell that develops from it. The resulting features may help, harm, or have little or no effect on the offspring’s success in its environment  5.3.12.D.3 Sorting and recombining of genes in sexual reproduction result in a great variety of possible gene combinations in the offspring of any two parents  5.3.12.E.1 New traits may result from new combinations of existing genes or from mutations of genes in reproductive cells within a population | Pre/post tests  Punnett squares and pedigree analyses  Human genetic disorder project  Formative assessments  Do nows  Class discussions  Exit passes  Summative assessments  Quizzes  Test  Teacher created activities  Teacher observation |

**Big Idea: The development of technological applications for biology has resulted in advanced research and medicine Month: May**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enduring Understandings** | **Essential Questions** | **Skills** | **Standards** | **Recommended Assessments** |
| DNA is the universal code for life; it enables an organism to transmit hereditary information and, along with the environment, determines an organisms characteristics  Genetics are used to study human inheritance  Biotechnology is used to not only determine what the extent of the human genome is, but hot to identify and ultimately cure genetic disorders. | How do humans take advantage of naturally occurring variation among organisms?  How do scientists study and work with specific genes?  How do humans use genetic engineering?  What are the ethical issues raised by genetic engineering?  Vocabulary:  Selective breeding, hybridization, inbreeding, biotechnology, gene therapy, DNA fingerprinting, forensics, | Apply scientific principles and theories to build and refine standards for data collection, posing controls, and presenting evidence  Revise predictions and explanations using evidence, and connect explanations/arguments to established scientific knowledge, models, and theories  Reflect on and revise observations as new evidence emerges  Use data representations and new models to revise predictions and explanations  Engage in multiple forms of discussion in order to process, make sense of, and learn from others’ ideas, observations, and experiences  Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams  Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions  Explain the value and potential applications of genome projects  Provide a scientific explanation for the history of life on Earth using scientific evidence | 5.1.12.A.3 Revisions of predictions and explanations are based on systematic observations, accurate measurements, and structured data/evidence  5.1.12.B.3 Empirical evidence is used to construct and defend arguments  5.1.12.C.1 Refinements of understandings, explanations, and models occurs as new evidence is incorporated  5.1.12.C.2 Data and refined models are used to revise predictions and explanations  5.1.12.D.1 Science involves practicing productive social interaction with peers, such as partner talk, whole group discussions, and small group work  5.1.12.D.2 Science involves practicing productive social interactions with peers, such as partner talk, whole group discussions, and small group work  5.3.12. A.6 There is a relationship between the organization of cells into tissues and the organization of tissues into organs. The structures and functions of organs determine their relationships within body systems of an organism  5.3.12. D.1 Genes are segments of DNA molecules located into the chromosome of each cell. DNA molecules contain information that determines a sequence of amino acids, which result in specific proteins  5.3.12.E.2 Molecular evidence (e.g., DNA, protein structures, etc.) substantiates the anatomical evidence of evolution and provides additional detail about the sequence in which various lines of descent branches | Pre/Post Tests  Biotechnology project  Formative Assessments  Do Now’s  Exit Passes  Group Work  Summative Assessments  Quiz  Test  Teacher created materials  Teacher created activities  Teacher Observation |

**Big Idea: The process of evolution drives the diversity and unity of life. Month: June**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enduring Understandings** | **Essential Questions** | **Skills** | **Standards** | **Recommended Assessments** |
| The diversity and changing of life forms over many generations is the result of natural selection, in which organisms with advantageous traits survive, reproduce, and pass those traits to offspring . | What is natural selection and how is it different than artificial selection?  How can populations evolve to form new species?  What is the goal of biologists who classify living things?  Vocabulary:  Evolution, artificial selection, adaptation, fitness, natural selection, biogeography, homologous structure, analogous structure, vestigial structure | Apply data representations and new models to revise predictions and explanations  Predict the potential impact on an organism given a change in a specific DNA code, and provide specific real world examples of conditions caused by mutations  Demonstrate through modeling how the sorting and recombining of genes during sexual reproduction has an effect on variation in offspring  Account for the appearance of a novel trait that arose in a given population  Estimate how closely related species are, based on scientific evidence  Provide a scientific explanation for the history of life on Earth using scientific evidence  Account for the evolution of a species by citing specific evidence of biological mechanisms | 5.1.12.C.2 Data and refined models are used to revise predictions and explanations  5.3.12. D.2 Inserting, deleting, or substituting DNA segments can alter the genetic code. An altered gene may be passed on to every cell that develops from it. The resulting features may help, harm, or have little or no effect on the offspring’s success in its environment  5.3.12.D.3 Sorting and recombining of genes in sexual reproduction result in a great variety of possible gene combinations in the offspring of any two parents  5.3.12.E.1 New traits may result from new combinations of existing genes or from mutations of genes in reproductive cells within a population  5.3.12.E.2 Molecular evidence (e.g., DNA, protein structures, etc.) substantiates the anatomical evidence of evolution and provides additional detail about the sequence in which various lines of descent branches  5.3.12.E.3 The principles of evolution (including natural selection and common descent) provide a scientific explanation for the history of life on earth as evidenced in the fossil record and in the similarities that exist within the diversity of existing organisms  5.3.12.E.4 Evolution occurs as a result of a combination of the following factors: Ability of a species to reproduce, Genetic variability of offspring due to mutation and recombination of genes, Finite supply of the resources required for life. Natural selection, due to environmental pressure, of those organisms better able to survive and leave offspring | EOC practice word problem  Natural Selection lab  Pre/Post Tests  Homologous/analogous structures lab  Formative Assessments  Do Now’s  Exit Passes  Group Work  Summative Assessments  Quiz  Test  Teacher created materials  Teacher created activities  Teacher Observation |