

# Attainment Company

## Teaching to Standards: Science (TSS)

### Alignment with Texas TAKS-Alt-5<sup>th</sup> Grade through Exit Level

© 2008 Attainment Company 1.800.327.4269

#### Safety

**Scientific processes.** All TSS science lessons review safety and are based on the inquiry method

The student uses the process of science to develop an understanding about their world (Pre-K.1). The student participates in classroom and field investigations following home and school safety procedures (K.1). The student conducts classroom and field investigations following home and school safety procedures (1.1; 2.1). The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices (3.1; 4.1; 5.1). The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices (6.1; 7.1; 8.1). The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices (Biology 1; IPC 1). The student is expected to

#### *Demonstrate home and school safety practices*

- begin to demonstrate safe practices and appropriate use of materials (Pre-K)
- demonstrate safe practices during classroom and field investigations (K-2)
- demonstrate safe practices during field and laboratory investigations (3-8; Biology; IPC) All TSS units

#### *Use and conservation of school resources and laboratory materials*

- begin to demonstrate safe practices and appropriate use of materials (Pre-K)
- learn how to use and conserve resources and materials (K-1)
- learn how to use and conserve resources and dispose of materials (2)
- make wise choices in the use and conservation of resources and the disposal or recycling of materials (3-8; Biology; IPC) Biology Unit

#### Scientific Investigations

• **Scientific processes.** The student uses the processes of science to develop an understanding about their world (Pre-K.1). The student develops abilities necessary to do scientific inquiry in the field and the classroom (K.2; 1.2; 2.2). The student uses scientific inquiry methods during field and laboratory investigations (3.2; 4.2; 6.2; 7.2; 8.2). All TSS units

• The student uses scientific methods during field and laboratory investigations (5.2; Biology 2; IPC 2). All TSS units

The student is expected to

#### *Plan and conduct descriptive investigations*

- begin to perform simple investigations (Pre-K)
- show an interest in investigating unfamiliar objects, organisms, and phenomena (Pre-K)
- ask questions about organisms, objects, and events (K-2)
- plan and conduct simple descriptive investigations (K-2)
- plan and implement descriptive investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology (3-4)
- plan and implement descriptive and simple experimental investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology (5)
- plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology (6-8) All TSS units

- plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology (Biology; IPC) **All TSS units**

- connect Grade 7 science concepts with the history of science and contributions of scientists (7)

- connect Grade 8 science concepts with the history of science and contributions of scientists (8)

- describe the connection between biology and future careers (Biology) research and describe the history of biology and contributions of scientists (Biology)

July 2007 TEKS Vertical Alignment for TAKS–Alt Science 1

- **Scientific processes.** The student uses the processes of science to develop an understanding about their world (Pre-K.1). The student develops abilities necessary to do scientific inquiry in the field and the classroom (K.2; 1.2; 2.2). The student uses age-appropriate tools and models to verify that organisms and objects and parts of organisms and objects can be observed, described, and measured (K.4; 1.4; 2.4). The student uses scientific inquiry methods during field and laboratory investigations (3.2; 4.2; 5.2; 6.2; 7.2; 8.2). The student knows how to use tools and methods to conduct science inquiry (3.4; 4.4; 5.4; 6.4; 8.4). **All TSS units**

- The student knows how to use tools and methods to conduct science inquiry (7.4). The student uses scientific methods during field and laboratory investigations (Biology 2; IPC 2). **All TSS units**

The student is expected to

*Gather information*

- describe observations (Pre-K)

- explore by manipulating materials with simple equipment, (e.g., pouring from a cup, and using a spoon to pick up sand or water) (Pre-K)

- use simple measuring devices to learn about objects and organisms (Pre-K)

- gather information using simple tools such as a magnifying lens and an eyedropper (Pre-K)

- use one or more senses to observe and learn about objects, events, and organisms (Pre-K)

- identify and use senses as tools of observation (K)

- make observations using tools including hand lenses, balances, cups, bowls, and computers (K)

- gather information using simple equipment and tools to extend the senses (K–2)

- measure organisms and objects and parts of organisms and objects, using non-standard units such as paper clips, hands, and pencils (1)

- record and compare collected information (1)

- collect information using tools including hand lenses, clocks, computers, thermometers, and balances (1)

- measure and compare organisms and objects and parts of organisms and objects, using standard and non-standard units (2)

- collect information using tools including rulers, meter sticks, measuring cups, clocks, hand lenses, computers, thermometers, and balances (2)

- collect and analyze information using tools including calculators, microscopes, cameras, safety goggles, sound recorders, clocks, computers, thermometers, hand lenses, meter sticks, rulers, balances, magnets, and compasses (3)

- collect information by observing and measuring (3–5)

- collect and analyze information using tools including calculators, safety goggles, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, meter sticks, timing devices, balances, and compasses (4)

- collect and analyze information using tools including calculators, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, compasses, balances, hot plates, meter sticks, timing devices, magnets, collecting nets, and safety goggles (5)

- collect, analyze, and record information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, timing devices, hot plates, test tubes, safety goggles, spring scales, magnets, balances, microscopes, telescopes, thermometers, calculators, field equipment, compasses, computers, and computer probes (6) **All TSS units**

- collect data by observing and measuring (6–8) Biology Unit **All TSS units**

- collect, analyze, and record information to explain a phenomenon using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, hot plates, dissecting equipment, test tubes, safety goggles, spring scales, balances, microscopes, telescopes, thermometers, calculators, field equipment, computers, computer probes, timing devices, magnets, and compasses (7) **All TSS units**
- collect, record, and analyze information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, hot plates, dissecting equipment, test tubes, safety goggles, spring scales, balances, microscopes, telescopes, thermometers, calculators, field equipment, computers, computer probes, water test kits, and timing devices (8) **All TSS units**
- collect data and make measurements with precision (Biology; IPC)

*Organize information*

- compare objects and organisms and identify similarities and differences (Pre-K)
- participate in creating and using simple data charts (Pre-K)
- sort objects and organisms into groups and begins to describe how groups were organized (Pre-K)
- compare results of investigations with what students and scientists know about the world (2)
- construct simple graphs, tables, maps, and charts to organize, examine, and evaluate information (3–4)
- construct simple graphs, tables, maps, and charts using tools including computers to organize, examine, and evaluate information (5) **Biology Unit**
- construct graphs, tables, maps, and charts using tools including computers to organize, examine, and evaluate data (6–8)

*Construct explanations based on evidence and communicate conclusions*

- begin to offer explanations, using his or her own words (Pre-K)
- share observations and findings with others through pictures, discussions, or dramatizations (Pre-K)
- construct reasonable explanations using information (K)
- communicate findings about simple investigations (K)
- construct reasonable explanations and draw conclusions (1)
- communicate explanations about investigations (1–2)
- construct reasonable explanations and draw conclusions using information and prior knowledge (2)
- analyze and interpret information to construct reasonable explanations from direct and indirect evidence (3–6) **All TSS units**
- communicate valid conclusions (3–8; Biology; IPC ) **All TSS units**
- organize, analyze, make inferences, and predict trends from direct and indirect evidence (7) • organize, analyze, evaluate and make inferences, and predict trends from direct and indirect evidence (8) • organize, analyze, evaluate, make inferences, and predict trends from data (Biology; IPC) **All TSS units**

• **Scientific processes.** The student uses the processes of science to develop an understanding about their world (Pre-K). The student knows that information and critical thinking are used in making decisions (K.3; 1.3; 2.3). The student knows that information, critical thinking, and scientific problem solving are used in making decisions (3.3). The student knows how to use tools and methods to conduct science inquiry (3.4; 4.4; 5.4; 6.4; 7.4; 8.4). **All TSS units**

The student uses critical thinking and scientific problem solving to make informed decisions (4.3; 5.3; 6.3; 7.3; 8.3; Biology 3; IPC 3). The student is expected to

*Explain a problem*

- solve simple design problems (e.g., making a box into a little house for a storybook character, toy, or pet) (Pre-K)
- explain a problem in his/her own words and propose a solution (K)
- explain a problem in his/her own words and identify a task and solution related to the problem (1–2)
- draw inferences based on information related to promotional materials for products and services (3–5)
- analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information (3–8; Biology; IPC) **All TSS units**
- 
- draw inferences based on data related to promotional materials for products and services (6–8; IPC)
- evaluate promotional claims that relate to biological issues such as product labeling and advertisements (Biology)

*Make and justify a decision*

- predict what will happen next based on previous experience (Pre-K)
- make decisions using information (K–2)
- discuss and justify the merits of decisions (K–2)

*Use models*

- represent the natural world using models and identify their limitations (3–8) **All TSS units**
- 
- evaluate models according to their adequacy in representing biological objects or events (Biology)

*History and impact of scientific research*

- connect Grade 3 science concepts with the history of science and contributions of scientists (3)
- evaluate the impact of research on scientific thought, society, and the environment (3–8; Biology; IPC)
- connect Grade 4 science concepts with the history of science and contributions of scientists (4)
- connect Grade 5 science concepts with the history of science and contributions of scientists (5)
- connect Grade 6 science concepts with the history of science and contributions of scientists (6)
- 
- research and describe the history of physics, chemistry, and contributions of scientists (IPC)
- describe connections between physics and chemistry, and future careers (IPC)

*Ways to analyze information*

- demonstrate that repeated investigations may increase the reliability of results (3–5)
- identify patterns in collected information using percent, average, range, and frequency (6)
- collect and analyze information to recognize patterns such as rates of change (7)
- extrapolate from collected information to make predictions (8)

**Technology**

**Scientific processes.** The student knows that relationships exist between science and technology (8.5). The student is expected to

*Science and technology*

- identify a design problem and propose a solution (8)
- design and test a model to solve the problem (8)
- evaluate the model and make recommendations for improving the model (8)

## Properties and Patterns

**Science concepts.** The student observes and describes changes and names organisms and describes basic needs of living things (Pre-K.2). The student knows that organisms, objects, and events have properties and patterns (K.5; 1.5; 2.5). The student knows that systems have parts and are composed of organisms and objects (K.6). **Biology Unit**

The student is expected to

### *Properties and patterns of objects, organisms, and events*

- describe properties of objects and characteristics of living things (Pre-K)
- use patterns (such as growth and day following night to predict what happens next) (Pre-K)
- identify similarities and differences among objects and organisms (Pre-K)
- begin to use scientific words and phrases to describe objects, events, and living things (Pre-K)
- 
- describe properties of objects and characteristics of organisms (K)
- observe and identify patterns including seasons, growth, and day and night and predict what happens next (K)
- recognize and copy patterns seen in charts and graphs (K)
- sort organisms and objects into groups according to their parts and describe how the groups are formed (K)
- sort objects and events based on properties and patterns (1)
- identify, predict, and create patterns including those seen in charts, graphs, and numbers (1)
- classify and sequence organisms, objects, and events based on properties and patterns (2)
- identify, predict, replicate, and create patterns including those seen in charts, graphs, and numbers (2)

**Science concepts.** The student observes and describes changes and names organisms and describes basic needs of living things (Pre-K.2). The student knows that many types of change occur (K.7; 1.7; 2.7). The student knows that change can create recognizable patterns (4.6). The student knows that some change occurs in cycles (5.6). The student knows that cycles exist in Earth systems (8.12).

### **Waters Unit**

The student is expected to

### *Observe and record changes*

- begin to observe changes in size, color, position, weather, and sound (Pre-K)
- observe, describe, and record changes in size, mass, color, position, quantity, time, temperature, sound, and movement (K)
- observe, measure, and record changes in size, mass, color, position, quantity, sound, and movement (1)
- observe, measure, record, analyze, predict, and illustrate changes in size, mass, temperature, color, position, quantity, sound, and movement (2)
- use reflections to verify that a natural object has symmetry (4)

### *Change in cycles*

- observe and record stages in the life cycle of organisms in their natural environment (K)
- observe and record changes in the life cycle of organisms (1)
- identify patterns of change such as in weather, metamorphosis, and objects in the sky (4)
- identify events and describe changes that occur on a regular basis such as in daily, weekly, lunar, and seasonal cycles (5)
- identify the significance of the water, carbon, and nitrogen cycles (5)
- describe and compare life cycles of plants and animals (5)
- analyze and predict the sequence of events in the lunar and rock cycles (8)
- predict the results of modifying the Earth's nitrogen, water, and carbon cycles (8)

### *Change and heat*

- identify that heat causes change, such as ice melting or the Sun warming the air and compare objects according to temperature (K)
- identify and test ways that heat may cause change such as when ice melts (1)
- identify, predict, and test uses of heat to cause change such as melting and evaporation (2)

#### *Change and weather*

- observe and record changes in weather from day to day and over seasons (1)
- observe, measure, and record changes in weather, the night sky, and seasons (2)

#### **Systems**

• **Science concepts.** The student knows that systems have parts and are composed of organisms and objects (K.6; 1.6; 2.6). The student knows that systems exist in the world (3.5). The student knows that complex systems may not work if some parts are removed (4.5). The student knows that a system is a collection of cycles, structures, and processes that interact (5.5). The student knows that systems may combine with other systems to form a larger system (6.5). The student knows the relationship between structure and function in living systems (6.10). The student knows that the responses of organisms are caused by internal or external stimuli (6.12). **Biology Unit** The student knows that an equilibrium of a system may change (7.5). The student knows the relationship between structure and function in living systems (7.9). The student knows that the responses of organisms are caused by internal or external stimuli (7.11). The student knows that interdependence occurs among living systems (8.6). **Waters Unit** The student knows how an organism grows and how specialized cells, tissues, and organs develop (Biology 5). **Biology Unit** The student knows that, at all levels of nature, living systems are found within other living systems, each with its own boundary and limits (Biology 10). **Biology Unit**

The student knows that organisms maintain homeostasis (Biology 11). The student knows that interdependence and interactions occur within an ecosystem (Biology 12). The student knows the significance of plants in the environment (Biology 13). The student is expected to

#### *Parts of a system put together as a whole system*

- manipulate parts of objects such as toys, vehicles, or construction sets that, when put together, can do things they cannot do by themselves (K)
- sort organisms and objects according to their parts and characteristics (1)
- identify parts that, when put together, can do things they cannot do by themselves, such as a working camera with film, a car moving with a motor, and an airplane flying with fuel (1)
- manipulate, predict, and identify parts that, when put together, can do things they cannot do by

themselves, such as a guitar and guitar strings (2) • observe a simple system and describe the role of various parts such as a yo-yo and string (3)

#### *Parts of a system separated from a whole system*

- identify parts that, when separated from the whole, may result in the part or the whole not working, such as cars without wheels and plants without roots (K)
- manipulate objects such as toys, vehicles, or construction sets so that the parts are separated from the whole which may result in the part or the whole not working (1)
- manipulate, predict, and identify parts that, when separated from the whole, may result in the part or the whole not working, such as flashlights without batteries and plants without leaves (2)
- predict and draw conclusions about what happens when part of a system is removed (4)
- describe how the properties of a system are different from the properties of its parts (6)

#### *Simple systems*

- observe and identify simple systems such as a sprouted seed and a wooden toy car (3)
- identify and describe the roles of some organisms in living systems such as plants in a schoolyard, and parts in nonliving systems such as a light bulb in a circuit (4)
- describe some cycles, structures, and processes that are found in a simple system (5)
- describe some interactions that occur in a simple system (5)

#### *Structure and function of living systems*

- record observations about parts of plants including leaves, roots, stems, and flowers (K)

- record observations about parts of animals including wings, feet, heads, and tails (K)
- observe and describe the parts of plants and animals (1)
- observe and record the functions of plant parts (2)
- observe and record the functions of animal parts (2)
- differentiate between structure and function (6)
- determine that all organisms are composed of cells that carry on functions to sustain life (6)
- identify how structure complements function at different levels of organization including organs, organ systems, organisms, and populations (6)
- identify the systems of the human organism and describe their functions (7)
- describe interactions among systems in the human organism (8)
- compare cells from different parts of plants and animals including roots, stems, leaves, epithelia, muscles, and bones to show specialization of structure and function (Biology)
- identify cell differentiation in the development of organisms (Biology)
- sequence the levels of organization in multicellular organisms to relate the parts to each other and to the whole (Biology)
- interpret the functions of systems in organisms including circulatory, digestive, nervous, endocrine, reproductive, integumentary, skeletal, respiratory, muscular, excretory, and immune (Biology)
- compare the interrelationships of organ systems to each other and to the body as a whole (Biology)
- analyze and identify characteristics of plant systems and subsystems (Biology)
- survey and identify methods of reproduction, growth, and development of various types of plants (Biology)

#### *Combinations of systems*

- identify and describe a system that results from the combination of two or more systems such as in the solar system (6)

#### *Equilibrium in a system*

- identify responses in organisms to internal stimuli such as hunger or thirst (6)
- identify responses in organisms to external stimuli such as the presence or absence of heat or light (6)
- identify responses in organisms to external stimuli found in the environment such as the presence or absence of light (7)
- analyze changes in organisms such as a fever or vomiting that may result from internal stimuli (7)
- 
- describe how systems may reach an equilibrium such as when a volcano erupts (7) **Earth Unit**
- observe and describe the role of ecological succession in maintaining an equilibrium in an ecosystem (7)
- describe how organisms maintain stable internal conditions while living in changing external environments (7)
- identify feedback mechanisms that maintain equilibrium of systems such as body temperature, turgor pressure, and chemical reactions (8)
- identify and describe the relationships between internal feedback mechanisms in the maintenance of homeostasis (Biology)
- investigate and identify how organisms, including humans, respond to external stimuli (Biology)
- analyze the importance of nutrition, environmental conditions, and physical exercise on health (Biology)
- summarize the role of microorganisms in maintaining and disrupting equilibrium including diseases in plants and animals and decay in an ecosystem (Biology) **Biology and Chemistry Units**

#### *Interactions in systems*

- describe interactions within ecosystems (8)
- describe interactions among solar, weather, and ocean systems (8) **Waters Unit**
- investigate and explain the interactions in an ecosystem including food chains, food webs, and food pyramids (Biology) **Biology Unit**

### **Life Science/Biology**

**Science concepts.** The student observes and describes changes and names organisms and describes basic needs of living things (Pre-K.2). The student knows the difference between living organisms and nonliving objects (K.8). The student distinguishes between living organisms and nonliving objects (1.8; 2.8). The student is expected to

*Living versus non-living*

- identify animals and plants as living things (Pre-K)
- group organisms and objects as living or nonliving and begin to identify things people have built (Pre-K)
- identify a particular organism or object as living or nonliving (K)
- group organisms and objects as living or nonliving (K)
- group living organisms and nonliving objects (1)
- compare living organisms and nonliving objects (1)
- identify characteristics of living organisms (2)
- identify characteristics of nonliving objects (2)

**Science concepts.** The student knows that cells are the basic structures of all living things and have specialized parts that perform specific functions, and that viruses are different from cells and have different properties and functions (Biology 4). The student knows applications of taxonomy and can identify its limitations (Biology 8). The student is expected to

*Viruses, bacteria, and eukaryotic cells*

- identify the parts of prokaryotic and eukaryotic cells (Biology)
- investigate and identify cellular processes including homeostasis, permeability, energy production, transportation of molecules, disposal of wastes, function of cellular parts, and synthesis of new molecules (Biology)
- compare the structures and functions of viruses to cells and describe the role of viruses in causing diseases and conditions such as acquired immune deficiency syndrome, common colds, smallpox, influenza, and warts (Biology)
- identify and describe the role of bacteria in maintaining health such as in digestion and in causing diseases such as in streptococcus infections and diphtheria (Biology) **Biology Unit**

*Classification of living systems*

- collect and classify organisms at several taxonomic levels such as species, phylum, and kingdom using dichotomous keys (Biology)
- analyze relationships among organisms and develop a model of a hierarchical classification system based on similarities and differences using taxonomic nomenclature (Biology)
- identify characteristics of kingdoms including monerans, protists, fungi, plants, and animals (Biology)

July 2007 TEKS Vertical Alignment for TAKS–Alt Science 8

**Organisms and their Environment**

**Science concepts.** The student observes and describes changes and names organisms and describes basic needs of living things (Pre-K.2). The student knows that living organisms have basic needs (K.9; 1.9; 2.9). The student knows that living organisms need food, water, light, air, a way to dispose of waste, and an environment in which to live (3.8). The student knows that the responses of organisms are caused by internal or external stimuli (6.12) **Biology Unit** The student knows that there is a relationship between organisms and the environment (7.12). The student is expected to

*Identify how organisms meet their basic needs*

- begin to recognize that living things have similar needs for water, food, and air (Pre-K)
- identify basic needs of living organisms (K)
- identify characteristics of living organisms that allow their basic needs to be met (1)
- identify the external characteristics of different kinds of plants and animals that allow their needs to be met (2)
- describe how living organisms modify their physical environment to meet their needs such as beavers building a dam or humans building a home (3)

*How organisms depend on each other and their environment*

- give examples of how living organisms depend on each other (K)
- identify ways that the Earth can provide resources for life (K)
- compare and give examples of the ways living organisms depend on each other for their basic needs (1)
- compare and give examples of the ways living organisms depend on each other and on their environments (2)
- observe and describe the habitats of organisms within an ecosystem (3)
- observe and identify organisms with similar needs that compete with one another for resources such as oxygen, water, food, or space (3)
- describe environmental changes in which some organisms would thrive, become ill, or perish (3)
- identify components of an ecosystem to which organisms may respond (6)
- identify components of an ecosystem (7)
- observe and describe how organisms including producers, consumers, and decomposers live together in an environment and use existing resources (7)
- describe how different environments support different varieties of organisms (7)
- observe and describe the role of ecological succession in ecosystems (7)

**Science concepts.** The student knows that species have different adaptations that help them survive and reproduce in their environment (3.9). The student knows that adaptations may increase the survival of members of a species (4.8; 5.9). The student knows that species can change through generations and that the instructions for traits are contained in the genetic material of the organisms (7.10). The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms (8.11). The student knows the theory of biological evolution (Biology 7). The student knows that interdependence and interactions occur within an ecosystem (Biology 12). The student knows the significance of plants in the environment (Biology 13). The student is expected to

*Observe and identify adaptive characteristics*

- observe and identify characteristics among species that allow each to survive and reproduce (3)
- identify characteristics that allow members within a species to survive and reproduce (4)

J

- identify the kinds of species that lived in the past and compare them to existing species (4)

**Earth Unit**

*Compare adaptive characteristics*

- compare adaptive characteristics of various species (4)
- compare the adaptive characteristics of species that improve their ability to survive and reproduce in an ecosystem (5)
- compare traits of organisms of different species that enhance their survival and reproduction (7)
- identify that change in environmental conditions can affect the survival of individuals and of species (8)

**Waters Unit**

*Analyze and predict adaptive characteristics*

- analyze how adaptive characteristics help individuals within a species to survive and reproduce (3)
- analyze and describe adaptive characteristics that result in an organism's unique niche in an ecosystem (5)
- predict some adaptive characteristics required for survival and reproduction by an organism in an ecosystem (5)
- interpret interactions among organisms exhibiting predation, parasitism, commensalism, and mutualism (Biology)

- compare variations, tolerances, and adaptations of plants and animals in different biomes (Biology)
- identify and illustrate that long-term survival of species is dependent on a resource base that may be limited (Biology)
- evaluate the significance of structural and physiological adaptations of plants to their environments (Biology)

*Natural selection and biological evolution*

- identify evidence of change in species using fossils, DNA sequences, anatomical similarities, physiological similarities, and embryology (Biology)
- illustrate the results of natural selection in speciation, diversity, phylogeny, adaptation, behavior, and extinction (Biology)

**Reproduction**

**Science concepts.** The student knows that many likenesses between offspring and parents are inherited from the parents (3.10). The student knows that many likenesses between offspring and parents are inherited or learned (4.9). The student knows that likenesses between offspring and parents can be inherited or learned (5.10). The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms (6.11; 8.11). The student knows that species can change through generations and that the instructions for traits are contained in the genetic material of the organisms (7.10). The student knows the structures and functions of nucleic acids in the mechanisms of genetics (Biology 6). The student is expected to

*Inherited traits and learned characteristics*

- identify some inherited traits of plants (3)
- identify some inherited traits of animals (3)
- identify and provide examples of inherited traits and learned characteristics (4)
- distinguish between inherited traits and learned characteristics (4)
- identify traits that are inherited from parent to offspring in plants and animals (5)
- give examples of learned characteristics that result from the influence of the environment (5)

July 2007 TEKS Vertical Alignment for TAKS–Alt Science **10**

- identify some changes in traits that can occur over several generations through natural occurrence and selective breeding (6)
- distinguish between inherited traits and other characteristics that result from interactions with the environment (8)

*Genetic material and its role in inheritance*

- identify cells as structures containing genetic material (6)
- interpret the role of genes in inheritance (6)
- distinguish between dominant and recessive traits and recognize that inherited traits of an individual are contained in genetic material (7)
- make predictions about possible outcomes of various genetic combinations of inherited characteristics (8)
- describe components of deoxyribonucleic acid (DNA), and illustrate how information for specifying the traits of an organism is carried in the DNA (Biology)
- explain replication, transcription, and translation using models of DNA and ribonucleic acid (RNA) (Biology)
- identify and illustrate how changes in DNA cause mutations and evaluate the significance of these changes (Biology)
- compare genetic variations observed in plants and animals (Biology)
- identify and analyze karyotypes (Biology)

*Asexual versus sexual reproduction*

- identify that sexual reproduction results in more diverse offspring and asexual reproduction results in more uniform offspring (7)

- compare the processes of mitosis and meiosis and their significance to sexual and asexual reproduction (Biology)

### **Matter**

**Science concepts.** The student observes and describes changes and names organisms and describes the basic needs of living things (Pre-K.2). The student knows that matter has physical properties (3.7; 4.7; 5.7). The student is expected to

#### *Physical properties of matter*

- begin to identify what things are made of (e.g., distinguishing a metal spoon from a plastic spoon) (Pre-K)
- gather information including temperature, magnetism, hardness, and mass using appropriate tools to identify physical properties of matter (3)
- identify matter as liquids, solids, and gases (3) • observe and record changes in the states of matter caused by the addition or reduction of heat (4)
- conduct tests, compare data, and draw conclusions about physical properties of matter including states of matter, conduction, density, and buoyancy (4)
- classify matter based on its physical properties including magnetism, physical state, and the ability to conduct or insulate heat, electricity, and sound (5)
- identify changes that can occur in the physical properties of the ingredients of solutions such as dissolving sugar in water (5) **Chemistry Unit**
- demonstrate that some mixtures maintain the physical properties of their ingredients (5) **Earth Unit**

- observe and measure characteristic properties of substances that remain constant such as boiling points and melting points (5)

**Science concepts.** The student knows that substances have physical and chemical properties (6.7; 7.7). The student knows that substances have chemical and physical properties (8.9). The student knows relationships exist between properties of matter and its components (IPC 7). The student knows how solution chemistry is a part of everyday life (IPC 9). **Chemistry Unit.** The student is expected to

#### *Physical and chemical properties of matter*

- demonstrate that new substances can be made when two or more substances are chemically combined and compare the properties of the new substances to the original substances (6) **Earth and Chemistry Units**
- classify substances by their physical and chemical properties (6)
- describe physical properties of elements and identify how they are used to position an element on the periodic table (7)
- recognize that compounds are composed of elements (7)
- interpret information on the periodic table to understand that physical properties are used to group elements (8)
- identify that physical and chemical properties influence the development and application of everyday materials such as cooking surfaces, insulation, adhesives, and plastics (8)
- investigate and identify properties of fluids including density, viscosity, and buoyancy (IPC)
- classify samples of matter from everyday life as being elements, compounds, or mixtures (IPC)
- relate the structure of water to its function as the universal solvent (IPC)
- relate the concentration of ions in a solution to physical and chemical properties such as pH, electrolytic behavior, and reactivity (IPC)
- demonstrate how various factors influence solubility including temperature, pressure, and nature of the solute and solvent (IPC)
- demonstrate how factors such as particle size, influence the rate of dissolving (IPC)
- simulate the effects of acid rain on soil, buildings, statues, or microorganisms (IPC)

**Science concepts.** The student knows that matter is composed of atoms (8.8). The student knows relationships exist between properties of matter and its components (IPC 7). The student is expected to

### *Atomic structure of matter*

- describe the structure and parts of an atom (8)
- identify the properties of an atom including mass and electrical charge (8)
- research and describe the historical development of the atomic theory (IPC)
- identify constituents of various materials or objects such as metal salts, light sources, fireworks displays, and stars using spectral-analysis techniques (IPC)
- relate the chemical behavior of an element including bonding, to its placement on the periodic table (IPC)

**Science concepts.** The student knows that substances have physical and chemical properties (7.7).

**Chemistry Unit** The student knows that substances have chemical and physical properties (8.9).

**Chemistry Unit** The student knows that changes in matter affect everyday life (IPC 8). **Chemistry**

**Unit** The student is expected to

### *Chemical change and reactions*

- identify and demonstrate everyday examples of chemical phenomena such as rusting and tarnishing of metals and burning of wood (7) **Chemistry Unit**
- demonstrate that substances may react chemically to form new substances (8) **Chemistry Unit**
- recognize the importance of formulas and equations to express what happens in a chemical reaction (8)
  
- distinguish between physical and chemical changes in matter such as oxidation, digestion, changes in states, and stages in the rock cycle (IPC)
- investigate and identify the law of conservation of mass (IPC)
- describe types of nuclear reactions such as fission and fusion and their roles in applications such as medicine and energy production (IPC)
- research and describe the environmental and economic impact of the end-products of chemical reactions (IPC) **Chemistry Unit**
- analyze energy changes that accompany chemical reactions such as those occurring in heat packs, cold packs, and glow sticks to classify them as endergonic or exergonic reactions (IPC)

### **Earth Systems**

**Science concepts.** The student observes and describes changes and names organisms and describes basic needs of living things (Pre-K.2). The student knows that the natural world includes rocks, soil, and water (K.10). The student knows that the natural world includes rocks, soil, and water (1.10). The student knows that the natural world includes rocks, soil, water, and gases of the atmosphere (2.10). The student knows that the natural world includes earth materials and objects in the sky (3.11; 4.11; 5.12). The student knows that certain past events affect present and future events (4.10; 5.11). The student knows the structures and functions of Earth systems (6.14). The student knows that natural events and human activity can alter Earth systems (7.14). **Waters Unit** The student knows that cycles exist in Earth systems (8.12). **Waters Unit** The student knows that natural events and human activities can alter Earth systems (8.14). **Earth Unit** The student is expected to

### *Properties of rock, soil, and water*

- observe and describe properties of rocks, soil, and water (Pre-K; K)
- observe and describe differences in rocks and soil samples (1)
- identify and record properties of soils such as color and texture, capacity to retain water, and ability to support the growth of plants (3)
- test properties of soils including texture, capacity to retain water, and ability to support life (4)

### *Uses and importance of rocks, soil, and water*

- give examples of ways that rocks, soil, and water are useful (K)
- identify how rocks, soil, and water are used and how they can be recycled (1)
- identify and describe a variety of natural sources of water including streams, lakes, and oceans (1)
- identify uses of natural resources (2)

- identify and describe the importance of earth materials including rocks, soil, water, and gases of the atmosphere in the local area and classify them as renewable, nonrenewable, or inexhaustible resources (3)
- identify relationships between groundwater and surface water in a watershed (6)
- describe components of the atmosphere, including oxygen, nitrogen, and water vapor, and identify the role of atmospheric movement in weather change (6)
- describe how human activities have modified soil, water, and air quality (8) **Waters Unit**
- analyze how natural or human events may have contributed to the extinction of some species (8)

#### *Water cycle and the Sun's role*

- describe and illustrate the water cycle (2)
- identify the Sun as the major source of energy for the Earth and understand its role in the growth of plants, in the creation of winds, and in the water cycle (4)
- summarize the effects of the oceans on land (4) **Waters Unit**
- relate the role of oceans to climatic changes (8)

#### *Formation of Earth's surface and Earth's resources*

- identify and observe effects of events that require time for changes to be noticeable including growth, erosion, dissolving, weathering, and flow (4)
- draw conclusions about “what happened before” using fossils or charts and tables (4)
- identify and observe actions that require time for changes to be measurable, including growth, erosion, dissolving, weathering, and flow (5)
- draw conclusions about “what happened before” using data such as from tree-growth rings and sedimentary rock sequences (5)
- identify past events that led to the formation of the Earth's renewable, non-renewable, and inexhaustible resources (5)
- interpret how land forms are the result of a combination of constructive and destructive forces such as deposition of sediment and weathering (5)
- describe processes responsible for the formation of coal, oil, gas, and minerals (5)
- summarize the rock cycle (6) **Earth Unit**
- describe and predict the impact of different catastrophic events on the Earth (7) **Earth Unit**
- analyze effects of regional erosional deposition and weathering (7)
- make inferences and draw conclusions about effects of human activity on Earth's renewable, nonrenewable, and inexhaustible resources (7) **Earth Unit**
- predict land features resulting from gradual changes such as mountain building, beach erosion, land subsidence, and continental drift (8) **Earth Unit**

### **Space Systems**

**Science concepts.** The student knows that the natural world includes earth materials and objects in the sky (3.11). The student knows that the natural world includes earth materials and objects in the sky (5.12). The student knows components of our solar system (6.13; 7.13). The student knows characteristics of the universe (8.13). The student is expected to

#### *The solar system and the universe*

- identify the planets in our solar system and their position in relation to the Sun (3)
- describe the characteristics of the Sun (3)
- identify the physical characteristics of the Earth and compare them to the physical characteristics of the moon (5)
- identify gravity as the force that keeps planets in orbit around the Sun and the moon in orbit around the Earth (5)
- identify characteristics of objects in our solar system including the Sun, planets, meteorites, comets, asteroids, and moons (6)
- describe types of equipment and transportation needed for space travel (6)
- identify and illustrate how the tilt of the Earth on its axis as it rotates and revolves around the Sun causes changes in seasons and the length of a day (7)

- relate the Earth's movement and the moon's orbit to the observed cyclical phases of the moon (7)
- describe characteristics of the universe such as stars and galaxies (8)
- explain the use of light years to describe distances in the universe (8)
- research and describe historical scientific theories of the origin of the universe (8)

14

### Force and Motion

**Science concepts.** The student knows that many types of change occur (2.7). The student knows that forces cause change (3.6). The student knows that change can create recognizable patterns (4.6). The student knows that there is a relationship between force and motion (6.6; 7.6; 8.7). The student knows concepts of force and motion evident in everyday life (IPC 4). The student is expected to

#### *Change in force and motion*

- demonstrate a change in the motion of an object by giving the object a push or a pull (2)
- measure and record changes in the position and direction of the motion of an object to which a force such as a push or pull has been applied (3)
- identify that the surface of the Earth can be changed by forces such as earthquakes and glaciers (3)
- illustrate that certain characteristics of an object can remain constant even when the object is rotated like a spinning top, translated like a skater moving in a straight line, or reflected on a smooth surface (4)
- identify and describe the changes in position, direction of motion, and speed of an object when acted upon by force (6)
- demonstrate that changes in motion can be measured and graphically represented (6)
- identify forces that shape features of the Earth including uplifting, movement of water, and volcanic activity (6)

#### *The relationship between force and motion*

- demonstrate basic relationships between force and motion using simple machines including pulleys and levers (7)
- demonstrate that an object will remain at rest or move at a constant speed and in a straight line if it is not being subjected to an unbalanced force (7)
- relate forces to basic processes in living organisms including the flow of blood and the emergence of seedlings (7)
- demonstrate how unbalanced forces cause changes in the speed or direction of an object's motion (8)
- recognize that waves are generated and can travel through different media (8)

#### *Force and motion in everyday life*

- calculate speed, momentum, acceleration, work, and power in systems such as in the human body, moving toys, and machines (IPC)
- investigate and describe applications of Newton's laws such as in vehicle restraints, sports activities, geological processes, and satellite orbits (IPC)
- analyze the effects caused by changing force or distance in simple machines as demonstrated in household devices, the human body, and vehicles (IPC)
- investigate and demonstrate mechanical advantage and efficiency of various machines such as levers, motors, wheels and axles, pulleys, and ramps (IPC)

### Energy

**Science concepts.** The student knows that energy occurs in many forms (5.8). The student knows that the natural world includes earth materials and objects in the sky (5.12). The student knows that complex interactions occur between matter and energy (6.8). The student knows that obtaining, transforming, and distributing energy affects the environment (6.9). The student knows that complex interactions occur between matter and energy (7.8; 8.10). The student knows metabolic processes and energy transfers that occur in living organisms (Biology 9). The student knows that

interdependence and interactions occur within an ecosystem (Biology 12). The student knows the impact of energy transformations in everyday

life (IPC 6). The student knows that changes in matter affect everyday life (IPC 8). The student is expected to

#### *Energy in its many forms*

- differentiate among forms of energy including light, heat, electrical, and solar energy (5)
- identify and demonstrate everyday examples of how light is reflected, such as from tinted windows, and refracted, such as in cameras, telescopes, and eyeglasses (5)
- demonstrate that electricity can flow in a circuit and can produce heat, light, sound, and magnetic effects (5)
- verify that vibrating an object can produce sound (5)
- identify energy transformations occurring during the production of energy for human use such as electrical energy to heat energy or heat energy to electrical energy (6)
- compare methods used for transforming energy in devices such as water heaters, cooling systems, or hydroelectric and wind power plants (6)
- research and describe energy types from their source to their use and determine if the type is renewable, non-renewable, or inexhaustible (6)
- illustrate examples of potential and kinetic energy in everyday life such as objects at rest, movement of geologic faults, and falling water (7)
- identify that radiant energy from the Sun is transferred into chemical energy through the process of photosynthesis (7)
- analyze the flow of matter and energy through different trophic levels and between organisms and the physical environment (Biology)
- compare the energy flow in photosynthesis to the energy flow in cellular respiration (Biology)
- describe the law of conservation of energy (IPC)
- investigate and identify the law of conservation of mass (IPC)

#### *Energy resources*

- describe processes responsible for the formation of coal, oil, gas, and minerals (5)
- analyze the efficiency of energy conversions that are responsible for the production of electricity such as from radiant, nuclear, and geothermal sources, fossil fuels such as coal, gas, oil, and the movement of water or wind (IPC)
- investigate and compare economic and environmental impacts of using various energy sources such as rechargeable or disposable batteries and solar cells (IPC)

#### *Interactions between matter and energy*

- define matter and energy (6)
- explain and illustrate the interactions between matter and energy in the water cycle and in the decay of biomass such as in a compost bin (6)
- describe energy flow in living systems including food chains and food webs (6)
- illustrate interactions between matter and energy including specific heat (8)
- identify and demonstrate that loss or gain of heat energy occurs during exothermic and endothermic chemical reactions (8)
- describe interactions among solar, weather, and ocean systems (8)
- analyze the flow of matter and energy through different trophic levels and between organisms and the physical environment (Biology)
- analyze the flow of energy through various cycles including the carbon, oxygen, nitrogen, and water cycles (Biology)
- investigate and demonstrate the movement of heat through solids, liquids, and gases by convection, conduction, and radiation (IPC)
- measure the thermal and electrical conductivity of various materials and explain results (IPC)
- analyze the effects of heating and cooling processes in systems such as weather, living, and mechanical (IPC)

#### *Electricity and magnetism*

- investigate and compare series and parallel circuits (IPC)
- analyze the relationship between an electric current and the strength of its magnetic field using simple electromagnets (IPC)

*Energy Molecules*

- compare the structures and functions of different types of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids (Biology)
- investigate and identify the effects of enzymes on food molecules (Biology)

**Science concepts.** The student knows that there is a relationship between force and motion (8.7). The student knows the effects of waves on everyday life (IPC 5). The student is expected to

*Characteristics and applications of waves*

- recognize that waves are generated and can travel through different media (8)
- demonstrate wave types and their characteristics through a variety of activities such as modeling with ropes and coils, activating tuning forks, and interpreting data on seismic waves (IPC)
- demonstrate wave interactions including interference, polarization, reflection, refraction, and resonance within various materials (IPC)
  - identify uses of electromagnetic waves in various technological applications such as fiber optics, optical scanners, and microwaves (IPC)
  - demonstrate the application of acoustic principles such as in echolocation, musical instruments, noise pollution, and sonograms (IPC)

\* "Prekindergarten Curriculum Guidelines" (1999). Texas Education Agency.