All Aboard for the Great Outdoors

(4th Grade Social Studies and Science)

Train Bingo (Vocabulary)

Heard Natural Science Museum & Wildlife Sanctuary

Texas Regions Activity

Museum of the American Railroad/TrainTopia

Chapter 113

TEXAS ESSENTIAL KNOWLEDGE AND SKILLS FOR SOCIAL STUDIES

Subchapter A

ELEMENTARY

Rule §113.15

Social Studies, Grade 4, Adopted 2022

(c) Knowledge and skills.

(4) History. The student understands the political, economic, and social changes in Texas during the last half of the 19th century. The student is expected to:

(A) describe the impact of the Civil War and Reconstruction on Texas;

(B) explain the growth, development, and impact of the cattle industry such as contributions made by Charles Goodnight, Richard King, and Lizzie Johnson;

(C) explain the effects of the railroad industry on life in Texas, including changes to cities and major industries; and

(D) explain the effects on American Indian life brought about by the Red River War, building of U.S. forts and railroads, and loss of buffalo.

(5) History. The student understands important issues, events, and individuals of the 20th century in Texas. The student is expected to:

(A) explain the impact of various events on life in Texas such as the Great Depression, the Dust Bowl, and World War II and notable individuals such as Audie Murphy, Cleto Rodríguez, and Bessie Coleman and other local individuals; and

(B) explain the development and impact of the oil and gas industry on industrialization and urbanization in Texas, including Spindletop and important people such as Pattillo Higgins.

(6) Geography. The student understands the concept of regions. The student is expected to:

(A) identify, locate, and describe the physical regions of Texas (Mountains and Basins, Great Plains, North Central Plains, Coastal Plains), including their characteristics such as landforms, climate, vegetation, and economic activities; and

(B) compare the physical regions of Texas (Mountains and Basins, Great Plains, North Central Plains, Coastal Plains).

(7) Geography. The student understands the location and patterns of settlement and the geographic factors that influence where people live. The student is expected to:

(A) explain the geographic factors such as landforms and climate that influence patterns of settlement and the distribution of population in Texas, past and present; and

(B) identify and explain patterns of settlement such as the location of towns and cities in Texas at different time periods.

(8) Geography. The student understands how people adapt to and modify their environment. The student is expected to:

(A) describe ways people have adapted to and modified their environment in Texas, past and present, such as timber clearing, agricultural production, wetlands drainage, energy production, and construction of dams;

(B) explain reasons why people have adapted to and modified their environment in Texas, past and present, such as the use of natural resources to meet basic needs, facilitate transportation, and enhance recreational activities; and

(C) compare the positive and negative consequences of human modification of the environment in Texas, past and present.

(10) Economics. The student understands the characteristics and benefits of the free enterprise system in Texas. The student is expected to:

(A) describe how the free enterprise system works, including supply and demand;

(B) identify examples of the benefits of the free enterprise system such as choice and opportunity; and

(C) describe the development of the free enterprise system in Texas such as the growth of cash crops by early colonists and the railroad boom.

(11) Economics. The student understands patterns of work and economic activities in Texas. The student is expected to:

(A) identify how people in different regions of Texas earn their living, past and present;

(B) explain how physical geographic factors such as climate and natural resources have influenced the location of economic activities in Texas;

(C) identify the effects of exploration, immigration, migration, and limited resources on the economic development and growth of Texas; and

(D) explain how developments in transportation and communication have influenced economic activities in Texas.

(16) Citizenship. The student understands the importance of effective leadership in a constitutional republic. The student is expected to:

(B) identify leadership qualities of state and local leaders, past and present.

(18) Science, technology, and society. The student understands the impact of science and technology on life in Texas. The student is expected to:

(A) identify famous inventors and scientists such as Gail Borden, Joseph Glidden, Michael DeBakey, and Millie Hughes-Fulford and their contributions; and

(B) describe how scientific discoveries and innovations such as in aerospace, agriculture, energy, and technology have benefited individuals, businesses, and society in Texas.

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

(A) differentiate between, locate, and use valid primary and secondary sources such as technology; interviews; biographies; oral, print, and visual material; documents; and artifacts to acquire information about Texas;

(B) differentiate and compare the information about a specific issue or event provided in primary and secondary sources;

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

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

(E) identify different points of view about an issue, topic, historical event, or current event;

Chapter 112

TEXAS ESSENTIAL KNOWLEDGE AND SKILLS FOR SCIENCE

Subchapter A

ELEMENTARY

Rule §112.6

Science, Grade 4, Adopted 2021

(b) Knowledge and skills.

(3) Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:

(A) develop explanations and propose solutions supported by data and models;

(C) listen actively to others' explanations to identify relevant evidence and engage respectfully in scientific discussion.

(4) Scientific and engineering practices. The student knows the contributions of scientists and recognizes the importance of scientific research and innovation for society. The student is expected to:

(B) research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field to investigate STEM careers.

(5) Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. The student is expected to:

(A) identify and use patterns to explain scientific phenomena or to design solutions;

(D) examine and model the parts of a system and their interdependence in the function of the system;

(E) investigate how energy flows and matter cycles through systems and how matter is conserved;

(F) explain the relationship between the structure and function of objects, organisms, and systems; and

(G) explain how factors or conditions impact stability and change in objects, organisms, and systems.

(8) Force, motion, and energy. The student knows that energy is everywhere and can be observed in cycles, patterns, and systems. The student is expected to:

(A) investigate and identify the transfer of energy by objects in motion, waves in water, and sound;

(B) identify conductors and insulators of thermal and electrical energy; and

(C) demonstrate and describe how electrical energy travels in a closed path that can produce light and thermal energy.

(10) Earth and space. The student knows that there are processes on Earth that create patterns of change. The student is expected to:

(A) 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;

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

(C) differentiate between weather and climate.

(12) Organisms and environments. The student describes patterns, cycles, systems, and relationships within environments. The student is expected to:

(A) investigate and explain how most producers can make their own food using sunlight, water, and carbon dioxide through the cycling of matter;

(B) describe the cycling of matter and flow of energy through food webs, including the roles of the Sun, producers, consumers, and decomposers; and

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

(A) explore and explain how structures and functions of plants such as waxy leaves and deep roots enable them to survive in their environment; and

(B) differentiate between inherited and acquired physical traits of organisms.

All Aboard for the Great Outdoors

(5th Grade Science)

Train Bingo (Vocabulary)

Heard Natural Science Museum & Wildlife Sanctuary

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Chapter 112

TEXAS ESSENTIAL KNOWLEDGE AND SKILLS FOR SCIENCE

Subchapter A

ELEMENTARY

Rule §112.7

Science, Grade 5, Adopted 2021

(a) Introduction.

(1) In Kindergarten through Grade 5 Science, content is organized into recurring strands. The concepts within each grade level build on prior knowledge, prepare students for the next grade level, and establish a foundation for high school courses. In Grade 5, the following concepts will be addressed in each strand.

(A) Scientific and engineering practices. Scientific inquiry is the planned and deliberate investigation of the natural world using scientific and engineering practices. Scientific methods of investigation are descriptive, correlative, comparative, or experimental. The method chosen should be appropriate to the grade level and question being asked. Student learning for different types of investigations includes descriptive investigations, which have no hypothesis that tentatively answers the research question and involve collecting data and recording observations without making comparisons; correlative and comparative investigations, which have a hypothesis that predicts a relationship and involve collecting data, measuring variables relevant to the hypothesis that are manipulated, and comparing results; and experimental investigations, which involve processes similar to comparative investigations but in which a hypothesis can be tested by comparing a treatment with a control.

(i) Scientific practices. Students ask questions, plan and conduct investigations to answer questions, and explain phenomena using appropriate tools and models.

(ii) Engineering practices. Students identify problems and design solutions using appropriate tools and models.

(iii) To support instruction in the science content standards, it is recommended that districts integrate scientific and engineering practices through classroom and outdoor investigations for at least 50% of instructional time.

(B) Matter and energy. Students investigate matter expanding their understanding of properties learned in Grade 4 (mass, volume, states, temperature, magnetism, and relative density) to include solubility and the ability to conduct or insulate both thermal and electrical energy. Students observe the combination of substances to make mixtures and develop an understanding of conservation of matter. These concepts lead to the understanding of elements and compounds. Students will build on this understanding in middle school when they learn to determine density and to identify evidence of chemical changes.

(C) Force, motion, and energy. Students investigate equal and unequal forces and the effects these forces have on objects (motion and direction). Additionally, students investigate energy, including mechanical, light, thermal, electrical, and sound. They uncover cycles (e.g., movement of thermal energy), patterns (e.g., behavior of light, including reflection and refraction), and systems through their exploration. Students will build on this understanding in middle school when they begin to use calculations and measurements to study force, motion, and energy through the study of Newton's Laws of Motion.

(D) Earth and space. This strand is focused on identifying recognizable patterns and processes as students learn about Earth's rotation and demonstrate the effects this movement has on Earth's surface, including day and night, shadows, and the rotation of Earth on its axis. Students continue their learning of patterns and processes on Earth while exploring weather, climate, the water cycle, the formation of sedimentary rock and fossil fuels, and the formation of landforms. Finally, students learn ways to manage natural resources to support a healthy environment.

(E) Organisms and environments. This strand focuses on identifying relationships, systems, and cycles within organisms and environments. Students describe the interactions of biotic and abiotic factors in an ecosystem. Students build on their understanding of food webs from Grade 4 by predicting how ecosystem changes affect the flow of energy. Additionally, they describe how humans impact the ecosystem. Students also learn how organisms' structures help them to survive, and they distinguish between instinctual and learned behaviors in animals. This will set the foundation for Grade 6 where students compare and contrast variations within organisms and how they impact survival.

(2) Nature of science. 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." 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 currently scientifically testable.

(3) Scientific observations, inferences, hypotheses, and theories. Students are expected to know that:

(A) observations are active acquisition of either qualitative or quantitative information from a primary source through the senses;

(B) inferences are conclusions reached on the basis of observations or reasoning supported by relevant evidence;

(C) hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories; and

(D) scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed.

(4) Science and social ethics. Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. Students distinguish between scientific decision-making practices and ethical and social decisions that involve science.

(5) Recurring themes and concepts. Science consists of recurring themes and making connections between overarching concepts. Recurring themes include structure and function, systems, models, and patterns. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. Models have limitations but provide a tool for understanding the ideas presented. Students analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.

(6) Statements containing the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(b) Knowledge and skills.

(2) Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to:

(B) analyze data by identifying any significant features, patterns, or sources of error;

(C) use mathematical calculations to compare patterns and relationships.

(3) Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:

(C) listen actively to others' explanations to identify relevant evidence and engage respectfully in scientific discussion.

(4) Scientific and engineering practices. The student knows the contributions of scientists and recognizes the importance of scientific research and innovation for society. The student is expected to:

(B) research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field to investigate STEM careers.

(5) Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. The student is expected to:

(C) use scale, proportion, and quantity to describe, compare, or model different systems;

(E) investigate how energy flows and matter cycles through systems and how matter is conserved;

(F) explain the relationship between the structure and function of objects, organisms, and systems; and

(G) explain how factors or conditions impact stability and change in objects, organisms, and systems.

(7) Force, motion, and energy. The student knows the nature of forces and the patterns of their interactions. The student is expected to:

(A) investigate and explain how equal and unequal forces acting on an object cause patterns of motion and transfer of energy; and

(B) design a simple experimental investigation that tests the effect of force on an object in a system such as a car on a ramp or a balloon rocket on a string.

(8) Force, motion, and energy. The student knows that energy is everywhere and can be observed in cycles, patterns, and systems. The student is expected to:

(A) investigate and describe the transformation of energy in systems such as energy in a flashlight battery that changes from chemical energy to electrical energy to light energy;

(B) demonstrate that electrical energy in complete circuits can be transformed into motion, light, sound, or thermal energy and identify the requirements for a functioning electrical circuit; and

(C) demonstrate and explain how light travels in a straight line and can be reflected, refracted, or absorbed.

(12) Organisms and environments. The student describes patterns, cycles, systems, and relationships within environments. The student is expected to:

(A) observe and describe how a variety of organisms survive by interacting with biotic and abiotic factors in a healthy ecosystem;

(B) predict how changes in the ecosystem affect the cycling of matter and flow of energy in a food web; and

(C) describe a healthy ecosystem and how human activities can be beneficial or harmful to an ecosystem.

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

(A) analyze the structures and functions of different species to identify how organisms survive in the same environment; and