

KANSAS SCHOOL FOR THE DEAF

SCIENCE CURRICULUM

Grades K-12

**Adapted from the February 2007
Kansas State Curricular Standards
(Revised August 2007)**

Science Curriculum Standards

Standard 1 – Science as Inquiry

The student begins to develop the physical and intellectual abilities of scientific inquiry.

Standard 2 – Physical Science (Physics & Chemistry)

The student will explore the world by observing and manipulating common objects and materials in their environment.

Standard 3 – Life Science

The student will begin to develop an understanding of biological concepts.

Standard 4 – Earth & Space Science

The student will observe closely the objects and materials in their environment.

Standard 5 – Science and Technology

The student will have a variety of educational experiences that involve science and technology.

Standard 6 – Science in Personal & Environmental Perspectives

The student will have a variety of experiences that provide understanding for various science-related personal and environmental challenges.

Standard 7 – History and Nature of Science

The student will experience scientific inquiry and learn about people from history.

Grades K-2

Standard 1 – Science as Inquiry—The student will experience science as *full inquiry*. In the elementary grades, students begin to develop the physical and intellectual abilities of scientific inquiry.

B1 – The student will be involved in activities that develop skills necessary to conduct scientific inquiries.

1. The student identifies properties of objects.
2. The student classifies and arranges groups of objects by a variety of properties, one property at a time.
3. The student uses appropriate materials, tools, and safety procedures to collect information.
4. The student asks and answers questions about objects, organisms, and events in his/her environment.
5. The student describes an observation orally or pictorially.

Standard 2 – Physical Science—The student will explore the world by observing and manipulating common objects and materials in their environment.

B1 – The student will develop skills to describe objects.

1. The student observes properties of objects and measures or describes those properties using age-appropriate tools and materials.

2. The student separates or sorts a group of objects or materials by properties.
3. The student compares solids and liquids.
4. The student describes the position of an object in relation to other objects.

Standard 3 –Life Science—The student will begin to develop an understanding of biological concepts.

B1 – The student will develop an understanding of the characteristics of living things.

1. The student discusses that organisms live only in environments in which their needs can be met.
2. The student observes life cycles of different living things.
3. The student observes living things in various environments.
4. The student examines the structures/parts of living things.

Standard 4 –Earth and Space Science—The student will observe closely the objects and materials in their environment.

B1 – The student will describe properties of earth materials.

1. The student observes, compares, and sorts earth materials.

B2 – The student will observe and compare objects in the sky.

1. The student observes and recognizes the sun, moon, stars, clouds, birds, airplanes, and other objects in the sky.
2. The student describes that the sun provides light and warmth.

B3 – The student will describe changes in weather.

1. The student observes changes in the weather from day to day.
2. The student records weather changes daily.
3. The student discusses weather safety procedures.

Standard 5 – Science and Technology—The student will have a variety of educational experiences that involve science and technology.

B1 – The student will use technology to learn about the world around them.

1. The student explores the way things work.
2. The student experiences science through technology.

Standard 6 – Science in Personal and Environmental Perspectives—The student will have a variety of experiences that provide understandings for various science-related personal and environmental challenges.

B1 – The student will demonstrate responsibility for their own health.

1. The student engages in personal care.
2. The student discusses healthy foods.
3. The student discusses that humans need to practice being safe.

Standard 7 – History and Nature of Science—The student will experience scientific inquiry and learn about people from history.

B1 – The student will know they practice science.

1. The student is involved in explorations that make his/her mind wonder and know that he/she is practicing science.
2. The student uses technology to learn about people in science.

Grades 3-4
(▲=Grade 4 Assessed Indicator)

Standard 1 –Science as Inquiry—The student will experience science as full inquiry. In the elementary grades, students begin to develop the physical and intellectual abilities of scientific inquiry.

B1 – The student will develop the skills necessary to do full inquiry. *Full inquiry* involves asking a simple question, completing an *investigation*, answering the question, and sharing the results with others.

1. The student asks questions that he/she can answer by investigating. ▲
2. The student plans and conducts a simple investigation. ▲
3. The student employs appropriate equipment, tools, and safety procedures to gather data. ▲
4. The student begins developing the ability to communicate, critique, analyze his/her own investigations, and interpret the work of other students. ▲

Standard 2 –Physical Science—The student will increase their understanding of the properties of objects and materials that they encounter on a daily basis. The student will compare, describe, and sort and classify these materials by observable properties.

B1 – The student will develop skills to describe objects.

1. The student observes properties of objects and measures those properties using appropriate tools. ▲
2. The student describes and classifies objects by more than one property. ▲
3. The student observes and records how one object interacts with another object. ▲
4. The student recognizes and describes the differences between solids, liquids, and gases. ▲

B2 – The student will describe the motion of objects.

1. The student moves objects by pushing, pulling, throwing, spinning, dropping, and rolling; and describes the motion. ▲
2. The student describes the change in position of objects when moved.

B3 – The student will recognize and demonstrate what makes sounds.

1. The student identifies that the source of sound is vibrations. ▲
2. The student discriminates between sounds made by different objects.
3. The student discriminates between various pitches.

B4 – The student will experiment with electricity and magnetism.

1. The student demonstrates that magnets attract and repel. ▲
2. The student designs a simple experiment to determine whether various objects will be attracted to magnets.
3. The student constructs a simple circuit. ▲

Standard 3 –Life Science—The student will develop an understanding of biological concepts through direct experience with living things, their life cycles, and their habitats.

B1 – The student will develop knowledge of organisms in their environment.

1. The student observes organisms and compares and contrasts how similar functions are served by different structural characteristics. ▲
2. The student compares basic needs of different organisms in their environment. ▲
3. The student discusses ways organisms use their senses to survive in their environments.

B2 – The student will observe and illustrate the life cycles of various organisms.

1. The student compares, contrasts, and asks questions about life cycles of various organisms. ▲

Standard 4 –Earth and Space Science—The student will observe objects, materials, and changes in their environment, note their properties, distinguish one from another, and develop their own explanations of how things become the way they are.

B1 – The student will develop an understanding of the properties of earth materials.

1. The student collects, observes properties, and classifies a variety of earth materials in his/her environment. ▲
2. The student experiments with a variety of soil types (clay, silt, sand, and loam).
3. The student describes properties of water and process of the water cycle. ▲
4. The student observes and records the properties of fossils and discusses what fossils are.

B2 – The student will observe and describe objects in the sky.

1. The student observes the moon and stars.
2. The student observes and compares the length of shadows.

3. The student discusses that the sun provides light and heat (electromagnetic radiation) to maintain the temperature of the earth. ▲

B3 – The student will develop skills necessary to describe changes in the earth and weather.

1. The student describes changes in the surface of the earth. ▲
2. The student observes, describes, and records daily and seasonal weather changes. ▲

Standard 5 – Science and Technology—The student will have a variety of educational experiences which involve science and technology. The student will begin to understand the design process.

B1 – The student will work with a technology design.

1. The student identifies a simple design problem (designs a plan, implements the plan, evaluates the results, makes changes to improve the product, and communicates the results). ▲

B2 – The student will apply their understanding about science and technology.

1. The student will understand that the design process produces knowledge that can be used to solve a problem and improve our world.
2. The student invents a product to solve problems.
3. The student works with others to solve problems.

4. The student develops an awareness that women and men of all ages, backgrounds, and ethnic groups engage in a variety of scientific and technological work.
5. The student investigates how scientists use tools to observe.

Standard 6 –Science in Personal and Environmental Perspectives—The student will demonstrate personal health and environmental practices.

B1 – The student will develop an understanding of personal health.

1. The student discusses the nutritional value of various foods and their contribution to health. ▲
2. The student discusses that safety involves preventing injury by avoiding inappropriate risks and dangers.
3. The student assumes some responsibility for his/her own health, and the health and well being of others.

B2 – The student will demonstrate an awareness of changes in the environment.

1. The student defines pollution.
2. The student develops personal actions to solve pollution problems in and around the neighborhood.
3. The student practices reducing, reusing, and recycling.

Standard 7 –History and Nature of Science—The student will experience some things about scientific inquiry and learn about people from history.

B1 – The student will develop awareness that people practice science.

1. The student recognizes that students participate in science inquiry by asking questions.
2. The student studies the lives of people who made scientific contributions.

Grades 5-7
(▲=Grade 7 Assessed Indicator)

Standard 1 –Science as Inquiry—The student will develop the abilities to do scientific inquiry, be able to demonstrate how scientific inquiry is applied, and develop understandings about scientific inquiry.

B1 – The student will demonstrate abilities necessary to do the processes of scientific inquiry.

1. The student identifies questions that can be answered through scientific investigations. ▲
2. The student designs and conducts scientific investigations safely using appropriate tools, mathematics, technology, and techniques to gather, analyze, and interpret data. ▲
3. The student identifies the relationship between evidence and logical conclusions. ▲
4. The student communicates scientific procedures, results and explanations. ▲

B2 – The student will apply different kinds of investigations to different kinds of questions.

1. The student develops questions and adapts (frames) the inquiry process to guide the appropriate type of investigation.
2. The student differentiates between qualitative and quantitative data in an investigation.

B3 – The student will analyze how science advances through the interaction of new ideas, scientific investigations, skepticism, and examinations of evidence of varied explanations.

1. The student, after completing an investigation, generates alternative methods of investigation and/or further questions for inquiry.
2. The student evaluates the work of others to determine evidence which scientifically supports or contradicts the results, identifying faulty reasoning or conclusions that go beyond evidence and/or are not supported by data. ▲

Standard 2 – Physical Science—The student will apply process skills to develop an understanding of physical science including: properties, changes of properties of matter, motion and forces, and transfer of energy.

B1 – The student will observe, compare, and classify properties of matter.

1. The student compares and classifies the states of matter; solids, liquids, gases, and plasma. ▲
2. The student compares and contrasts classes of matter; elements, compounds, and mixtures.
3. The student identifies and communicates properties of matter including but not limited to, boiling point, solubility, and density.

B2 – The student will observe, measure, infer, and classify changes in properties of matter.

1. The student understands the relationship of atoms to elements and elements to compounds. ▲
2. The student measures and graphs the effects of temperature on matter. ▲

B3 – The student will investigate motion and forces.

1. The student identifies the forces that act on an object (e.g. gravity and friction).
2. The student describes, measures, and represents data on a graph showing the motion of an object (position, direction of motion, speed). ▲
3. The student recognizes and describes examples of Newton's Laws of Motion. ▲
4. The student investigates how simple machines multiply force at the expense of distance. ▲

B4 – The student will understand and demonstrate the transfer of energy.

1. The student understands the difference between potential and kinetic energy.
2. The student understands that when work is done energy transforms from one form to another, including mechanical, heat, light, sound, electrical, chemical, and nuclear energy, yet is conserved. ▲

3. The student observes and communicates how light (electromagnetic) energy interacts with matter: transmitted, reflected, refracted, and absorbed. ▲
4. The student understands that heat energy can be transferred from hot to cold by radiation, convection, and conduction. ▲

Standard 3 –Life Science—The student will apply process skills to explore and understand structure and function in living systems, reproduction and heredity, regulation and behavior, populations and ecosystems, and diversity and adaptations of organisms.

B1 – The student will model structures of organisms and relate functions to the structures.

1. The student will understand the cell theory; that all organisms are composed of one or more cells, cells are the basic unit of life, and that cells come from other cells. ▲
2. The student relates the structure of cells, organs, tissues, organ systems, and whole organisms to their functions. ▲
3. The student compares organisms composed of single cells with organisms that are multi-cellular.
4. The student concludes that breakdowns in structure or function may be caused by disease, damage, heredity, or aging.

B2 – The student will understand the role of reproduction and heredity for all living things.

1. The student differentiates between asexual and sexual reproduction of organisms. ▲
2. The student understands how hereditary information of each cell is passed from one generation to the next.
3. The student infers that the characteristics of an organism result from heredity and interactions with the environment.

B3 – The student will describe homeostasis, the regulation and balance of internal conditions in response to a changing external environment.

1. The student understands that internal and/or environmental conditions affect an organism's behavior and/or response in order to maintain and regulate stable internal conditions to survive in a continually changing environment. ▲
2. The student recognizes that the survival of all organisms requires the ingestion of materials, the intake and release of energy, growth, release of wastes and responses to environmental change.

B4 – The student will identify and relate interactions of populations of organisms within an ecosystem.

1. The student recognizes that all populations living together (biotic resources) and the physical factors (abiotic resources) with which they interact compose an ecosystem. ▲
2. The student understands how limiting factors determine the carrying capacity of an ecosystem.
3. The student traces the energy flow from the sun (source of radiant energy) to producers (via photosynthesis –chemical energy) to consumers and decomposers in food webs. ▲

B5 – The student will observe the diversity of living things and relate their adaptations to their survival or extinction.

1. The student concludes that species of animals, plants, and microorganisms may look dissimilar on the outside but have similarities in internal structures, developmental characteristics, chemical processes, and genomes.
2. The student understands that adaptations of organisms (changes in structure, function, or behavior that accumulate over successive generations) contribute to biological diversity. ▲
3. The student associates extinction of a species with environmental changes and insufficient adaptive characteristics. ▲

Standard 4 –Earth and Space Science—The student will apply process skills to explore and develop an understanding of the structure of the earth system, earth’s history, and earth in the solar system.

B1 – The student will understand that the structure of the earth system is continuously changing due to earth’s physical and chemical processes.

1. The student identifies properties of the solid earth, the oceans and fresh water, and the atmosphere. ▲
2. The student models earth’s cycles, constructive and destructive processes, and weather systems. ▲

B2 – The student will understand past and present earth processes and their similarity.

1. The student understands that earth processes observed today (including movement of lithospheric plates and changes in atmospheric conditions) are similar to those that occurred in the past; earth history is also influenced by occasional catastrophes, such as the impact of a comet or asteroid. ▲

B3 – The student will identify and classify stars, planets, and other solar system components.

1. The student compares and contrasts the characteristics of stars, planets, moons, comets, and asteroids. ▲
2. The student models spatial relationships of the earth/moon/planets/sun system to scale.

3. The student identifies past and present methods used to explore space.

B4 – The student will model motions and identify forces that explain earth phenomena.

1. The student demonstrates and models object/space/time relationships that explain phenomena such as the day, the month, the year, seasons, phases of the moon, eclipses and tides. ▲
2. The student describes how the angle of incidence of solar energy striking earth’s surface affects the amount of heat energy absorbed at the earth’s surface.

Standard 5 – Science and Technology—The student will demonstrate abilities of technological design and understanding about science and technology.

B1 – The student will demonstrate abilities of technological design.

1. The student identifies appropriate problems for technological design, designs a solution or product, implements the proposed design, evaluates the product, and communicates the process of technological design.

B2 – The student will develop understandings of the similarities, differences, and relationships in science and technology.

1. The student compares the work of various types of scientists and engineers.
2. The student evaluates benefits, risks, limitations and trade-offs of technological solutions.
3. The student identifies contributions to science and technology by many people and many cultures.

Standard 6 –Science in Personal and Environmental Perspectives—The student will apply process skills to explore and develop an understanding of issues of personal health, population, resources and environment, and natural hazards.

B1 – The student will understand scientific knowledge relative to personal health.

1. The student identifies individual nutrition, exercise, and a rest needs based on science and uses a scientific approach to thinking critically about personal health, lifestyle choices, risks and benefits. ▲

B2 – The student will understand the impact of human activity on resources and environment.

1. The student investigates the effects of human activities on the environment and analyzes decisions based on knowledge of benefits and risks. ▲

B3 – The student will understand that natural hazards are dynamic examples of earth processes which cause us to evaluate risks.

1. The student recognizes patterns of natural processes and/or human activities that may cause and/or contribute to natural hazards.
2. The student evaluates risks and defines appropriate actions associated with the natural hazard.

Standard 7 –History and Nature of Science—The student will examine and develop an understanding of science as a historical human endeavor.

B1 – The student will develop scientific habits of mind.

1. The student practices intellectual honesty, demonstrates skepticism appropriately, displays open-mindedness to new ideas, and bases decisions on evidence.

B2 – The student will research contributions to science throughout history.

1. The student recognizes that new knowledge leads to new questions and new discoveries, replicates historic experiments to understand principles of science, and relates contributions of men and women to the fields of science. ▲

Grades 8-12
(▲=High School Assessed Indicator)

Standard 1 –Science as Inquiry—The student will develop the abilities necessary to do scientific inquiry and develop an understanding of scientific inquiry.

B1 – The student will demonstrate the abilities necessary to do scientific inquiry.

1. The student actively engages in asking and evaluating research questions.
2. The student actively engages in investigations, including developing questions, gathering and analyzing data, and designing and conducting research. ▲
3. The student actively engages in using technological tools and mathematics in their own scientific investigations. ▲
4. The student actively engages in conducting an inquiry, formulating and revising his or her scientific explanations and models (physical, conceptual, or mathematical) using logic and evidence, and recognizing that potential alternative explanations and models should be considered.
5. The student actively engages in communicating and defending the design, results, and conclusion of his/her investigation.

Standard 2A –Chemistry—The student will develop an understanding of the structure of atoms, compounds, chemical reactions, and the interactions of energy and matter.

B1 – The student will understand the structure of the atom.

1. The student understands atoms, the fundamental organizational unit of matter, are composed of subatomic particles. Chemists are primarily interested in the protons, electrons, and neutrons found in the atom. ▲
2. The student understands isotopes are atoms with the same atomic number (same number of protons) but different numbers of neutrons. The nuclei of some atoms are radioactive isotopes that spontaneously decay, releasing radioactive energy.

B2 – The student will understand the states and properties of matter.

1. The student understands chemists use kinetic and potential energy to explain the physical and chemical properties of matter on earth that may exist in any of these three states: solids, liquids, and gases. ▲
2. The student understands the periodic table lists elements according to increasing atomic number. This table organizes physical and chemical trends by groups, periods, and sub-categories. ▲

- The student understands chemical bonds result when valence electrons are transferred or shared between atoms. Breaking a chemical bond requires energy. Formation of a chemical bond releases energy. Ionic compounds result from atoms transferring electrons. Molecular compounds result from atoms sharing electrons. For example, carbon atoms can bond to each other in chains, rings, and branching networks. Branched network and metallic solids also result from bonding. ▲

B3 – The student will gain a basic concept of chemical reactions.

- The student understands a chemical reaction occurs when one or more substances (reactants) react to form a different chemical substance(s) (products). There are different types of chemical reactions all of which demonstrate the Law of Conservation of Matter and Energy. ▲
- The student understands how to perform mathematical calculations regarding the Law of Conservation of Matter, i.e., through stoichiometric relationships.
- The student understands the differences and reactions between acids, bases, and salts. Perform calculations to determine the concentration of ions in solutions.

Standard 2B –Physics—The student will develop an understanding of the structure of atoms, compounds, chemical reactions, and the interactions of energy and matter.

B1 – The student will understand the relationships between force and motion.

- The student understands Newton's Laws and the variables of time, position, velocity, and acceleration can be used to describe the position and motion of particles. ▲
- The student understands physicists use conservation laws to analyze the motion of objects.

B2 – The student will understand the conservation of mass and energy, and the First and Second Laws of Thermodynamics.

- The student understands matter has energy. Mass and energy can be interchanged. The total energy in the universe is constant, but the type of energy may vary.
- The student understands the first law of thermodynamics states the total internal energy of a substance (the sum of all the kinetic and potential energies of its constituent molecules) will change only if heat is exchanged with the environment or work is done on or by the substance. In any physical interaction, the total energy in the universe is conserved. ▲
- The student understands the second law of thermodynamics that states the entropy of the universe is increasing.

B3 – The student will understand the nature of the fundamental interactions of matter and energy.

1. The student understands there are four fundamental forces in nature: strong nuclear force, weak nuclear force, electromagnetic force, and gravitational force.
2. The student understands waves have energy and can transfer energy when they interact with matter. ▲
3. The student understands interference—how waves interact with other waves.
4. The student will understand the principles of reflection and refraction.
5. The student understands electromagnetic waves result when a charged particle is accelerated or decelerated. ▲
6. The student understands basic electrostatics and circuits.

Standard 3 –Life Science—The student will develop an understanding of the cell, molecular basis of heredity, biological evolution, interdependence of organisms, matter, energy, and organization in living systems, and the behavior of organisms.

B1 – The student will demonstrate an understanding of the structure and function of the cell.

1. The student understands cells are composed of a variety of specialized structures that carry out specific functions.
2. The student understands cell functions involve specific chemical reactions. ▲
3. The student understands cell function and replicate as a result of information stored in DNA and RNA molecules.
4. The student understands some plant cells contain chloroplasts, which are the sites of photosynthesis.
5. The student understands cells can differentiate, thereby enabling complex multi-cellular organisms to form.

B2 – The student will demonstrate an understanding of chromosomes, genes, and the molecular basis of heredity.

1. The student understands living organisms contain DNA or RNA as their genetic material, which provides the instructions that specify the characteristics of organisms. ▲
2. The student understands organisms usually have a characteristic number of chromosomes; one pair of these may determine the sex of individuals.
3. The student understands hereditary information is contained in genes, located in the chromosomes of each cell. ▲

4. The student understands gametes carry the genetic information to the next generation.
5. The student understands expressed mutations occur in DNA at very low rates.

B3 – The student will understand biological evolution.

1. The student understands biological evolution, descent with modification, is a scientific explanation for the history of the diversification of organisms from common ancestors. ▲
2. The student understands populations of organisms adapt to environmental challenges and changes as a result of natural selection, genetic drift, and various mechanisms of genetic change.
3. The student understands biological evolution is used to explain the earth's present day biodiversity: the number, variety and variability of organisms. ▲
4. The student understands organisms vary widely within and between populations. Variation allows for natural selection to occur. ▲
5. The student understands the primary mechanism acting on variation is natural selection.
6. The student understands biological evolution is used as a broad, unifying theoretical framework for biology.

B4 – The student will understand the interdependence of organisms and their interaction with the physical environment.

1. The student understands atoms and molecules on the earth cycle among the living and nonliving components of the biosphere. ▲
2. The student understands energy is received, transformed and expended in ecosystems.
3. The student understands the distribution and abundance of organisms and populations in ecosystems are limited by the carrying capacity. ▲
4. The student understands organisms cooperate and compete in complex, interdependent relationships.
5. The student understands human beings live within and impact ecosystems.

B5 – The student will develop an understanding of matter, energy, and organization in living systems.

1. The student understands living systems require a continuous input of energy to maintain their chemical and physical organization.
2. The student understands the sun is the primary source of energy for life through the process of photosynthesis. ▲

3. The student understands food molecules contain biochemical energy, which is then available for cellular respiration. ▲
4. The student understands the structure and function of an organism serves to acquire, transform, transport, release, and eliminate the matter and energy used to sustain the organism.

B6 – The student will understand the behavior of animals.

1. The student understands animals have behavioral responses to internal changes and to external stimuli. ▲
2. The student understands most multi-cellular animals have nervous systems that underlie behavior.
3. The student understands behaviors are often adaptive when viewed in terms of survival and reproductive success.

B7 – The student will demonstrate an understanding of the diversity of structure and function in organisms.

1. The student understands differences in structure and function among organisms and can identify the characteristics of relevant life forms.
2. The student understands that homeostasis is the dynamic regulation and balance of an organism's internal environment to maintain conditions suitable for survival. ▲

3. The student understands that living things change following a specific pattern of developmental stages called life cycles. ▲
4. The student understands that in complex organisms there is a division of labor into specific body systems, e.g., respiration, digestion, nervous, endocrine, excretion, circulatory, reproductive, immune, skeletal and muscle.
5. The student understands taxonomy is the systematic way in which organism are placed into hierarchical classification system, according to their physical and genetic characteristics and their evolutionary history.

Standard 4 – Earth and Space Science—The student will develop an understanding of energy in the earth system, geochemical cycles, the formation and organization of the earth system, the dynamics of the earth/moon/sun system, and the organization and development of the universe.

B1 – The student will develop an understanding of the sources of energy that power the subsystems and cycles of the dynamic earth: The geosphere, hydrosphere, atmosphere and biosphere.

1. The student understands constructive and destructive processes, including weathering, erosion and deposition, dynamically reshape the surface of the earth.

2. The student understands the theory of Plate Tectonics explains that internal energy drives the Earth's ever changing structure. ▲
3. The student understands the ultimate source of atmospheric and oceanic energy comes from the sun. Energy flow drives global climate and weather. Climate and weather are influenced by geographic features, cloud cover, and the earth's rotation.
4. The student understands the processes of water cycling through surface water (oceans, lakes, streams, glaciers), ground water (aquifers), and the atmosphere (hydrological cycle).

B2 – The student will develop an understanding of the origin and development of the dynamic earth.

1. The student understands geological time is used to understand the earth's past. ▲

B3 – The student will develop an understanding of dynamics of our solar system.

1. The student understands gravitational attraction of objects in the solar system keeps solar system objects in orbit.
2. The student understands the relationship between the earth, moon, and sun explains the seasons, tides and moon phases. ▲
3. The student understands the relative sizes and distances of objects in the solar system.

4. The student understands the sun, earth, and other objects in the solar system formed from a nebular cloud of dust and gas.

B4 – The student will develop an understanding of the organization of the universe, and its development.

1. The student understands stellar evolution. ▲
2. The student understands the current scientific explanation of the origin and structure of the universe.
3. The student understands how the tools of astronomy have revolutionized the study of the universe.

Standard 5 –Science and Technology—The student will develop understandings about the relationship between science and technology.

B1 – The student will develop an understanding that technology is applied science.

1. The student understands technology is the application of scientific knowledge for functional purposes. ▲
2. The student understands creativity, imagination, and a broad scientific knowledge base are required to produce useful results.
3. The student understands science advances new technologies. New technologies open new areas for scientific inquiry.

Standard 6 –Science in Personal and Environmental Perspectives—The student will develop an understanding of personal and community health, population growth, natural resources, environmental quality, natural and human-induced hazards, and science and technology in local, national, and global settings.

B1 – The student will develop an understanding of the overall functioning of human systems and their interaction with the environment in order to understand specific mechanisms and processes related to health issues.

1. The student understands some chemical and physical hazards and accidents can be avoided through safety education.
2. The student understands the severity of disease symptoms is dependent on many factors.
3. The student understands informed personal choices concerning fitness and health involve an understanding of chemistry and biology.
4. The student understands selection of foods and eating patterns determine nutritional balance which affects emotional and physical well-being.

B2 – The student will demonstrate an understanding of population growth.

1. The student understands the rate of change in populations is determined by the combined effects of birth, death, emigration, and immigration.

2. The student understands a variety of factors influence birth rates and fertility rates.
3. The student understands populations have limits to growth.

B3 – The student will understand that human populations use natural resources and influence environmental quality.

1. The student understands natural resources from the lithosphere and ecosystems are required to sustain human populations. ▲
2. The student understands earth does not have infinite resources.

B4 – The student will understand the effect of natural and human-influenced hazards.

1. The student understands natural processes of earth may be hazardous for humans.
2. The student understands there is a need to assess potential risk and danger from natural and human-induced hazards.

B5 – The student will develop an understanding of the relationship between science, technology, and society.

1. The student understands progress in science and technology can be affected by social issues and

challenges. Science and technology indicate what can happen, not what should happen.

Standard 7 –History and Nature of Science—The student will develop understanding of science as a human endeavor, the nature of scientific knowledge, and historical perspectives.

B1 – The student will develop an understanding that science is a human endeavor that uses models to describe and explain the physical universe.

1. The student demonstrates an understanding of science as both vocation and avocation.
2. The student explains how science uses peer review, replication of methods, and norms of honesty.
3. The student recognizes the universality of basic science concepts and the influence of personal and cultural beliefs that embed science in society.
4. The student recognizes that society helps create the ways of thinking (mindsets) required for scientific advances, both toward training scientists and educating a populace to utilize benefits of science (e.g., standards of hygiene, attitudes toward forces of nature, etc.).
5. The student understands there are many issues which involve morals, ethics, values or spiritual beliefs that go beyond what science can explain, but for which solid scientific literacy is useful.

6. The student recognizes society's role in supporting topics of research and determining institutions where research is conducted.

B2 – The student will develop an understanding of the nature of scientific knowledge.

1. The student understands scientific knowledge describes and explains the physical world in terms of matter, energy, and forces. Scientific knowledge is provisional and is subject to change as new evidence becomes available.
2. The student understands scientific knowledge begins with empirical observations, which are the data (also called facts or evidence) upon which further scientific knowledge is built.
3. The student understands scientific knowledge consists of hypotheses, inferences, laws, and theories.
4. The student understands a testable hypothesis or inference must be subject to confirmation by empirical evidence.

B3 – The student will understand science from historical perspectives.

1. The student demonstrates an understanding of the history of science.
2. The student demonstrates a knowledge that scientific method historically proceeded from an inductive approach rather than a deductive approach.

