

Texas Tutorials are designed specifically for the Texas Essential Knowledge and Skills (TEKS) to prepare students for the State of Texas Assessment of Academic Readiness (STAAR)® end-of-course assessments.

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Biology Tutorials offer targeted instruction, practice, and review designed to help students develop fluency, deepen conceptual understanding, and apply scientific thinking skills. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing their ability to explain and analyze biological scenarios, students build the depth of knowledge and higher-order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible through focused content, guided analysis, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high-impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

## Unit 1: Nature of Science

### • WHAT IS SCIENCE?

- B.2.A: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;
- B.2.C: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;

### • TYPES OF INVESTIGATIONS

- B.2.E: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;

- **USING MODELS**

- B.3.E: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. evaluate models according to their limitations in representing biological objects or events; and

## Unit 2: Measurement and Data

- **TOOLS AND MEASUREMENT**

- B.2.F: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as data-collecting probes, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, balances, gel electrophoresis apparatuses, micropipettes, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;

- **DISPLAYING AND INTERPRETING DATA**

- B.2.F: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as data-collecting probes, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, balances, gel electrophoresis apparatuses, micropipettes, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;

## Unit 3: Nature of Life

- **FROM ATOMS TO BIOSPHERE**

- B.10.C: Science concepts. The student knows that biological systems are composed of multiple levels. analyze the levels of organization in biological systems and relate the levels to each other and to the whole system.

- **CHARACTERISTICS OF LIFE**

- B.4.A: Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. compare and contrast prokaryotic and eukaryotic cells, including their complexity, and compare and contrast scientific explanations for cellular complexity;
- B.4.B: Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. investigate and explain cellular processes, including homeostasis and transport of molecules; and
- B.4.C: Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. compare the structures of viruses to cells, describe viral reproduction, and describe the role of viruses in causing diseases such as human immunodeficiency virus (HIV) and influenza.

- B.5.A: Science concepts. The student knows how an organism grows and the importance of cell differentiation. describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms;
- B.7.C: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze and evaluate how natural selection produces change in populations, not individuals;
- B.12.B: Science concepts. The student knows that interdependence and interactions occur within an environmental system. compare variations and adaptations of organisms in different ecosystems;

#### Unit 4: Chemistry of Life

- **BIOMOLECULES**

- B.6.A: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. identify components of DNA, identify how information for specifying the traits of an organism is carried in the DNA, and examine scientific explanations for the origin of DNA;
- B.9.A: Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. compare the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids;

- **ENZYMES**

- B.9.C: Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. identify and investigate the role of enzymes.

#### Unit 5: Cell Structure and Function

- **PROKARYOTIC AND EUKARYOTIC CELLS**

- B.3.F: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. research and describe the history of biology and contributions of scientists.
- B.4.A: Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. compare and contrast prokaryotic and eukaryotic cells, including their complexity, and compare and contrast scientific explanations for cellular complexity;
- B.4.B: Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. investigate and explain cellular processes, including homeostasis and transport of molecules; and

- **PLANT AND ANIMAL CELLS**

- B.4.A: Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. compare and contrast prokaryotic and eukaryotic cells, including their complexity, and compare and contrast scientific explanations for cellular complexity;

- B.4.B: Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. investigate and explain cellular processes, including homeostasis and transport of molecules; and

### Unit 6: Cell Membrane Structure and Function

- **PASSIVE TRANSPORT**

- B.4.B: Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. investigate and explain cellular processes, including homeostasis and transport of molecules; and

- **ACTIVE TRANSPORT**

- B.4.B: Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. investigate and explain cellular processes, including homeostasis and transport of molecules; and

### Unit 7: Cellular Energetics

- **PHOTOSYNTHESIS**

- B.9.B: Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. compare the reactants and products of photosynthesis and cellular respiration in terms of energy, energy conversions, and matter; and
- B.8.B: Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. categorize organisms using a hierarchical classification system based on similarities and differences shared among groups; and

- **CELLULAR RESPIRATION**

- B.9.B: Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. compare the reactants and products of photosynthesis and cellular respiration in terms of energy, energy conversions, and matter; and

### Unit 8: Cell Growth and Reproduction

- **THE CELL CYCLE**

- B.5.A: Science concepts. The student knows how an organism grows and the importance of cell differentiation. describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms;
- B.5.B: Science concepts. The student knows how an organism grows and the importance of cell differentiation. describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation; and
- B.5.C: Science concepts. The student knows how an organism grows and the importance of cell differentiation. recognize that disruptions of the cell cycle lead to diseases such as cancer.

- **MITOSIS**

- B.5.A: Science concepts. The student knows how an organism grows and the importance of cell differentiation. describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms;

### Unit 9: DNA Structure and Function

- **COMPONENTS OF DNA**

- B.6.A: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. identify components of DNA, identify how information for specifying the traits of an organism is carried in the DNA, and examine scientific explanations for the origin of DNA;
- B.6.B: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. recognize that components that make up the genetic code are common to all organisms;
- B.9.A: Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. compare the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids;
- B.5.B: Science concepts. The student knows how an organism grows and the importance of cell differentiation. describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation; and
- B.3.F: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. research and describe the history of biology and contributions of scientists.
- B.2.B: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories;

- **THE GENETIC CODE**

- B.5.B: Science concepts. The student knows how an organism grows and the importance of cell differentiation. describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation; and
- B.6.A: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. identify components of DNA, identify how information for specifying the traits of an organism is carried in the DNA, and examine scientific explanations for the origin of DNA;
- B.6.B: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. recognize that components that make up the genetic code are common to all organisms;

- B.6.D: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. recognize that gene expression is a regulated process;
- B.6.C: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. explain the purpose and process of transcription and translation using models of DNA and RNA;

## Unit 10: DNA Replication and Biotechnology

### • DNA REPLICATION

- B.5.A: Science concepts. The student knows how an organism grows and the importance of cell differentiation. describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms;
- B.6.C: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. explain the purpose and process of transcription and translation using models of DNA and RNA;
- B.3.D: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. evaluate the impact of scientific research on society and the environment;

### • BIOTECHNOLOGY

- B.3.D: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. evaluate the impact of scientific research on society and the environment;

## Unit 11: Gene Expression

### • TRANSCRIPTION

- B.6.A: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. identify components of DNA, identify how information for specifying the traits of an organism is carried in the DNA, and examine scientific explanations for the origin of DNA;
- B.6.C: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. explain the purpose and process of transcription and translation using models of DNA and RNA;
- B.9.A: Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. compare the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids;
- B.5.B: Science concepts. The student knows how an organism grows and the importance of cell differentiation. describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation; and

### • TRANSLATION

- B.5.B: Science concepts. The student knows how an organism grows and the importance of cell differentiation. describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation; and
- B.6.A: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. identify components of DNA, identify how information for specifying the traits of an organism is carried in the DNA, and examine scientific explanations for the origin of DNA;
- B.6.C: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. explain the purpose and process of transcription and translation using models of DNA and RNA;
- B.6.D: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. recognize that gene expression is a regulated process;

## Unit 12: Mutations

### • GENETIC CHANGES IN DNA

- B.6.E: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. identify and illustrate changes in DNA and evaluate the significance of these changes;
- B.7.F: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze other evolutionary mechanisms, including genetic drift, gene flow, mutation, and recombination.
- B.11.A: Science concepts. The student knows that biological systems work to achieve and maintain balance. summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems; and

### • GENETIC CHANGES IN CHROMOSOMES

- B.6.G: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. recognize the significance of meiosis to sexual reproduction.
- B.6.E: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. identify and illustrate changes in DNA and evaluate the significance of these changes;
- B.7.F: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze other evolutionary mechanisms, including genetic drift, gene flow, mutation, and recombination.

## Unit 13: Heredity

### • MENDELIAN LAWS OF HEREDITY

- B.3.F: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. research and describe the history of

biology and contributions of scientists.

- B.6.F: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses, and non-Mendelian inheritance; and
- B.6.G: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. recognize the significance of meiosis to sexual reproduction.
- B.2.G: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. analyze, evaluate, make inferences, and predict trends from data; and
- **MULTIPLE ALLELES AND ALLELES WITHOUT DOMINANCE**
- B.2.G: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. analyze, evaluate, make inferences, and predict trends from data; and
- B.6.F: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses, and non-Mendelian inheritance; and

## Unit 14: Reproduction

- **MEIOSIS**
- B.5.A: Science concepts. The student knows how an organism grows and the importance of cell differentiation. describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms;
- B.6.G: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. recognize the significance of meiosis to sexual reproduction.
- B.7.F: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze other evolutionary mechanisms, including genetic drift, gene flow, mutation, and recombination.
- **SEXUAL AND ASEXUAL REPRODUCTION**
- B.6.G: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. recognize the significance of meiosis to sexual reproduction.
- B.5.A: Science concepts. The student knows how an organism grows and the importance of cell differentiation. describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms;
- B.7.D: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze and evaluate how the elements of natural selection, including inherited



variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success;

### Unit 15: Evolution

- **MULTIPLE LINES OF EVIDENCE**

- B.2.C: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;
- B.7.A: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular, and developmental;
- B.7.B: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. examine scientific explanations of abrupt appearance and stasis in the fossil record;
- B.8.B: Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. categorize organisms using a hierarchical classification system based on similarities and differences shared among groups; and
- B.6.A: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. identify components of DNA, identify how information for specifying the traits of an organism is carried in the DNA, and examine scientific explanations for the origin of DNA;
- B.6.B: Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. recognize that components that make up the genetic code are common to all organisms;

- **THE FOSSIL RECORD**

- B.7.A: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular, and developmental;
- B.7.B: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. examine scientific explanations of abrupt appearance and stasis in the fossil record;

### Unit 16: Mechanisms of Evolution

- **NATURAL SELECTION**

- B.7.D: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze and evaluate how the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success;
- B.7.E: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze and evaluate the relationship of natural selection to adaptation and to the development of diversity in and among species; and
- B.12.B: Science concepts. The student knows that interdependence and interactions occur within an environmental system. compare variations and adaptations of organisms in different ecosystems;
- B.7.C: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze and evaluate how natural selection produces change in populations, not individuals;
- **EVOLUTION OF SPECIES**
  - B.7.E: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze and evaluate the relationship of natural selection to adaptation and to the development of diversity in and among species; and
  - B.7.F: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze other evolutionary mechanisms, including genetic drift, gene flow, mutation, and recombination.
  - B.7.A: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular, and developmental;
  - B.7.D: Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. analyze and evaluate how the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success;

## Unit 17: Classification

- **TAXONOMY**
  - B.8.A: Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community;
  - B.8.B: Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. categorize organisms using a hierarchical classification system based on similarities and differences shared among groups; and
  - B.8.C: Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. compare

characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals.

- **THE SIX KINGDOMS**

- B.8.A: Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community;
- B.8.B: Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. categorize organisms using a hierarchical classification system based on similarities and differences shared among groups; and
- B.8.C: Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. compare characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals.
- B.11.A: Science concepts. The student knows that biological systems work to achieve and maintain balance. summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems; and

## Unit 18: Homeostasis

- **HOMEOSTASIS AND DYNAMIC EQUILIBRIUM**

- B.4.B: Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. investigate and explain cellular processes, including homeostasis and transport of molecules; and
- B.10.A: Science concepts. The student knows that biological systems are composed of multiple levels. describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals;
- B.12.E: Science concepts. The student knows that interdependence and interactions occur within an environmental system. describe how environmental change can impact ecosystem stability.
- B.10.B: Science concepts. The student knows that biological systems are composed of multiple levels. describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants; and
- B.2.G: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. analyze, evaluate, make inferences, and predict trends from data; and

- **FEEDBACK MECHANISMS IN ANIMALS**

- B.10.A: Science concepts. The student knows that biological systems are composed of multiple levels. describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals;
- B.4.B: Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. investigate and explain cellular processes, including homeostasis and transport of molecules; and

## Unit 19: Functions of Animal Systems

- **THE IMMUNE AND LYMPHATIC SYSTEMS**

- B.10.A: Science concepts. The student knows that biological systems are composed of multiple levels. describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals;

- **THE NERVOUS SYSTEM**

- B.10.A: Science concepts. The student knows that biological systems are composed of multiple levels. describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals;

### Unit 20: Functions of Plant Systems

- **PLANT TISSUES**

- B.10.B: Science concepts. The student knows that biological systems are composed of multiple levels. describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants; and
- B.12.B: Science concepts. The student knows that interdependence and interactions occur within an environmental system. compare variations and adaptations of organisms in different ecosystems;

- **PLANT RESPONSES**

- B.10.B: Science concepts. The student knows that biological systems are composed of multiple levels. describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants; and

### Unit 21: Biogeochemical Cycles

- **THE CARBON CYCLE**

- B.12.D: Science concepts. The student knows that interdependence and interactions occur within an environmental system. describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles; and
- B.3.D: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. evaluate the impact of scientific research on society and the environment;
- B.12.E: Science concepts. The student knows that interdependence and interactions occur within an environmental system. describe how environmental change can impact ecosystem stability.

- **THE NITROGEN AND PHOSPHORUS CYCLES**

- B.12.D: Science concepts. The student knows that interdependence and interactions occur within an environmental system. describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles; and
- B.11.A: Science concepts. The student knows that biological systems work to achieve and maintain balance. summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems; and

- B.2.G: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. analyze, evaluate, make inferences, and predict trends from data; and
- B.3.D: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. evaluate the impact of scientific research on society and the environment;
- B.12.C: Science concepts. The student knows that interdependence and interactions occur within an environmental system. analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids;
- B.12.E: Science concepts. The student knows that interdependence and interactions occur within an environmental system. describe how environmental change can impact ecosystem stability.

## Unit 22: Ecology: Matter and Energy Flow

### • INTERACTIONS IN ECOSYSTEMS

- B.12.A: Science concepts. The student knows that interdependence and interactions occur within an environmental system. interpret relationships, including predation, parasitism, commensalism, mutualism, and competition, among organisms;

### • FOOD CHAINS AND WEBS

- B.11.A: Science concepts. The student knows that biological systems work to achieve and maintain balance. summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems; and
- B.12.A: Science concepts. The student knows that interdependence and interactions occur within an environmental system. interpret relationships, including predation, parasitism, commensalism, mutualism, and competition, among organisms;
- B.12.C: Science concepts. The student knows that interdependence and interactions occur within an environmental system. analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids;
- B.3.E: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. evaluate models according to their limitations in representing biological objects or events; and

### • PYRAMIDS OF ENERGY, NUMBERS, AND BIOMASS

- B.12.C: Science concepts. The student knows that interdependence and interactions occur within an environmental system. analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids;
- B.2.G: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. analyze, evaluate, make inferences, and predict trends from data; and
- B.3.E: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. evaluate models according to their limitations in representing biological objects or events; and

- B.3.D: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. evaluate the impact of scientific research on society and the environment;
- B.12.E: Science concepts. The student knows that interdependence and interactions occur within an environmental system. describe how environmental change can impact ecosystem stability.

### Unit 23: Ecology: Succession and Natural Impacts

- **SUCCESSION IN COMMUNITIES**

- B.11.B: Science concepts. The student knows that biological systems work to achieve and maintain balance. describe how events and processes that occur during ecological succession can change populations and species diversity.
- B.12.E: Science concepts. The student knows that interdependence and interactions occur within an environmental system. describe how environmental change can impact ecosystem stability.
- B.10.C: Science concepts. The student knows that biological systems are composed of multiple levels. analyze the levels of organization in biological systems and relate the levels to each other and to the whole system.

- **NATURAL IMPACTS ON ECOSYSTEMS**

- B.11.B: Science concepts. The student knows that biological systems work to achieve and maintain balance. describe how events and processes that occur during ecological succession can change populations and species diversity.
- B.12.E: Science concepts. The student knows that interdependence and interactions occur within an environmental system. describe how environmental change can impact ecosystem stability.
- B.2.G: Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. analyze, evaluate, make inferences, and predict trends from data; and
- B.3.D: Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. evaluate the impact of scientific research on society and the environment;