Texas Tutorials are designed specifically for the Texas Essential Knowledge and Skills (TEKS).

Science 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?**
  - 6.4.A: Scientific and engineering practices. The student knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. relate the impact of past and current research on scientific thought and society, including the process of science, cost-benefit analysis, and contributions of diverse scientists as related to the content;
  - 6.1.A: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. ask questions and define problems based on observations or information from text, phenomena, models, or investigations;
  - 6.1.H: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. distinguish between scientific hypotheses, theories, and laws.
- **TYPES OF INVESTIGATIONS**
  - 6.1.D: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. use appropriate tools such as graduated cylinders, metric rulers, periodic tables, balances, scales, thermometers, temperature probes, laboratory ware, timing devices, pH indicators,

hot plates, models, microscopes, slides, life science models, petri dishes, dissecting kits, magnets, spring scales or force sensors, tools that model wave behavior, satellite images, hand lenses, and lab notebooks or journals;

- 6.1.E: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. collect quantitative data using the International System of Units (SI) and qualitative data as evidence;
- 6.1.B: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems;
- 6.2.D: Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. evaluate experimental and engineering designs.
- 6.1.A: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. ask questions and define problems based on observations or information from text, phenomena, models, or investigations;

- **USING MODELS**
  - 6.2.A: Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. identify advantages and limitations of models such as their size, scale, properties, and materials;
  - 6.1.G: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and
  - 6.2.C: Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. use mathematical calculations to assess quantitative relationships in data; and
  - 6.5.C: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. analyze how differences in scale, proportion, or quantity affect a system's structure or performance;

Unit 2: Measurement and Data

- **TOOLS AND MEASUREMENT**

- 6.1.D: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. use appropriate tools such as graduated cylinders, metric rulers, periodic tables, balances, scales, thermometers, temperature probes, laboratory ware, timing devices, pH indicators, hot plates, models, microscopes, slides, life science models, petri dishes, dissecting kits, magnets, spring scales or force sensors, tools that model wave behavior, satellite images, hand lenses, and lab notebooks or journals;
- 6.1.E: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. collect quantitative data using the International System of Units (SI) and qualitative data as evidence;
- 6.2.C: Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. use mathematical calculations to assess quantitative relationships in data; and
- 6.1.D: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. use appropriate tools such as graduated cylinders, metric rulers, periodic tables, balances, scales, thermometers, temperature probes, laboratory ware, timing devices, pH indicators, hot plates, models, microscopes, slides, life science models, petri dishes, dissecting kits, magnets, spring scales or force sensors, tools that model wave behavior, satellite images, hand lenses, and lab notebooks or journals;
- 6.1.E: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. collect quantitative data using the International System of Units (SI) and qualitative data as evidence;

- **DISPLAYING AND INTERPRETING DATA**
  - 6.1.E: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. collect quantitative data using the International System of Units (SI) and qualitative data as evidence;
  - 6.1.F: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. construct appropriate tables, graphs, maps, and charts using repeated trials and means to organize data;

- 6.2.B: Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. analyze data by identifying any significant descriptive statistical features, patterns, sources of error, or limitations;

Unit 3: Nature of Matter

- **WHAT IS MATTER?**
  - 6.5.B: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;
  - 6.6.B: Matter and energy. The student knows that matter is made of atoms, can be classified according to its properties, and can undergo changes. investigate the physical properties of matter to distinguish between pure substances, homogeneous mixtures (solutions), and heterogeneous mixtures;
- **THE PERIODIC TABLE**
  - 6.1.D: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. use appropriate tools such as graduated cylinders, metric rulers, periodic tables, balances, scales, thermometers, temperature probes, laboratory ware, timing devices, pH indicators, hot plates, models, microscopes, slides, life science models, petri dishes, dissecting kits, magnets, spring scales or force sensors, tools that model wave behavior, satellite images, hand lenses, and lab notebooks or journals;
  - 6.5.A: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. identify and apply patterns to understand and connect scientific phenomena or to design solutions;
  - 6.6.C: Matter and energy. The student knows that matter is made of atoms, can be classified according to its properties, and can undergo changes. identify elements on the periodic table as metals, nonmetals, metalloids, and rare Earth elements based on their physical properties and importance to modern life;

Unit 4: Describing Matter

- **PROPERTIES OF MATTER**
  - 6.2.C: Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. use mathematical calculations to assess quantitative relationships in data; and
  - 6.6.B: Matter and energy. The student knows that matter is made of atoms, can be classified according to its properties, and can undergo changes. investigate the physical properties of matter to distinguish between pure substances, homogeneous mixtures (solutions), and heterogeneous mixtures;

- 6.6.D: Matter and energy. The student knows that matter is made of atoms, can be classified according to its properties, and can undergo changes. compare the density of substances relative to various fluids; and

- **SOLIDS, LIQUIDS, AND GASES**
  - 6.6.A: Matter and energy. The student knows that matter is made of atoms, can be classified according to its properties, and can undergo changes. compare solids, liquids, and gases in terms of their structure, shape, volume, and kinetic energy of atoms and molecules;
  - 6.5.B: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;
  - 6.3.A: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;
- **PHYSICAL AND CHEMICAL CHANGES**
  - 6.6.E: Matter and energy. The student knows that matter is made of atoms, can be classified according to its properties, and can undergo changes. identify the formation of a new substance by using the evidence of a possible chemical change, including production of a gas, change in thermal energy, production of a precipitate, and color change.
  - 6.5.B: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;

Unit 5: Forces

- **DESCRIBING FORCES**
  - 6.7.A: Force, motion, and energy. The student knows the nature of forces and their role in systems that experience stability or change. identify and explain how forces act on objects, including gravity, friction, magnetism, applied forces, and normal forces, using real-world applications;
  - 6.7.C: Force, motion, and energy. The student knows the nature of forces and their role in systems that experience stability or change. identify simultaneous force pairs that are equal in magnitude and opposite in direction that result from the interactions between objects using Newton's Third Law of Motion.
  - 6.3.B: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and
  - 6.3.A: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;
  - 6.2.C: Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop

evidence-based arguments or evaluate designs. use mathematical calculations to assess quantitative relationships in data; and

- 6.7.B: Force, motion, and energy. The student knows the nature of forces and their role in systems that experience stability or change. calculate the net force on an object in a horizontal or vertical direction using diagrams and determine if the forces are balanced or unbalanced; and

- **EFFECTS OF FORCES**
  - 6.5.B: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;
  - 6.3.A: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;
  - 6.2.C: Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. use mathematical calculations to assess quantitative relationships in data; and
  - 6.7.A: Force, motion, and energy. The student knows the nature of forces and their role in systems that experience stability or change. identify and explain how forces act on objects, including gravity, friction, magnetism, applied forces, and normal forces, using real-world applications;
  - 6.7.B: Force, motion, and energy. The student knows the nature of forces and their role in systems that experience stability or change. calculate the net force on an object in a horizontal or vertical direction using diagrams and determine if the forces are balanced or unbalanced; and
- **GRAVITATIONAL FORCE**
  - 6.3.C: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.
  - 6.3.A: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;
  - 6.5.B: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;
  - 6.7.A: Force, motion, and energy. The student knows the nature of forces and their role in systems that experience stability or change. identify and explain how forces act on objects, including gravity, friction, magnetism, applied forces, and normal forces, using real-world applications;

Unit 6: Energy

- **DESCRIBING ENERGY**

- 6.8.A: Force, motion, and energy. The student knows that the total energy in systems is conserved through energy transfers and transformations. compare and contrast gravitational, elastic, and chemical potential energies with kinetic energy;

- **ENERGY TRANSFER AND TRANSFORMATION**
  - 6.5.G: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.
  - 6.5.B: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;
  - 6.5.E: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems;
  - 6.8.B: Force, motion, and energy. The student knows that the total energy in systems is conserved through energy transfers and transformations. describe how energy is conserved through transfers and transformations in systems such as electrical circuits, food webs, amusement park rides, or photosynthesis; and
- **MECHANICAL WAVES**
  - 6.8.C: Force, motion, and energy. The student knows that the total energy in systems is conserved through energy transfers and transformations. explain how energy is transferred through transverse and longitudinal waves.

Unit 7: Earth and Space Systems

- **THE EARTH SYSTEM**
  - 6.10.A: Earth and space. The student understands the rock cycle and the structure of Earth. differentiate between the biosphere, hydrosphere, atmosphere, and geosphere and identify components of each system;
  - 6.1.G: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and
  - 6.10.B: Earth and space. The student understands the rock cycle and the structure of Earth. model and describe the layers of Earth, including the inner core, outer core, mantle, and crust; and
  - 6.5.E: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems;

- 6.5.D: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. examine and model the parts of a system and their interdependence in the function of the system;
- 6.3.A: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;

- **SUN-EARTH-MOON SYSTEM**
  - 6.1.G: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and
  - 6.5.B: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;
  - 6.1.G: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and
  - 6.9.A: Earth and space. The student models the cyclical movements of the Sun, Earth, and Moon and describes their effects. model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons; and
  - 6.9.B: Earth and space. The student models the cyclical movements of the Sun, Earth, and Moon and describes their effects. describe and predict how the positions of the Earth, Sun, and Moon cause daily, spring, and neap cycles of ocean tides due to gravitational forces.

Unit 8: The Rock Cycle

- **THE ROCK CYCLE**
  - 6.5.G: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.
  - 6.5.E: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems;
  - 6.1.G: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools

and models. develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and

- 6.10.C: Earth and space. The student understands the rock cycle and the structure of Earth. describe how metamorphic, igneous, and sedimentary rocks form and change through geologic processes in the rock cycle.

- **SOIL**
  - 6.1.B: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems;
  - 6.1.G: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and
  - 6.3.A: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;
  - 6.5.A: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. identify and apply patterns to understand and connect scientific phenomena or to design solutions;
  - 6.12.A: Organisms and environments. The student knows that interdependence occurs between living systems and the environment. investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as availability of light and water, range of temperatures, or soil composition;
  - 6.11.B: Earth and space. The student understands how resources are managed. explain how conservation, increased efficiency, and technology can help manage air, water, soil, and energy resources.

Unit 9: Humans and Earth's Resources

- **NATURAL RESOURCES**
  - 6.11.A: Earth and space. The student understands how resources are managed. research and describe why resource management is important in reducing global energy, poverty, malnutrition, and air and water pollution, and
  - 6.11.B: Earth and space. The student understands how resources are managed. explain how conservation, increased efficiency, and technology can help manage air, water, soil, and energy resources.
  - 6.1.D: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field

investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. use appropriate tools such as graduated cylinders, metric rulers, periodic tables, balances, scales, thermometers, temperature probes, laboratory ware, timing devices, pH indicators, hot plates, models, microscopes, slides, life science models, petri dishes, dissecting kits, magnets, spring scales or force sensors, tools that model wave behavior, satellite images, hand lenses, and lab notebooks or journals;

- 6.8.B: Force, motion, and energy. The student knows that the total energy in systems is conserved through energy transfers and transformations. describe how energy is conserved through transfers and transformations in systems such as electrical circuits, food webs, amusement park rides, or photosynthesis; and
- 6.5.E: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems;
- 6.3.A: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;

- **IMPACTS OF HUMANS**
  - 6.5.B: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;
  - 6.3.B: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and
  - 6.3.A: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;
  - 6.1.G: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and
  - 6.11.A: Earth and space. The student understands how resources are managed. research and describe why resource management is important in reducing global energy, poverty, malnutrition, and air and water pollution, and
  - 6.11.B: Earth and space. The student understands how resources are managed. explain how conservation, increased efficiency, and technology can help manage air, water, soil, and energy resources.

- 6.2.D: Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. evaluate experimental and engineering designs.

Unit 10: Characteristics of Life and Cells

- **CHARACTERISTICS OF LIFE**
  - 6.13.B: Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic; and
  - 6.5.G: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.
  - 6.13.C: Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. describe how variations within a population can be an advantage or disadvantage to the survival of a population as environments change.
- **CELL STRUCTURE**
  - 6.1.D: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. use appropriate tools such as graduated cylinders, metric rulers, periodic tables, balances, scales, thermometers, temperature probes, laboratory ware, timing devices, pH indicators, hot plates, models, microscopes, slides, life science models, petri dishes, dissecting kits, magnets, spring scales or force sensors, tools that model wave behavior, satellite images, hand lenses, and lab notebooks or journals;
  - 6.13.A: Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function;
  - 6.13.B: Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic; and
  - 6.5.F: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. analyze and explain the complementary relationship between the structure and function of objects, organisms, and systems; and

Unit 11: Ecosystems

- **CHARACTERISTICS OF ECOSYSTEMS**

- 6.12.C: Organisms and environments. The student knows that interdependence occurs between living systems and the environment. describe the hierarchical organization of organism, population, and community within an ecosystem.
- 6.5.G: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.
- 6.3.C: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.
- 6.5.B: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;
- 6.3.B: Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and
- 6.12.A: Organisms and environments. The student knows that interdependence occurs between living systems and the environment. investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as availability of light and water, range of temperatures, or soil composition;

- **INTERACTIONS IN ECOSYSTEMS**
  - 6.12.A: Organisms and environments. The student knows that interdependence occurs between living systems and the environment. investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as availability of light and water, range of temperatures, or soil composition;
  - 6.12.B: Organisms and environments. The student knows that interdependence occurs between living systems and the environment. describe and give examples of predatory, competitive, and symbiotic relationships between organisms, including mutualism, parasitism, and commensalism; and
  - 6.1.G: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and
  - 6.5.D: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. examine and model the parts of a system and their interdependence in the function of the system;
  - 6.5.E: Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems;

- 6.1.G: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and
- 6.1.G: Scientific and engineering practices. The student, for at least 40 of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and

- **NATURAL SELECTION**
  - 6.13.C: Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. describe how variations within a population can be an advantage or disadvantage to the survival of a population as environments change.