

# EARTH SCIENCE TEKS BEGINNING 2010 ELEMENTARY

## Science, Kindergarten

### Introduction.

(1) Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process."

(2) Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include patterns, cycles, systems, models, and change and constancy.

(3) The study of elementary science includes planning and safely implementing classroom and outdoor investigations using scientific processes, including inquiry methods, analyzing information, making informed decisions, and using tools to collect and record information, while addressing the major concepts and vocabulary, in the context of physical, earth, and life sciences. Districts are encouraged to facilitate classroom and outdoor investigations for at least 80% of instructional time.

(4) In Kindergarten, students observe and describe the natural world using their five senses. Students do science as inquiry in order to develop and enrich their abilities to understand scientific concepts and processes. Students develop vocabulary through their experiences investigating properties of common objects, earth materials, and organisms.

(A) A central theme throughout the study of scientific investigation and reasoning; matter and energy; force, motion, and energy; Earth and space; and organisms and environment is active engagement in asking questions, communicating ideas, and exploring with scientific tools. Scientific investigation and reasoning involves practicing safe procedures, asking questions about the natural world, and seeking answers to those questions through simple observations and descriptive investigations.

(B) Matter is described in terms of its physical properties, including relative size and mass, shape, color, and texture. The importance of light, heat, and sound energy is identified as it relates to the students' everyday life. The location and motion of objects are explored.

**(C) Weather is recorded and discussed on a daily basis so students may begin to recognize patterns in the weather. Other patterns are observed in the appearance of objects in the sky.**

### b) Knowledge and skills.

(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures and uses environmentally appropriate and responsible practices. The student is expected to:

C) demonstrate how to use, conserve, and dispose of natural resources and materials such as conserving water and reusing or recycling paper, plastic, and metal

2) Scientific investigation and reasoning. The student develops abilities to ask questions and seek answers in classroom and outdoor investigations.

3) Scientific investigation and reasoning. The student knows that information and critical thinking are used in scientific problem solving.

(4) Scientific investigation and reasoning. The student uses age-appropriate tools and models to investigate the natural world.

(5) Matter and energy. The student knows that objects have properties and patterns

(6) Force, motion, and energy. The student knows that energy, force, and motion are related and are a part of their everyday life

**(7) Earth and space. The student knows that the natural world includes earth materials. The student is expected to:**

**(A) observe, describe, compare, and sort rocks by size, shape, color, and texture;**

**(B) observe and describe physical properties of natural sources of water, including color and clarity; and**

**(C) give examples of ways rocks, soil, and water are useful.**

**(8) Earth and space. The student knows that there are recognizable patterns in the natural world and among objects in the sky. The student is expected to:**

**(A) observe and describe weather changes from day to day and over seasons;**

**(B) identify events that have repeating patterns, including seasons of the year and day and night; and**

**(C) observe, describe, and illustrate objects in the sky such as the clouds, Moon, and stars, including the Sun.**

(9) Organisms and environments. The student knows that plants and animals have basic needs and depend on the living and nonliving things around them for survival.

(10) Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them survive within their environments.

## §112.12. Science, Grade 1,

Introduction same as kindergarten

b) Knowledge and skills.

(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures and uses environmentally appropriate and responsible practices.

(2) Scientific investigation and reasoning. The student develops abilities to ask questions and seek answers in classroom and outdoor investigations.

(3) Scientific investigation and reasoning. The student knows that information and critical thinking are used in scientific problem solving

(4) Scientific investigation and reasoning. The student uses age-appropriate tools and models to investigate the natural world.

(5) Matter and energy. The student knows that objects have properties and patterns

(6) Force, motion, and energy. The student knows that force, motion, and energy are related and are a part of everyday life.

**(7) Earth and space. The student knows that the natural world includes rocks, soil, and water that can be observed in cycles, patterns, and systems. The student is expected to:**

**(A) observe, compare, describe, and sort components of soil by size, texture, and color;**

**(B) identify and describe a variety of natural sources of water, including streams, lakes, and oceans; and**

**(C) gather evidence of how rocks, soil, and water help to make useful products.**

**(8) Earth and space. The student knows that the natural world includes the air around us and objects in the sky. The student is expected to:**

**(A) record weather information, including relative temperature, such as hot or cold, clear or cloudy, calm or windy, and rainy or icy;**

**(B) observe and record changes in the appearance of objects in the sky such as clouds, the Moon, and stars, including the Sun;**

**(C) identify characteristics of the seasons of the year and day and night; and**

**(D) demonstrate that air is all around us and observe that wind is moving air.**

(9) Organisms and environments. The student knows that the living environment is composed of relationships between organisms and the life cycles that occur.

(10) Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them survive within their environments.

## §112.13. Science, Grade 2

### Introduction

1-3 remain basically the same. Lab time is reduced to 60%

(4) In Grade 2, careful observation and investigation are used to learn about the natural world and reveal patterns, changes, and cycles. Students should understand that certain types of questions can be answered by using observation and investigations and that the information gathered in these may change as new observations are made. As students participate in investigation, they develop the skills necessary to do science as well as develop new science concepts.

(A) Within the physical environment, students expand their understanding of the properties of objects such as shape, mass, temperature, and flexibility then use those properties to compare, classify, and then combine the objects to do something that they could not do before. Students manipulate objects to demonstrate a change in motion and position.

(B) Within the natural environment, students will observe the properties of earth materials as well as predictable patterns that occur on Earth and in the sky. The students understand that those patterns are used to make choices in clothing, activities, and transportation.

(C) Within the living environment, students explore patterns, systems, and cycles by investigating characteristics of organisms, life cycles, and interactions among all the components within their habitat. Students examine how living organisms depend on each other and on their environment.

(b) Knowledge and skills.

(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures.

(2) Scientific investigation and reasoning. The student develops abilities necessary to do scientific inquiry in classroom and outdoor investigations

(3) Scientific investigation and reasoning. The student knows that information and critical thinking, scientific problem solving, and the contributions of scientists are used in making decisions

(4) Scientific investigation and reasoning. The student uses age-appropriate tools and models to investigate the natural world.

(5) Matter and energy. The student knows that matter has physical properties and those properties determine how it is described, classified, changed, and used.

(6) Force, motion, and energy. The student knows that forces cause change and energy exists in many forms

**(7) Earth and space. The student knows that the natural world includes earth materials. The student is expected to:**

**(A) observe and describe rocks by size, texture, and color;**

**(B) identify and compare the properties of natural sources of freshwater and saltwater; and**

**(C) distinguish between natural and manmade resources.**

**(8) Earth and space. The student knows that there are recognizable patterns in the natural world and among objects in the sky. The student is expected to:**

**(A) measure, record, and graph weather information, including temperature, wind conditions, precipitation, and cloud coverage, in order to identify patterns in the data;**

**(B) identify the importance of weather and seasonal information to make choices in clothing, activities, and transportation;**

**(C) explore the processes in the water cycle, including evaporation, condensation, and precipitation, as connected to weather conditions; and**

**(D) observe, describe, and record patterns of objects in the sky, including the appearance of the Moon.**

(9) Organisms and environments. The student knows that living organisms have basic needs that must be met for them to survive within their environment.

(10) Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them survive within their environments.

## 112.14. Science, Grade 3

(a) Introduction.

1-3 remain the same as 2<sup>nd</sup> grade

(4) In Grade 3, students learn that the study of science uses appropriate tools and safe practices in planning and implementing investigations, asking and answering questions, collecting data by observing and measuring, and by using models to support scientific inquiry about the natural world.

(A) Students recognize that patterns, relationships, and cycles exist in matter. Students will investigate the physical properties of matter and will learn that changes occur. They explore mixtures and investigate light, sound, and heat/thermal energy in everyday life. Students manipulate objects by pushing and pulling to demonstrate changes in motion and position.

(B) Students investigate how the surface of Earth changes and provides resources that humans use. As students explore objects in the sky, they describe how relationships affect patterns and cycles on Earth. Students will construct models to demonstrate Sun, Earth, and Moon system relationships and will describe the Sun's role in the water cycle.

(C) Students explore patterns, systems, and cycles within environments by investigating characteristics of organisms, life cycles, and interactions among all components of the natural environment. Students examine how the environment plays a key role in survival. Students know that when changes in the environment occur organisms may thrive, become ill, or perish.

(b) Knowledge and skills.

(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following school and home safety procedures and environmentally appropriate practices.

(2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and outdoor investigations

(3) Scientific investigation and reasoning. The student knows that information, critical thinking, scientific problem solving, and the contributions of scientists are used in making decisions.

(4) Scientific investigation and reasoning. The student knows how to use a variety of tools and methods to conduct science inquiry

(5) Matter and energy. The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used.

(6) Force, motion, and energy. The student knows that forces cause change and that energy exists in many forms

**(7) Earth and space. The student knows that Earth consists of natural resources and its surface is constantly changing. The student is expected to:**

**(A) explore and record how soils are formed by weathering of rock and the decomposition of plant and animal remains;**

**(B) investigate rapid changes in Earth's surface such as volcanic eruptions, earthquakes, and landslides;**

**(C) identify and compare different landforms, including mountains, hills, valleys, and plains; and**

**(D) explore the characteristics of natural resources that make them useful in products and materials such as clothing and furniture and how resources may be conserved.**

**(8) Earth and space. The student knows there are recognizable patterns in the natural world and among objects in the sky. The student is expected to:**

**(A) observe, measure, record, and compare day-to-day weather changes in different locations at the same time that include air temperature, wind direction, and precipitation;**

**(B) describe and illustrate the Sun as a star composed of gases that provides light and heat energy for the water cycle;**

**(C) construct models that demonstrate the relationship of the Sun, Earth, and Moon, including orbits and positions; and**

**(D) identify the planets in Earth's solar system and their position in relation to the Sun.**

(9) Organisms and environments. The student knows that organisms have characteristics that help them survive and can describe patterns, cycles, systems, and relationships within the environments.

(10) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environments.

## **.112.15. Science, Grade 4**

### (a) Introduction

1-3 remain essentially the same. Lab time falls to 50% of the time.

(4) In Grade 4, investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations and that methods, models, and conclusions built from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.

(A) Within the natural environment, students know that earth materials have properties that are constantly changing due to Earth's forces. The students learn that the natural world consists of resources, including renewable and nonrenewable, and their responsibility to conserve our natural resources for future generations. They will also explore Sun, Earth, and Moon relationships. The students will recognize that our major source of energy is the Sun.

(B) Within the living environment, students know and understand that living organisms within an ecosystem interact with one another and with their environment. The students will recognize that plants and animals have basic needs, and they are met through a flow of energy known as food webs. Students will explore how all living organisms go through a life cycle and that adaptations enable organisms to survive in their ecosystem.

### (b) Knowledge and skills.

(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations, following home and school safety procedures and environmentally appropriate and ethical practices.

(2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and outdoor investigations.

**(3) Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions**

**(C) represent the natural world using models such as rivers, stream tables, or fossils and identify their limitations, including accuracy and size**

(4) Scientific investigation and reasoning. The student knows how to use a variety of tools, materials, equipment, and models to conduct science inquiry

(5) Matter and energy. The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used.

(6) Force, motion, and energy. The student knows that energy exists in many forms and can be observed in cycles, patterns, and systems

**(7) Earth and space. The students know that Earth consists of useful resources and its surface is constantly changing. The student is expected to:**

**(A) examine properties of soils, including color and texture, capacity to retain water, and ability to support the growth of plants;**

**(B) observe and identify slow changes to Earth's surface caused by weathering, erosion, and deposition from water, wind, and ice; and**

(C) identify and classify Earth's renewable resources, including air, plants, water, and animals; and nonrenewable resources, including coal, oil, and natural gas; and the importance of conservation.

(8) Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:

(A) measure and record changes in weather and make predictions using weather maps, weather symbols, and a map key;

(B) describe and illustrate the continuous movement of water above and on the surface of Earth through the water cycle and explain the role of the Sun as a major source of energy in this process; and

(C) collect and analyze data to identify sequences and predict patterns of change in shadows, tides, seasons, and the observable appearance of the Moon over time.

(9) Organisms and environments. The student knows and understands that living organisms within an ecosystem interact with one another and with their environment.

(10) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environment.

## §112.16. Science, Grade 5

### Introduction

1-3 remain the same as 4<sup>th</sup> grade.

(4) In Grade 5, investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations and that methods, models, and conclusions built from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.

(A) Within the physical environment, students learn about the physical properties of matter, including magnetism, physical states of matter, relative density, solubility in water, and the ability to conduct or insulate electrical and heat energy. Students explore the uses of light, thermal, electrical, and sound energies.

(B) Within the natural environment, students learn how changes occur on Earth's surface and that predictable patterns occur in the sky. Students learn that the natural world consists of resources, including nonrenewable, renewable, and alternative energy sources.

(C) Within the living environment, students learn that structure and function of organisms can improve the survival of members of a species. Students learn to differentiate between inherited traits and learned behaviors. Students learn that life cycles occur in animals and plants and that the carbon dioxide-oxygen cycle occurs naturally to support the living environment.

(b) Knowledge and skills.

(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures and environmentally appropriate and ethical practices.

(2) Scientific investigation and reasoning. The student uses scientific methods during laboratory and outdoor investigations

(3) Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions

(4) Scientific investigation and reasoning. The student knows how to use a variety of tools and methods to conduct science inquiry

(5) Matter and energy. The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used

(6) Force, motion, and energy. The student knows that energy occurs in many forms and can be observed in cycles, patterns, and systems

**(7) Earth and space. The student knows Earth's surface is constantly changing and consists of useful resources. The student is expected to:**

**(A) explore the processes that led to the formation of sedimentary rocks and fossil fuels;**

**(B) recognize how landforms such as deltas, canyons, and sand dunes are the result of changes to Earth's surface by wind, water, and ice;**

**(C) identify alternative energy resources such as wind, solar, hydroelectric, geothermal, and biofuels; and**

**(D) identify fossils as evidence of past living organisms and the nature of the environments at the time using models.**

**(8) Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:**

**(A) differentiate between weather and climate;**

**(B) explain how the Sun and the ocean interact in the water cycle;**

**(C) demonstrate that Earth rotates on its axis once approximately every 24 hours causing the day/night cycle and the apparent movement of the Sun across the sky; and**

**(D) identify and compare the physical characteristics of the Sun, Earth, and Moon.**

(9) Organisms and environments. The student knows that there are relationships, systems, and cycles within environments.

(10) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environments.

## MIDDLE SCHOOL

### 112.18. Science, Grade 6

#### (a) Introduction.

(1) Science, as defined by the National Academy of Science, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.

(2) Scientific 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 become theories. Scientific theories are based on natural and physical phenomena and are capable of being tested by multiple, independent researchers. Students should know that scientific theories, unlike hypotheses, are well-established and highly reliable, but they may still be subject to change as new information and technologies are developed. Students should be able to distinguish between scientific decision-making methods and ethical/social decisions that involve the application of scientific information.

(3) Grade 6 science is interdisciplinary in nature; however, much of the content focus is on physical science. National standards in science are organized as multi-grade blocks such as Grades 5-8 rather than individual grade levels. In order to follow the grade level format used in Texas, the various national standards are found among Grades 6, 7, and 8. Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include change and constancy, patterns, cycles, systems, models, and scale.

(4) The strands for Grade 6 include:

#### (A) Scientific investigations and reasoning.

(i) To develop a rich knowledge of science and the natural world, students must become familiar with different modes of scientific inquiry, rules of evidence, ways of formulating questions, ways of proposing explanations, and the diverse ways scientists study the natural world and propose explanations based on evidence derived from their work.

(ii) Scientific investigations are conducted for different reasons. All investigations require a research question, careful observations, data gathering, and analysis of the data to identify the patterns that will explain the findings. Descriptive investigations are used to explore new phenomena such as conducting surveys of organisms or measuring the abiotic components in a given habitat. Descriptive statistics include frequency, range, mean, median, and mode. A hypothesis is not required in a descriptive investigation. On the other hand, when conditions can be controlled in order to focus on a single variable, experimental research design is used to determine causation. Students should experience both types of investigations and understand that different scientific research questions require different research designs.

(iii) Scientific investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and the methods, models, and conclusions built from these investigations change as new observations are made. Models of objects and events are tools for understanding the

natural world and can show how systems work. Models have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world

(B) Matter and energy.

(i) Matter can be classified as elements, compounds, or mixtures. Students have already had experience with mixtures in Grade 5, so Grade 6 will concentrate on developing an understanding of elements and compounds. It is important that students learn the differences between elements and compounds based on observations, description of physical properties, and chemical reactions. Elements are represented by chemical symbols, while compounds are represented by chemical formulas. Subsequent grades will learn about the differences at the molecular and atomic level.

(ii) Elements are classified as metals, nonmetals, and metalloids based on

(i) Matter can be classified as elements, compounds, or mixtures. Students have already had experience with mixtures in Grade 5, so Grade 6 will concentrate on developing an understanding of elements and compounds. It is important that students learn the differences between elements and compounds based on observations, description of physical properties, and chemical reactions. Elements are represented by chemical symbols, while compounds are represented by chemical formulas. Subsequent grades will learn about the differences at the molecular and atomic level.

(ii) Elements are classified as metals, nonmetals, and metalloids based on their physical properties. The elements are divided into three groups on the Periodic Table. Each different substance usually has a different density, so density can be used as an identifying property. Therefore, calculating density aids classification of substances.

(iii) Energy resources are available on a renewable, nonrenewable, or indefinite basis. Understanding the origins and uses of these resources enables informed decision making. Students should consider the ethical/social issues surrounding Earth's natural energy resources, while looking at the advantages and disadvantages of their long-term uses.

(C) Force, motion, and energy. Energy occurs in two types, potential and kinetic, and can take several forms. Thermal energy can be transferred by conduction, convection, or radiation. It can also be changed from one form to another. Students will investigate the relationship between force and motion using a variety of means, including calculations and measurements.

(D) Earth and space. The focus of this strand is on introducing Earth's processes. Students should develop an understanding of Earth as part of our solar system. The topics include organization of our solar system, the role of gravity, and space exploration.

(E) Organisms and environments. Students will gain an understanding of the broadest taxonomic classifications of organisms and how characteristics determine their classification. The other major topics developed in this strand include the interdependence between organisms and their environments and the levels of organization within an ecosystem.

(b) Knowledge and skills.

(1) Scientific investigation and reasoning. The student, for at least 40% of instructional time, conducts laboratory and field investigations following safety procedures and environmentally appropriate and ethical practices

(2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and field investigations

**(3) Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists.**

**(B) use models to represent aspects of the natural world such as a model of Earth's layers;**

(4) Scientific investigation and reasoning. The student knows how to use a variety of tools and safety equipment to conduct science inquiry

**(5) Matter and energy. The student knows the differences between elements and compounds**

**(B) recognize that a limited number of the many known elements comprise the largest portion of solid Earth, living matter, oceans, and the atmosphere;**

**(6) Matter and energy. The student knows matter has physical properties that can be used for classification**

**(A) compare metals, nonmetals, and metalloids using physical properties such as luster, conductivity, or malleability;**

**(C) test the physical properties of minerals, including hardness, color, luster, and streak.**

**(7) Matter and energy. The student knows that some of Earth's energy resources are available on a nearly perpetual basis, while others can be renewed over a relatively short period of time. Some energy resources, once depleted, are essentially nonrenewable. The student is expected to:**

**(A) research and debate the advantages and disadvantages of using coal, oil, natural gas, nuclear power, biomass, wind, hydropower, geothermal, and solar resources; and**

**(B) design a logical plan to manage energy resources in the home, school, or community.**

(8) Force, motion, and energy. The student knows force and motion are related to potential and kinetic energy.

(9) Force, motion, and energy. The student knows that the Law of Conservation of Energy states that energy can neither be created nor destroyed, it just changes form.

**(10) Earth and space. The student understands the structure of Earth, the rock cycle, and plate tectonics. The student is expected to:**

**(A) build a model to illustrate the structural layers of Earth, including the inner core, outer core, mantle, crust, asthenosphere, and lithosphere;**

**(B) classify rocks as metamorphic, igneous, or sedimentary by the processes of their formation;**

**(C) identify the major tectonic plates, including Eurasian, African, Indo-Australian, Pacific, North American, and South American; and**

**(D) describe how plate tectonics causes major geological events such as ocean basins, earthquakes, volcanic eruptions, and mountain building.**

**(11) Earth and space. The student understands the organization of our solar system and the relationships among the various bodies that comprise it. The student is expected to:**

**(A) describe the physical properties, locations, and movements of the Sun, planets, Galilean moons, meteors, asteroids, and comets;**

**(B) understand that gravity is the force that governs the motion of our solar system; and**

**(C) describe the history and future of space exploration, including the types of equipment and transportation needed for space travel.**

**(12) Organisms and environments. The student knows all organisms are classified into Domains and Kingdoms.**

## 112.19. Science, Grade 7

### Introduction

1-3 remain virtually the same as 6<sup>th</sup> grade

4) The strands for Grade 7 include

(A) Scientific investigation and reasoning.

(B) Matter and energy

(C) Force, motion, and energy

(D) Earth and space. Earth and space phenomena can be observed in a variety of settings. Both natural events and human activities can impact Earth systems. There are characteristics of Earth and relationships to objects in our solar system that allow life to exist.

(E) Organisms and environments.

(b) Knowledge and skills.

(1) Scientific investigation and reasoning. The student, for at least 40% of the instructional time, conducts laboratory and field investigations following safety procedures and environmentally appropriate and ethical practices

(2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and field investigations.

(3) Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists.

(4) Science investigation and reasoning. The student knows how to use a variety of tools and safety equipment to conduct science inquiry.

(5) Matter and energy. The student knows that interactions occur between matter and energy

(6) Matter and energy. The student knows that matter has physical and chemical properties and can undergo physical and chemical changes

(7) Force, motion, and energy. The student knows that there is a relationship among force, motion, and energy.

8) Earth and space. The student knows that natural events and human activity can impact Earth systems. The student is expected to:

(A) predict and describe how different types of catastrophic events impact ecosystems such as floods, hurricanes, or tornadoes;

(B) analyze the effects of weathering, erosion, and deposition on the environment in ecoregions of Texas; and

(C) model the effects of human activity on groundwater and surface water in a watershed.

- (9) Earth and space. The student knows components of our solar system. The student is expected to:
- (A) analyze the characteristics of objects in our solar system that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere; and
  - (B) identify the accommodations, considering the characteristics of our solar system, that enabled manned space exploration
- (10) Organisms and environments. The student knows that there is a relationship between organisms and the environment
- (11) Organisms and environments. The student knows that populations and species demonstrate variation and inherit many of their unique traits through gradual processes over many generations.
- (12) Organisms and environments. The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function.
- (13) Organisms and environments. The student knows that a living organism must be able to maintain balance in stable internal conditions in response to external and internal stimuli.
- (14) Organisms and environments. The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material.

## **§112.20. Science, Grade 8**

### Introduction

1&2 remain the same

(3) Grade 8 science is interdisciplinary in nature; however, much of the content focus is on earth and space science. National standards in science are organized as multi-grade blocks such as Grades 5-8 rather than individual grade levels. In order to follow the grade level format used in Texas, the various national standards are found among Grades 6, 7, and 8. Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include change and constancy, patterns, cycles, systems, models, and scale.

(4) The strands for Grade 8 include:

(A) Scientific investigation and reasoning.

(B) Matter and energy.

(C) Force, motion, and energy. Students experiment with the relationship between forces and motion through the study of Newton's three laws. Students learn how these forces relate to geologic processes and astronomical phenomena. In addition, students recognize that these laws are evident in everyday objects and activities. Mathematics is used to calculate speed using distance and time measurements.

(D) Earth and space. Students identify the role of natural events in altering Earth systems. Cycles within Sun, Earth, and Moon systems are studied as students learn about seasons, tides, and lunar phases. Students learn that stars and galaxies are part of the universe and that distances in space are measured by using light waves. In addition, students use data to research scientific theories of the origin of the universe. Students will illustrate how Earth features change over time by plate tectonics. They will interpret land and erosional features on topographic maps. Students learn how interactions in solar, weather, and ocean systems create changes in weather patterns and climate.

(E) Organisms and environments.

(b) Knowledge and skills.

(1) Scientific investigation and reasoning. The student, for at least 40% of instructional time, conducts laboratory and field investigations following safety procedures and environmentally appropriate and ethical practices.

(2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and field investigations

3) Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists.

(B) use models to represent aspects of the natural world such as an atom, a molecule, space, or a geologic feature;

(4) Scientific investigation and reasoning. The student knows how to use a variety of tools and safety equipment to conduct science inquiry

(5) Matter and energy. The student knows that matter is composed of atoms and has chemical and physical properties

**(6) Force, motion, and energy. The student knows that there is a relationship between force, motion, and energy**

**(C) investigate and describe applications of Newton's law of inertia, law of force and acceleration, and law of action-reaction such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches.**

**(7) Earth and space. The student knows the effects resulting from cyclical movements of the Sun, Earth, and Moon. The student is expected to:**

**(A) model and illustrate how the tilted Earth rotates on its axis, causing day and night, and revolves around the Sun causing changes in seasons;**

**(B) demonstrate and predict the sequence of events in the lunar cycle; and**

**(C) relate the position of the Moon and Sun to their effect on ocean tides.**

**(8) Earth and space. The student knows characteristics of the universe. The student is expected to:**

**(A) describe components of the universe, including stars, nebulae, and galaxies, and use models such as the Hertzsprung-Russell diagram for classification;**

**(B) recognize that the Sun is a medium-sized star near the edge of a disc-shaped galaxy of stars and that the Sun is many thousands of times closer to Earth than any other star;**

**(C) explore how different wavelengths of the electromagnetic spectrum such as light and radio waves are used to gain information about distances and properties of components in the universe;**

**(D) model and describe how light years are used to measure distances and sizes in the universe; and**

**(E) research how scientific data are used as evidence to develop scientific theories to describe the origin of the universe.**

**(9) Earth and space. The student knows that natural events can impact Earth systems. The student is expected to:**

**(A) describe the historical development of evidence that supports plate tectonic theory;**

**(B) relate plate tectonics to the formation of crustal features; and**

**(C) interpret topographic maps and satellite views to identify land and erosional features and predict how these features may be reshaped by weathering.**

**(10) Earth and space. The student knows that climatic interactions exist among Earth, ocean, and weather systems. The student is expected to:**

**(A) recognize that the Sun provides the energy that drives convection within the atmosphere and oceans, producing winds and ocean currents;**

**(B) identify how global patterns of atmospheric movement influence local weather using weather maps that show high and low pressures and fronts; and**

**(C) identify the role of the oceans in the formation of weather systems such as hurricanes**

(11) Organisms and environments.