

Topic	Standard	Priority	Essential Question
Science Process Skills & Laboratory Safety	1.1 Demonstrates proficiency in the use of science process skills in laboratory and/or field activities involving observation, classification, communication, metric measurement, prediction, inference, identifying variables, formulating hypotheses, controlling variables, making operational definitions, designing investigations, experimenting, collecting qualitative and/or quantitative data, constructing a data table, graphing, analyzing, and interpreting data and/or drawing conclusions.	E	<ol style="list-style-type: none"> 1. Upon reading a scientific research paper what are the steps of the scientific method used?/controls?/variables? 2. Upon reading a scientific research paper what is the quantitative and qualitative data collected?
Science Process Skills & Laboratory Safety	1.2 Produces written reports of laboratory and/or field activities in accepted formats and use precise language for presentations of procedure, tables of data, graphs, analytical methods, results, and analyses of errors.	E	<ol style="list-style-type: none"> 1. What are the appropriate procedures in writing scientific reports concerning laboratory and field research?
Science Process Skills & Laboratory Safety	1.3 Uses Laboratory equipment to conduct safe and accurate laboratory work.	E	<ol style="list-style-type: none"> 1. What type of laboratory equipment and safety guidelines would be used to study microscopic or macroscopic organisms?
Science Process Skills & Laboratory Safety	1.4 Demonstrates the proper care and use of the microscope and how to prepare slides.	E	<ol style="list-style-type: none"> 1. What are the correct procedures to prepare slides for microscopic viewing?
Research	2.1 Uses media resources such as print, audiovisual, and online services to find information.	E	<ol style="list-style-type: none"> 1. What past and present technological methods are used to research a basic scientific problem? 2. What type of media source would you use to look for the most recent information on a topic?
Nature of Biology	3.1 Defines biology and major divisions (e.g., botany and genetics)	E	<ol style="list-style-type: none"> 1. After reading several scientific articles from various sources, what branches of biology are used in each and why were they chosen.
Nature of Biology	3.2 Explains the use of biology in daily life.	E	<ol style="list-style-type: none"> 1. How is biology related to everyday life? (Such as going to a doctor, or genetic disease)
Cellular Biology (Structure)	4.1 Distinguishes between living and nonliving things (e.g., characteristics of living things).	E	<ol style="list-style-type: none"> 1. If you came upon a remote island how would you determine living from nonliving organisms?
Cellular Biology (Structure)	4.2 States the cell theory.	E	<ol style="list-style-type: none"> 1. How is the cell theory different from the atomic theory?
Cellular Biology (Structure)	4.3 Differentiates between prokaryotes and eukaryotes.	E	<ol style="list-style-type: none"> 1. How do you determine if a cell is a prokaryote or eukaryote?
Cellular Biology (Structure)	4.4 Identifies common cell organelles and describe the function of each (e.g., diagrams and microscopic examinations).	E	<ol style="list-style-type: none"> 1. Using diagrams or viewing slides using a microscope what are the common cell organelles and their function? 2. How is the structure of a living cell similar to an industry?
Cellular Biology (Structure)	4.5 Distinguishes between unicellular and multicellular organisms.	E	<ol style="list-style-type: none"> 1. How are unicellular and multicellular organisms similar?/different? 2. How would you determine if you were observing a unicellular or multicellular organism?

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Cellular Biology (Homeostasis)	5.1 Explains the role of homeostasis in maintaining life.	E	<ol style="list-style-type: none"> How do athletes exhibit homeostasis? For what was Gatorade designed?
Cellular Biology (Homeostasis)	5.2 Cites examples of homeostatic mechanisms in unicellular and multicellular organisms.	E	<ol style="list-style-type: none"> What is the role of kidneys in many invertebrates and vertebrate organisms?
Cellular Biology (Homeostasis)	5.3 Describes processes whereby substances enter and leave the cell (passive and active transport mechanisms)	E	<ol style="list-style-type: none"> Would an animal cell use passive or active transport to remove excess water? How would you compare and contrast active and passive transport?
Cellular Biology (Homeostasis)	5.4 Compares the reaction of plant and animal cells in solutions of different solute concentrations, (e.g., isotonic, hypotonic, and hypertonic solutions).	E	<ol style="list-style-type: none"> How does fertilizer affect the growth or death of plants? How would changing the environment of a fish from fresh water to saltwater affect its survival rate? Why is it so important to have the proper concentration of an “IV Drip” while you are in the hospital?
Biochemistry (Chemical Concepts)	6.1 Demonstrates an understanding of basic chemical principles, (e.g., phases of matter, atomic structure, bonding, acids, and bases).	E	<ol style="list-style-type: none"> How would changing the “pH” of your blood affect the function and role of enzymes?
Biochemistry (Chemical Concepts)	6.2 Identifies the elements of the earth’s atmosphere and crust that comprise living cells.	E	<ol style="list-style-type: none"> Which elements are found in all living cells?
Biochemistry (Chemical Concepts)	6.3 Explains the special role of water in living systems.	E	<ol style="list-style-type: none"> How do the unique properties of water affect living systems?
Biochemistry (Chemical Concepts)	6.4 Describes the four basic types of organic compounds (carbohydrates, lipids, proteins, and nucleic acids) and their functions in the cell.	E	<ol style="list-style-type: none"> How can you test for carbohydrates, lipids, proteins, and nucleic acids in a laboratory setting? If cells lack certain enzymatic proteins what happens to their ability to take care of chemical reactions?
Biochemistry (Photosynthesis & Respiration)	7.1 Diagrams and explains ATP-ADP cycle.	E	<ol style="list-style-type: none"> What is the relationship between ATP and ADP? Where does this cycle take place?
Biochemistry (Photosynthesis & Respiration)	7.2 Lists the reactants, products, and other requirements of photosynthesis.	E	<ol style="list-style-type: none"> What are the starting materials for photosynthesis? What are the products of photosynthesis? What conditions are necessary for photosynthesis?
Biochemistry (Photosynthesis & Respiration)	7.3 Lists the reactants, products, and other requirements of respiration.	E	<ol style="list-style-type: none"> What are the starting materials for respiration? What is produced in respiration? What conditions are necessary for respiration?
Biochemistry (Protein synthesis)	8.1 Describes the double-helix model of DNA.	E	<ol style="list-style-type: none"> How does the structure of DNA enable it to reproduce itself accurately? How is DNA similar to the Morse code/binary code/other secret codes?

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Biochemistry (Protein synthesis)	8.2 Summarizes the processes of replication, transcription, and translation.	E	<ol style="list-style-type: none"> 1. What is the relationship between replication, transcription, and translation? 2. How are videotape and a video machine similar to transcription and translation?
Genetics (Cell Division)	9.1 Identifies the phases of mitosis in cell division.	E	<ol style="list-style-type: none"> 1. What occurs in each step in the process of mitosis? 2. What is a good way to remember the steps of mitosis? (“IPMAT”)
Genetics (Cell Division)	9.2 Describes the process of cytokinesis.	E	<ol style="list-style-type: none"> 1. How does cytokinesis differ in plant and animal cells?
Genetics (Cell Division)	9.3 States the significance of mitosis to unicellular and multicellular organisms.	E	<ol style="list-style-type: none"> 1. Why is mitosis necessary for the continuation of life in unicellular and multicellular organisms? 2. What are the outcomes of mitosis in unicellular and multicellular organisms?
Genetics (Cell Division)	9.4 Compares meiosis in sperm and egg formation, (e.g., cell number, cell size, and chromosome number).	E	<ol style="list-style-type: none"> 1. How would you determine if a cell formed by meiosis is a sperm cell or an egg cell? 2. What is the main role of meiosis? 3. Why is it important that meiosis only produce half the number of chromosomes in sex cells?
Genetics (Mendelian Genetics)	10.1 Defines important genetic terms.	E	<ol style="list-style-type: none"> 1. How do the following terms differ: dominance and recessiveness, monohybrid and dihybrid crosses, genotype and phenotype, homozygous and heterozygous, law of independent assortment and law of segregation?
Genetics (Mendelian Genetics)	10.2 Given parental genotypes, predicts the phenotypic and genotypic probabilities of subsequent generations.	E	<ol style="list-style-type: none"> 1. What would be the phenotype and genetic probability of a cross between a heterozygous tall plant and homozygous recessive plant? (Tall is the dominant trait)
Genetics (Patterns of Inheritance)	11.1 Relates normal patterns of genetic inheritance to genetic variation (e.g., crossing over).	E	<ol style="list-style-type: none"> 1. How did you get red hair when your parents have blonde hair? 2. Unicellular organisms look exactly like their parents, why? 3. Why do we not look exactly like our parents?
Genetics (Patterns of Inheritance)	11.2 Relates abnormal patterns of genetic inheritance to genetic disorders and disease (i.e.nondisjunction).	E	<ol style="list-style-type: none"> 1. What are some common genetic disorders and how are they inherited? 2. As parents you do not have the genetic disorder of color-blindness but your son does, how is this possible?
Genetics (Patterns of Inheritance)	11.3 Lists significant contributions of genetic engineering to agricultural and medical practices.	E	<ol style="list-style-type: none"> 1. How has genetic engineering (biotechnology) improved agriculture and medicine? 2. How are bacteria being used to assist people with diabetes? 3. How does biotechnology use weakened viruses to cure genetic diseases such as cystic fibrosis?
Classification	13.1 Recognizes and uses the Linnaean system of nomenclature as an accepted system of classification.	E	<ol style="list-style-type: none"> 1. What are the seven levels of classification used in the Linnaean system of nomenclature? 2. How would you recognize the genus and species of living organism in a classification article you are reading?

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Classification	13.2 Uses a dichotomous key to classify a variety of living things based on structural similarities and differences in a laboratory setting.	E	<ol style="list-style-type: none"> Using a simple dichotomous key how would you classify several simple tree leaves? How is classification of living things similar to classification of materials in a grocery store?
Classification	13.3 Describes characteristics of organisms and identify examples of at least five (should be six) different kingdoms.	E	<ol style="list-style-type: none"> What are the similarities and differences among the six kingdoms of life? You are hiking in a forest and notice different types of ferns, mushrooms, salamanders, and birds—how do you know in which kingdom of classification they belong?
Classification	13.4 Identifies common examples of organisms in each of the kingdoms.	E	<ol style="list-style-type: none"> What organisms can be found in each kingdom of life? You are shopping in the grocery store and you are to select items from the plant, animal, and fungi kingdom—what would you buy?
Ecology (Ecosystems)	25.1 Identifies and explains the interactions of biotic and abiotic factors in an ecosystem.	E	<ol style="list-style-type: none"> What are the similarities and differences of abiotic and biotic factors? How would changing the acidity of rain affect the reproduction of frog eggs? How would the change in temperature affect the growth of mushrooms?
Ecology (Ecosystems)	25.2 Explains the components of a community (e.g., populations, species, niche, and habitat).	E	<ol style="list-style-type: none"> How would you differentiate between populations, species, niche, and habitat?
Ecology (Ecosystems)	25.3 Traces the flow of matter and energy through a food chain and food webs.	E	<ol style="list-style-type: none"> Which trophic level of a food chain has the most energy? How would removing the first consumer in the food chain affect the flow of energy?
Ecology (Ecosystems)	25.4 Describes changes that occur in an ecosystem (e.g., ecological succession).	E	<ol style="list-style-type: none"> How does ecological succession occur? After you read an article about the volcanic eruption of Mount St. Helen in the state of Washington, what changes would occur in the environment over a period of time?
Ecology (Ecosystems)	25.5 Uses the principles of population growth to describe how a population changes.	E	<ol style="list-style-type: none"> How does a population change? How would a smallpox epidemic affect the human population growth in a small remote African village? How would the increase food supply for deer affect its birth and death rate over a period of time? How has medical technology affected the population growth in the human race?
Diversity of Life (Viruses)	14.1 Describes the structure of viruses and the manner in which they infect living cells.	I	<ol style="list-style-type: none"> What are the components (parts) that make up a virus? How do viruses reproduce? How do viruses infect living cells?
Diversity of Life (Viruses)	14.2 Describes transmission, treatment, and possible prevention of specific viral diseases.	I	<ol style="list-style-type: none"> How are viruses prevented, transmitted, and treated?

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Diversity of Life (Kingdom Monera) (Archaeobacteria and Eubacteria)	15.1 Describes the cellular structure and the conditions necessary for growth and reproduction.	I	<ol style="list-style-type: none"> 1. What is the basic structure of a prokaryotic cell? 2. What conditions inhibit growth?
Diversity of Life (Kingdom Monera) (Archaeobacteria and Eubacteria)	15.2 Describes common diseases caused by bacteria and their treatments (e.g., streptococcal, infections, pneumonia).	I	<ol style="list-style-type: none"> 1. What are common illnesses caused by bacteria? 2. How do we treat bacterial infections?
Diversity of Life (Kingdom Monera) (Archaeobacteria and Eubacteria)	15.3 Describes methods of bacterial control in food preparation, handling, and storage.	I	<ol style="list-style-type: none"> 1. How do we prevent bacterial growth in food preparation, handling and storage?
Diversity of Life (Kingdom Monera) (Archaeobacteria and Eubacteria)	15.4 Lists beneficial effects of monerans.	I	<ol style="list-style-type: none"> 1. How are bacteria helpful to humans and/or our environment?
Diversity of Life (Kingdom Protista)	16.1 Compares the phyla of protozoa.	I	<ol style="list-style-type: none"> 1. What are the major characteristics and structures of animal-like protists? 2. What are examples of animal-like protists?
Diversity of Life (Kingdom Protista)	16.2 Compares alga phyla and identify examples of each.	I	<ol style="list-style-type: none"> 1. What are the major characteristics and structures of plant-like protists? 2. What are examples of plant-like protists?
Diversity of Life (Kingdom Protista)	16.3 Describes the beneficial and harmful effects of protozoa and algae.	I	<ol style="list-style-type: none"> 1. How are protozoa and algae helpful and harmful?
Diversity Life (Kingdom Fungi)	17.1 Compares and identifies fungi phyla.	I	<ol style="list-style-type: none"> 1. How do the phyla in Kingdom Fungi differ?
Diversity of Life (Kingdom Fungi)	17.2 Explains the beneficial and harmful effects of fungi.	I	<ol style="list-style-type: none"> 1. How are fungi helpful and harmful?
Diversity of Life (Kingdom Planate: Spore Producers)	18.1 Identifies the structure for nonvascular and vascular spore producing plants.	I	<ol style="list-style-type: none"> 1. What are the different structures that make up nonvascular plants and vascular spore producing plants?
Diversity of Life (Kingdom Plantae: Spore Producers)	18.2 Describes the conditions necessary for growth and reproduction.	I	<ol style="list-style-type: none"> 1. What is necessary for plants to grow and reproduce?
Diversity of Life (Kingdom Plantae: Spore Producers)	18.3 Explains the life cycles of mosses and ferns.	I	<ol style="list-style-type: none"> 1. What are the similarities and differences between the life cycles of mosses and ferns?
Diversity of Life (Kingdom Plantae: Seed Producers)	19.1 Lists and describes distinguishing characteristics of gymnosperms and angiosperms.	I	<ol style="list-style-type: none"> 1. What are the similarities and differences between angiosperms and gymnosperms?

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Diversity of Life (Kingdom Plantae: Seed Producers)	19.2 Describes the structure and function of roots, stems, leaves, and flowers.	I	1. What is the structure and function of roots, stems, leaves, and flowers?
Diversity of Life (Kingdom Plantae: Seed Producers)	19.3. Explains the process of sexual and asexual plant reproduction (e.g., pollination, fertilization, germination).	I	1. How does a strawberry plant reproduce sexually and asexually?
Diversity of Life (Kingdom Plantae: Seed Producers)	19.4 Describes the importance of seed plants for food, medicine, and other products.	I	1. How are plants used by humans in agriculture, medicine, and industry?
Diversity of Life (Kingdom Animalia: Invertebrates)	20.1 Explains the classification of organisms within each phyla.	I	1. What is the genus and species of a sponge? 2. In what class would you find a leech?
Diversity of Life (Kingdom Animalia: Invertebrates)	20.2 Identifies major structures and their functions for common organisms in each phylum of invertebrates.	I	1. What physical structures do a honeybee and an earthworm have in common? 2. How are a honeybee and an earthworm different?
Diversity of Life (Kingdom Animalia: Invertebrates)	20.3 Describes the life processes of selected organisms in each phylum.	I	1. How is the lifecycle of a snail different from a jellyfish?
Diversity of Life (Kingdom Animalia: Invertebrates)	20.4 Evaluates the economic significance of certain invertebrates.	I	1. What are the pros and cons of harvesting invertebrates for food and manufacturing purposes?
Diversity of Life (Kingdom Animalia: Vertebrates)	21.1 Explains the taxonomy of each class of vertebrates.	I	1. To what family does a bear belong? 2. How many families are in the class vertebrate?
Diversity of Life (Kingdom Animalia: Vertebrates)	21.2 Identifies major structures and their functions for common organisms in each class of vertebrates.	I	1. How are the hearts of the fish, frog, snake, and bird different? 2. What structures are found only in mammals?
Diversity of Life (Kingdom Animalia: Vertebrates)	21.3 Describes the life processes of common organisms in each class of vertebrates (reproduction, response, nutrition, and behavior).	I	1. What is the difference between internal and external fertilization. 2. How does a fish obtain oxygen from the water?
Ecology (Biomes)	26.1 Locates the major biomes on a world map.	I	1. How are the tundra and taiga similar and different? 2. Where are each of the major biomes located? 3. If you were walking through an area with fields of tall grass, and buffalo, what biome are you in?

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Ecology (Biomes)	26.2 Compares the biotic and abiotic factors that distinguish the major biomes.	I	1. What are the biotic and abiotic factors of the rainforest? (Desert, temperate deciduous, coniferous, tundra, temperate grassland, tropical grassland)
Human Body (Organization)	22.1 Describes the basic function of each body system.	C	1. What is the function of each human body system?
Human Body (Organization)	22.2 Explains how the organ systems interact to maintain homeostasis.	C	1. How is the human body like a “well oiled” machine?
Human Body (Anatomy)	23.1 Identifies the organs and structural parts present in each system (e.g., circulatory: heart, arteries, veins, and capillaries).	C	1. How is the circulatory system like the water company?
Human Body (Anatomy)	23.2 Describes the basic structure of the major organ in each system (e.g., heart: chambers, valves; lungs: bronchi, bronchioles, and alveoli).	C	1. What are the basic structures of the major organs in each system?
Human Body (Physiology)	24.1 Identifies the function of each structural part in the human body system.	C	1. What is the relationship of the basic structural parts to each body system? (alveoli-to-lungs)
Human Body (Physiology)	24.2 Explains how the parts interrelate in a functioning system.	C	1. How are the structural parts of the human body interrelated?
Ecology (Environmental Issues)	27.1 Analyzes the possible causes of certain ecological problems (e.g., acid rain and pollution).	C	1. What is the cause of certain ecological problems such as acid rain, ozone depletion, global warming, etc.?
Ecology (Environmental Issues)	27.2 Identifies possible solutions to current ecological problems.	C	1. What can humans do to reduce our pollution problem? 2. After reading an ecological scenario, what is the best possible solution to the problem?
Theory of Evolution (Origins of Life)	12.1 Explains historical and current theories of origins (e.g., Big Bang, evolution, and others).	C	1. What are differing viewpoints on how life may have begun on Earth? 2. What is the Big Bang Theory?
Theory of Evolution (Origins of Life)	12.2 Compares micro- and macro-evolution.	C	1. How are micro- and macro-evolution the same? 2. How are micro- and macro-evolution different? 3. What do homologous structures indicate?
Theory of Evolution (Origins of Life)	12.3 Explains natural selection and how it is affected by environmental changes.	C	1. How do environmental changes affect population frequencies? 2. What is industrial melanism? 3. What is natural selection?