**Science TEKS Associated with Display Exhibits**

**1 – Strata Wall**

Grade K-2

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

observe, describe, compare, and sort rocks by size, shape, color, and texture

Grades 3-4

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

explore and record how soils are formed by weathering of rock and the decomposition of plant and animal remain

Grade 5

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

explore the processes that led to the formation of sedimentary rocks and fossil fuels;

Middle School

Classify rocks as metamorphic, igneous, or sedimentary by the processes of their formation

High School

Earth in space and time. The student knows that scientific dating methods of fossils and rock sequences are used to construct a chronology of Earth's history expressed in the geologic time scale. The student is expected to:

evaluate relative dating methods using original horizontality, rock superposition, lateral continuity, cross-cutting relationships, unconformities, index fossils, and biozones based on fossil succession to determine chronological order;

**2 – Dig Site**

Grade K-2

Scientific investigation and reasoning. The student uses age-appropriate tools and models to investigate the natural world. The student is expected to:

(A) collect information using tools, including computers, hand lenses, primary balances, cups, bowls, magnets, collecting nets, and notebooks; timing devices, including clocks and timers; non-standard measuring items such as paper clips and clothespins; weather instruments such as demonstration thermometers and wind socks; and materials to support observations of habitats of organisms such as terrariums and aquariums; and

(B)  use senses as a tool of observation to identify properties and patterns of organisms, objects, and events in the environment.

Grades 3-5

Scientific investigation and reasoning. The student knows how to use a variety of tools and methods to conduct science inquiry. The student is expected to:

(A)  collect, record, and analyze information using tools, including microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, wind vanes, rain gauges, pan balances, graduated cylinders, beakers, spring scales, hot plates, meter sticks, compasses, magnets, collecting nets, notebooks, sound recorders, and Sun, Earth, and Moon system models; timing devices, including clocks and stopwatches; and materials to support observation of habitats of organisms such as terrariums and aquariums; and

(B)  use safety equipment as appropriate, including safety goggles and gloves.

Middle School and High School

Scientific investigation and reasoning. The student knows how to use a variety of tools and safety equipment to conduct science inquiry. The student is expected to:

(A)  use appropriate tools to collect, record, and analyze information, including lab journals/notebooks, beakers, meter sticks, graduated cylinders, anemometers, psychrometers, hot plates, test tubes, spring scales, balances, microscopes, thermometers, calculators, computers, spectroscopes, timing devices, and other equipment as needed to teach the curriculum; and

(B)  use preventative safety equipment, including chemical splash goggles, aprons, and gloves, and be prepared to use emergency safety equipment, including an eye/face wash, a fire blanket, and a fire extinguisher.

**3 – The Dating Game and 4 – Radiometric Dating**

Al l Levels

Organize, analyze, evaluate, build models, make inferences, and predict trends from data;

**5 – Becoming a Fossil**

Elementary K-5

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

Middle School

 Investigate how evidence of chemical reactions indicate that new substances with different properties are formed

High School

Solid Earth. The student knows that Earth contains energy, water, mineral, and rock resources and that use of these resources impacts Earth's subsystems. The student is expected to:

(A)  evaluate how the use of energy, water, mineral, and rock resources affects Earth's subsystems;

(B)  describe the formation of fossil fuels, including petroleum and coal;

(C)  discriminate between renewable and nonrenewable resources based upon rate of formation and use;

(D)  analyze the economics of resources from discovery to disposal, including technological advances, resource type, concentration and location, waste disposal and recycling, and environmental costs; and

(E)  explore careers that involve the exploration, extraction, production, use, and disposal of Earth's resources

**Displays 6-19 (Geologic Time Periods)**

Elementary K-2

 Organisms and environments. The student knows that living organisms have basic needs that must be met for them to survive within their environment. The student is expected to:

(A)  identify the basic needs of plants and animals;

(B)  identify factors in the environment, including temperature and precipitation, that affect growth and behavior such as migration, hibernation, and dormancy of living things; and

(C)  compare and give examples of the ways living organisms depend on each other and on their environments such as food chains within a garden, park, beach, lake, and wooded area.

Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them survive within their environments. The student is expected to:

(A)  observe, record, and compare how the physical characteristics and behaviors of animals help them meet their basic needs such as fins help fish move and balance in the water;

(B)  observe, record, and compare how the physical characteristics of plants help them meet their basic needs such as stems carry water throughout the plant; and

(C)  investigate and record some of the unique stages that insects undergo during their life cycle.

Elementary 3-5

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

Middle School

Organisms and environments. The student knows that interdependence occurs among living systems and the environment and that human activities can affect these systems. The student is expected to:

(A)  describe producer/consumer, predator/prey, and parasite/host relationships as they occur in food webs within marine, freshwater, and terrestrial ecosystems;

(B)  investigate how organisms and populations in an ecosystem depend on and may compete for biotic and abiotic factors such as quantity of light, water, range of temperatures, or soil composition;

(C)  explore how short- and long-term environmental changes affect organisms and traits in subsequent populations; and

(D)  recognize human dependence on ocean systems and explain how human activities such as runoff, artificial reefs, or use of resources have modified these systems.

High School

 Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to:

(A)  interpret relationships, including predation, parasitism, commensalism, mutualism, and competition among organisms;

(B)  compare variations and adaptations of organisms in different ecosystems;

(C)  analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids;

(D)  recognize that long-term survival of species is dependent on changing resource bases that are limited;

(E)  describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles; and

(F)  describe how environmental change can impact ecosystem stability.

**20 – Eggs and Hardrosaur Bone**

Elementary K-2

Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them survive within their environments. The student is expected to:

(A)  investigate how the external characteristics of an animal are related to where it lives, how it moves, and what it eats;

(B)  identify and compare the parts of plants;

(C)  compare ways that young animals resemble their parents; and

(D)  observe and record life cycles of animals such as a chicken, frog, or fish

Elementary 3-5

Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environments. The student is expected to:

(A)  compare the structures and functions of different species that help them live and survive such as hooves on prairie animals or webbed feet in aquatic animals;

(B)  differentiate between inherited traits of plants and animals such as spines on a cactus or shape of a beak and learned behaviors such as an animal learning tricks or a child riding a bicycle; and

(C)  describe the differences between complete and incomplete metamorphosis of insects

Middle School

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. The student is expected to:

(A)  define heredity as the passage of genetic instructions from one generation to the next generation;

(B)  compare the results of uniform or diverse offspring from sexual reproduction or asexual reproduction; and

(C)  recognize that inherited traits of individuals are governed in the genetic material found in the genes within chromosomes in the nucleus

High School

Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to:

(A)  identify components of DNA, and describe how information for specifying the traits of an organism is carried in the DNA;

(B)  recognize that components that make up the genetic code are common to all organisms;

(C)  explain the purpose and process of transcription and translation using models of DNA and RNA;

(D)  recognize that gene expression is a regulated process;

(E)  identify and illustrate changes in DNA and evaluate the significance of these changes;

(F)  predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses and non-Mendelian inheritance;

(G)  recognize the significance of meiosis to sexual reproduction; and

(H)  describe how techniques such as DNA fingerprinting, genetic modifications, and chromosomal analysis are used to study the genomes of organisms

**28 - NASA**

Elementary

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

Middle School

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.

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 Herztsprung-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

High School

Science concepts. The student recognizes the importance and uses of astronomy in civilization. The student is expected to:

(A)  research and describe the use of astronomy in ancient civilizations such as the Egyptians, Mayans, Aztecs, Europeans, and the native Americans;

(B)  research and describe the contributions of scientists to our changing understanding of astronomy, including Ptolemy, Copernicus, Tycho Brahe, Kepler, Galileo, Newton, Einstein, and Hubble, and the contribution of women astronomers, including Maria Mitchell and Henrietta Swan Leavitt;

(C)  describe and explain the historical origins of the perceived patterns of constellations and the role of constellations in ancient and modern navigation; and

(D)  explain the contributions of modern astronomy to today's society, including the identification of potential asteroid/comet impact hazards and the Sun's effects on communication, navigation, and high-tech devices.

Science concepts. The student develops a familiarity with the sky. The student is expected to:

(A)  observe and record the apparent movement of the Sun and Moon during the day;

(B)  observe and record the apparent movement of the Moon, planets, and stars in the nighttime sky; and

(C)  recognize and identify constellations such as Ursa Major, Ursa Minor, Orion, Cassiopeia, and constellations of the zodiac.

Science concepts. The student knows our place in space. The student is expected to:

(A)  compare and contrast the scale, size, and distance of the Sun, Earth, and Moon system through the use of data and modeling;

(B)  compare and contrast the scale, size, and distance of objects in the solar system such as the Sun and planets through the use of data and modeling;

(C)  examine the scale, size, and distance of the stars, Milky Way, and other galaxies through the use of data and modeling;

(D)  relate apparent versus absolute magnitude to the distances of celestial objects; and

(E)  demonstrate the use of units of measurement in astronomy, including Astronomical Units and light years.

Science concepts. The student knows the role of the Moon in the Sun, Earth, and Moon system. The student is expected to:

(A)  observe and record data about lunar phases and use that information to model the Sun, Earth, and Moon system;

(B)  illustrate the cause of lunar phases by showing positions of the Moon relative to Earth and the Sun for each phase, including new moon, waxing crescent, first quarter, waxing gibbous, full moon, waning gibbous, third quarter, and waning crescent;

(C)  identify and differentiate the causes of lunar and solar eclipses, including differentiating between lunar phases and eclipses; and

(D)  identify the effects of the Moon on tides.

Science concepts. The student knows the reasons for the seasons. The student is expected to:

(A)  recognize that seasons are caused by the tilt of Earth's axis;

(B)  explain how latitudinal position affects the length of day and night throughout the year;

(C)  recognize that the angle of incidence of sunlight determines the concentration of solar energy received on Earth at a particular location; and

(D)  examine the relationship of the seasons to equinoxes, solstices, the tropics, and the equator.

 Science concepts. The student knows that planets of different size, composition, and surface features orbit around the Sun. The student is expected to:

(A)  compare and contrast the factors essential to life on Earth such as temperature, water, mass, and gases to conditions on other planets;

(B)  compare the planets in terms of orbit, size, composition, rotation, atmosphere, natural satellites, and geological activity;

(C)  relate the role of Newton's law of universal gravitation to the motion of the planets around the Sun and to the motion of natural and artificial satellites around the planets; and

(D)  explore the origins and significance of small solar system bodies, including asteroids, comets, and Kuiper belt objects.

Science concepts. The student knows the role of the Sun as the star in our solar system. The student is expected to:

(A)  identify the approximate mass, size, motion, temperature, structure, and composition of the Sun;

(B)  distinguish between nuclear fusion and nuclear fission, and identify the source of energy within the Sun as nuclear fusion of hydrogen to helium;

(C)  describe the eleven-year solar cycle and the significance of sunspots; and

(D)  analyze solar magnetic storm activity, including coronal mass ejections, prominences, flares, and sunspots.

Science concepts. The student knows the characteristics and life cycle of stars. The student is expected to:

(A)  identify the characteristics of main sequence stars, including surface temperature, age, relative size, and composition;

(B)  characterize star formation in stellar nurseries from giant molecular clouds, to protostars, to the development of main sequence stars;

(C)  evaluate the relationship between mass and fusion on the dying process and properties of stars;

(D)  differentiate among the end states of stars, including white dwarfs, neutron stars, and black holes;

(E)  compare how the mass and gravity of a main sequence star will determine its end state as a white dwarf, neutron star, or black hole;

(F)  relate the use of spectroscopy in obtaining physical data on celestial objects such as temperature, chemical composition, and relative motion; and

(G)  use the Hertzsprung-Russell diagram to plot and examine the life cycle of stars from birth to death.

Science concepts. The student knows the variety and properties of galaxies. The student is expected to:

(A)  describe characteristics of galaxies;

(B)  recognize the type, structure, and components of our Milky Way galaxy and location of our solar system within it; and

(C)  compare and contrast the different types of galaxies, including spiral, elliptical, irregular, and dwarf.

Science concepts. The student knows the scientific theories of cosmology. The student is expected to:

(A)  research and describe the historical development of the Big Bang Theory, including red shift, cosmic microwave background radiation, and other supporting evidence;

(B)  research and describe current theories of the evolution of the universe, including estimates for the age of the universe; and

(C)  research and describe scientific hypotheses of the fate of the universe, including open and closed universes and the role of dark matter and dark energy.

Science concepts. The student recognizes the benefits and challenges of space exploration to the study of the universe. The student is expected to:

(A)  identify and explain the contributions of human space flight and future plans and challenges;

(B)  recognize the advancement of knowledge in astronomy through robotic space flight;

(C)  analyze the importance of ground-based technology in astronomical studies;

(D)  recognize the importance of space telescopes to the collection of astronomical data across the electromagnetic spectrum; and

(E)  demonstrate an awareness of new developments and discoveries in astronomy.

**Social Studies TEKS Associated with Display Exhibits**

Elementary

 Social studies skills. The student applies critical-thinking skills to organize and use information acquired from a variety of valid sources, including electronic technology. The student is expected to:

(A)  research information, including historical and current events, and geographic data, about the community and world, using a variety of valid print, oral, visual, and Internet resources;

(B)  sequence and categorize information;

(C)  interpret oral, visual, and print material by identifying the main idea, distinguishing between fact and opinion, identifying cause and effect, and comparing and contrasting;

(D)  use various parts of a source, including the table of contents, glossary, and index as well as keyword Internet searches, to locate information;

(E)  interpret and create visuals, including graphs, charts, tables, timelines, illustrations, and maps; and

(F)  use appropriate mathematical skills to interpret social studies information such as maps and graphs.

Social studies skills. The student communicates in written, oral, and visual forms. The student is expected to:

(A)  express ideas orally based on knowledge and experiences;

(B)  use technology to create written and visual material such as stories, poems, pictures, maps, and graphic organizers to express ideas; and

(C)  use standard grammar, spelling, sentence structure, and punctuation.

Social studies skills. The student uses problem-solving and decision-making skills, working independently and with others, in a variety of settings. The student is expected to:

(A)  use a problem-solving process to identify a problem, gather information, list and consider options, consider advantages and disadvantages, choose and implement a solution, and evaluate the effectiveness of the solution; and

(B)  use a decision-making process to identify a situation that requires a decision, gather information, identify options, predict consequences, and take action to implement a decision.

Middle School

Social studies skills. The student applies critical-thinking skills to organize and use information acquired through established research methodologies from a variety of valid sources, including electronic technology. The student is expected to:

(A)  differentiate between, locate, and use valid primary and secondary sources such as computer software, databases, media and news services, biographies, interviews, and artifacts to acquire information about the United States;

(B)  analyze information by sequencing, categorizing, identifying cause-and-effect relationships, comparing, contrasting, finding the main idea, summarizing, making generalizations and predictions, and drawing inferences and conclusions;

(C)  organize and interpret information from outlines, reports, databases, and visuals, including graphs, charts, timelines, and maps;

(D)  identify points of view from the historical context surrounding an event and the frame of reference which influenced the participants;

(E)  support a point of view on a social studies issue or event;

(F)  identify bias in written, oral, and visual material;

(G)  evaluate the validity of a source based on language, corroboration with other sources, and information about the author;

(H)  use appropriate mathematical skills to interpret social studies information such as maps and graphs;

(I)  create thematic maps, graphs, charts, models, and databases representing various aspects of the United States; and

(J)  pose and answer questions about geographic distributions and patterns shown on maps, graphs, charts, models, and databases.

Social studies skills. The student communicates in written, oral, and visual forms. The student is expected to:

(A)  use social studies terminology correctly;

(B)  use standard grammar, spelling, sentence structure, punctuation, and proper citation of sources;

(C)  transfer information from one medium to another, including written to visual and statistical to written or visual, using computer software as appropriate; and

(D)  create written, oral, and visual presentations of social studies information.

Social studies skills. The student uses problem-solving and decision-making skills, working independently and with others, in a variety of settings. The student is expected to:

(A)  use a problem-solving process to identify a problem, gather information, list and consider options, consider advantages and disadvantages, choose and implement a solution, and evaluate the effectiveness of the solution; and

(B)  use a decision-making process to identify a situation that requires a decision, gather information, identify options, predict consequences, and take action to implement a decision.

High School

Social studies skills. The student applies critical-thinking skills to organize and use information acquired from a variety of valid sources, including electronic technology. The student is expected to:

(A)  analyze information by sequencing, categorizing, identifying cause-and-effect relationships, comparing, contrasting, finding the main idea, summarizing, making generalizations and predictions, and drawing inferences and conclusions;

(B)  create a product on a contemporary government issue or topic using critical methods of inquiry;

(C)  analyze and defend a point of view on a current political issue;

(D)  analyze and evaluate the validity of information, arguments, and counterarguments from primary and secondary sources for bias, propaganda, point of view, and frame of reference;

(E)  evaluate government data using charts, tables, graphs, and maps; and

(F)  use appropriate mathematical skills to interpret social studies information such as maps and graphs.

Social studies skills. The student communicates in written, oral, and visual forms. The student is expected to:

(A)  use social studies terminology correctly;

(B)  use standard grammar, spelling, sentence structure, and punctuation;

(C)  transfer information from one medium to another, including written to visual and statistical to written or visual, using computer software as appropriate; and

(D)  create written, oral, and visual presentations of social studies information.

 Social studies skills. The student uses problem-solving and decision-making skills, working independently and with others, in a variety of settings. The student is expected to:

(A)  use a problem-solving process to identify a problem, gather information, list and consider options, consider advantages and disadvantages, choose and implement a solution, and evaluate the effectiveness of the solution; and

(B)  use a decision-making process to identify a situation that requires a decision, gather information, identify options, predict consequences, and take action to implement a decision.