

## Science Standards and Benchmarks

### Standard 1. Understand and apply the skills of scientific inquiry.

CODE	BENCHMARK	LOCAL	ITBS	ITED	ALT	OTHER	OTHER
K.1.1	Know that learning comes from careful observations and simple experiments.						
K.1.2	Use careful observations and simple experiments to increase scientific knowledge.						
1.1.1	Discuss findings from observations and simple investigations.						
1.1.2	Asks questions based on observations and simple investigations.						
2.1.1	Knows that tools (i.e., thermometers, magnifiers, rulers, and balances) can be used to gather information and extend the senses.						
2.1.2	Makes predictions in scientific investigation.						
2.1.3	Compares using two or more attributes.						
3.1.1	Observes and predicts when performing scientific experiments.						
4.1.1	Recognize and classify objects that scientific investigation involves asking and answering a question and comparing the answer to what scientists already know about the world.						
5.1.1	Use simple equipment and tools to gather scientific data, extend the senses, and conduct simple investigations.						

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6.1.1	Uses simple equipment and tools to gather and analyze scientific data and extend the senses.						
6.1.2	Designs and conducts a scientific investigation						
7.1.1	Demonstrates an understanding of scientific methods and how they are used in the process of experimentation						
7.1.2	Uses appropriate tools and techniques to gather, analyze, and interpret scientific data.						
8.1.1	Continues to use appropriate tools and techniques to gather, analyze, and interpret scientific data.						
8.1.2	Knows that scientific inquiry includes evaluating results of scientific investigations, experiments, observations, theoretical and mathematical models, and explanations proposed by other scientists.						
CH.1.1	Solve problems using dimensional analysis						
PS.1.1	Read with confidence to find an answer and communicate results						
PS.1.2	Select and use appropriate technologies to gather, process, and analyze data and report information related to an investigation						
PS.1.3	Ask questions and state a hypothesis to guide exploration						
PS.1.4	Interpret and evaluate data in order to formulate conclusions						
PS.1.5	Be able to use discovery processes to experience science						
PS.1.6	Know that hypotheses are widely used in science for choosing what data to pay attention to and what additional data to seek, and for guiding the interpretation of the data						

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PS.1.7	Formulates a testable hypothesis						
PS.1.8	Designs and conducts scientific investigations by identifying and clarifying the question, method, controls, and variables; organizing and displaying data; revising methods and explanations; presenting the results; and receiving critical response from others.						
PS.1.9	Knows that conceptual principles and knowledge guide scientific inquiries, historical and current scientific knowledge influence the design and interpretation of investigations and the evaluation of proposed explanations made by other scientists						
PS.1.10	Knows that scientists conduct investigations for a variety of reasons, such as exploration of new areas, discovery of new aspects of the natural world, confirmation of prior investigations, prediction of current theories, and comparison of models and theories.						
PS.1.11	Knows the results of scientific inquiry —new knowledge and methods—emerge from different types of investigations and public communication among scientists; the nature of communicating and defending the results of scientific inquiry is guided by criteria of being logical and empirical and by connections between natural phenomena, investigations, and the historical body of scientific knowledge.						

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### Standard 2. Understand and apply scientific concepts, principles and theories pertaining to the earth and the universe.

CODE	BENCHMARK	LOCAL	ITBS	ITED	ALT	OTHER	OTHER
K.2.2	Distinguish between day and night.						
1.2.1	Recognizes that the sun supplies heat and light to Earth						
1.2.2	Identifies the properties of Earth's materials.						
2.2.1	Infers that weather can change from day to day and has seasonal patterns.						
3.2.1	Describe the water cycle, including evaporation, condensation, and precipitation.						
3.2.2	Describe and record weather conditions, patterns, and effects.						
4.2.1	Identifies the characteristics of the sun, moon, and Earth.						
4.2.2	Analyze the properties of Earth's minerals and rocks.						
5.2.1	Describe factors that affect the weather and its effects on the planet (water cycle, seasons, the atmosphere, weathering, etc).						
6.2.1	Identify objects in the universe and how they are affected by gravity (stars, planets, and other objects in and beyond our own solar system).						
6.2.2	Understands how features on the Earth's surface are constantly changed by a combination of slow and rapid processes (plate tectonics, earthquake, volcanoes, sea floor spreading).						

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7.2.1	Knows how the Sun acts as a major source of energy for changes on the Earth's surface.						
8.2.1	Understand basic processes of Earth.						
8.2.1	Understand essential ideas about the composition and structure of the universe.						
ES.2.1	Analyze the structure of a dynamic earth. (make-up of the earth—internal and external)						
ES.2.2	Knows the major external and internal sources of energy on Earth. (make-up of the earth—internal and external)						
ES.2.3	Knows that weather and climate involve the transfer of energy in and out of the atmosphere. (weather/climate)						
ES.2.4	Knows processes involved in the rock cycle (rock cycle)						
ES.2.5	Understands the concept of plate tectonics. (tectonic forces and activities)						
ES.2.6	Knows characteristics of our Sun and its position in the universe. (make-up of the universe)						
ES2.7	Explain the interaction between the earth's major forces (motions & forces of the universe)						
ES2.8	Knows characteristics and movement patterns of asteroids, comets, and meteors						
CH.2.1	Explain how an atom is affected when energy is absorbed or emitted by atoms (energy changes)						
PH.2.1	Understands the laws of planetary motion						

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### Standard 3. Understand and apply concepts, principles, and theories pertaining to life and its interactions.

CODE	BENCHMARK	LOCAL	ITBS	ITED	ALT	OTHER	OTHER
K.3.1	Identify the five senses and what they do.						
K.3.2	Recognizes that there are living and non-living things.						
1.3.1	Explain that plants and animals closely resemble their parents.						
1.3.2	Recognize that living things are found almost everywhere in the world, and that distinct environments support the life of different types of plants and animals.						
1.3.3	Identify the resources for energy and growth that plants and animals need (i.e., light, air, food, and water).						
2.3.1	Recognizes that Earth's environment changes over time, and living things must be able to adapt to these changes in order to survive.						
2.3.2	Describes the life cycles of plants and animals.						
3.3.1	Knows that animals and plants progress through life cycles of birth, growth, and development, reproduction and death						
3.3.2	Identify five sense organs and the stimuli's for each sense.						
4.3.1	Explains the functions of leaves, stems, and roots						
4.3.2	Recognizes animal adaptations help it survive in its environment						

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4.3.3	Discuss nutrition as it relates to health and body systems.						
5.3.1	List and describe the major land and water biomes (including weather, climate, plants, and animals).						
5.3.2	Describe and list the functions of the skeletal and muscular systems.						
6.3.1	Knows that all organisms are composed of cells, which are the fundamental units of life.						
6.3.2	Describe and list the functions of the circulatory, respiratory, and digestive systems.						
6.3.3	Analyze the components of ecosystems (food chains, food webs, interactions).						
7.3.1	Knows ways living things can be classified and their relationship in an ecosystem.						
7.3.2	Understand the structure and function of living systems including human systems.						
7.3.3	Identify and describe the structure and function of the cell.						
8.3.1	Explain how matter is recycled within ecosystems.						
ES.3.1	Knows how life is adapted to conditions on Earth. (earth processes)						
CH.3.1	Understands that enzymes are catalyst in chemical reactions in living organisms						
CH.3.2	Understands that food webs and food chains demonstrate laws of energy conservation						
CH.3.3	Understands that photosynthesis and respiration are examples of chemical reactions that take place in living organisms						

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LS.3.1	Knows ways in which genes may be altered and combined to create genetic variation within a species. (genetics)						
LS.3.2	Knows that the genetic information stored in DNA provides instructions for protein synthesis in cells. (genetics)						
LS.3.3	Examine the interdependency of cells to acquire a general picture of the function of cells and their specialized parts. (cell structure/function)						
PH.3.1	Knows that magnetic forces are very closely related to electric forces and can be thought of as different aspects of a single electromagnetic force. The interplay of these forces is the basis for electric motors, generators, radio, television, and many other modern technologies. (forces)						

### Standard 4. Understand and apply concepts and theories pertaining to the matter, its composition and the forces that govern it.

CODE	BENCHMARK	LOCAL	ITBS	ITED	ALT	OTHER	OTHER
K.4.1	Classify objects accordingly to observable physical properties (i.e., shape, size, color, paper, and wood).						
K.4.2	Observe an object's motion and position relative to its background (i.e., push/pull, gravity, and forms of energy).						
1.4.1	Demonstrates that magnets can be used to make certain objects move without being touched.						
2.4.1	Recognizes that objects exist in different states – solid, liquid, and gas.						
2.4.2	Identifies different types of energy forms and their production (i.e., heat, light, sound, electricity and magnetism).						

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3.4.1	Explain that materials have different states, solid, liquid, gas, and some common materials such as water can be changed from one state to another.						
3.4.2	Knows that magnets attract and repel each other and attract certain kinds of other materials.						
4.4.1	Define light, heat and sounds as kinds of energy that have certain properties.						
5.4.1	Differentiate between a chemical and physical change.						
5.4.2	Identify forces and their effects on objects (motion, inertia, friction and simple machines).						
5.4.3	Identify the basic components of electricity (currents, static, circuits).						
6.4.1	Demonstrates an understanding of basic atomic structures (protons, neutrons, electrons).						
6.4.2	Distinguish between acids and bases.						
6.4.3	Describe what happens to sound and light when they strike different types of matter and describe transmissions (prisms), absorption, and reflection (mirrors).						
7.4.1	Understand the basics of the structure and properties of the matter.						
8.4.1	List energy/heat (as conduction, convection, radiation, Law of Conservation of Energy).						
8.4.2	Knows that there are more than 100 known elements that combine in numerous ways to produce compounds, which account for the living and non-living substances that we encounter						
ES.4.1	Knows that throughout the rock cycle the total amount of material stays the same as its form changes. (rock cycle)						

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ES.4.2	Knows that evidence exists that suggests the universe is expanding. (theories of beginning)						
ES.4.3	Knows the common characteristics of stars in the universe. (make-up of the universe)						
CH.4.1	Understands how elements are arranged in the periodic table when elements are listed in order according to the number of protons (called the atomic number), repeating patterns of physical and chemical properties identify families of elements with similar properties (periodic table)						
CH.4.2	Knows that the physical & chemical properties of a compound are determined by its molecular structure and the interactions among these molecules—polar, non-polar, ionic, covalent, network (chemical/physical properties)						
CH.4.3	Classifies matter as elements, compounds and mixtures						
CH.4.4	Knows that the number of electrons in an atom determines whether the atom is electrically neutral or an ion (structure of matter)						
CH.4.5	Knows that when an element has atoms that differ in the number of neutrons, these atoms are called isotopes (structure of matter)						
CH.4.6	Knows how to write electron configurations and Lewis Dot Diagrams to model electron probability. (structure of matter)						
CH.4.7	Understands the complete mole concept and ways in which it can be used (stoichiometry & the mole)						
CH.4.8	Compare and contrast solids, liquids and gases and their changes in state (states of matter)						
CH.4.9	Knows that atoms consist of negative electrons, which occupy most of the space in the atom, and very tiny nuclei consisting of neutrons and positive protons, each almost two thousand times heavier than an electron; the electric force between the nucleus and electrons holds the atom together (states of matter)						

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CH.4. 10	Discuss the law of conservation of energy, law of conservation of mass and the law of conservation of mass-energy (energy changes)						
CH.4. 11	Write and correctly balance chemical equations, identify the types of reactions, and energy changes (exothermic/endothemic)						
CH.4. 12	Knows that chemical reactions can take place at vastly different rates and reaction rates depend on a variety of factors (chemical reactions)						
CH.4. 13	Knows how to write and name chemical formulas using oxidation numbers (nomenclature)						
CH.4. 14	Knows that atoms bond with one another by transferring or sharing electrons that are furthest from the nucleus (ionic, covalent, metallic)						
CH.4. 15	Knows how to find the concentration of a solution						
PS.4.1	Knows that atoms consist of negative electrons, which occupy most of the space in the atom, and very tiny nuclei consisting of neutrons and positive protons, each almost two thousand times heavier than an electron; the electric force between the nucleus and electrons hold the atom together (structure of atoms)						
PS.4.2	Knows that when an element has atoms that differ in the number of neutrons, these atoms are called different isotopes of the element; although neutrons have little effect on how an atom interacts with others. They do affect the mass and stability of the nucleus. (structure of atoms)						
PS.4.3	Understand, write, and balance chemical equations. (chemical reactions)						
PS.4.4	Knows that a large number of important reactions involve the transfer or sharing of electrons. (chemical reactions)						
PS.4.5	Be able to divide matter into different categories by their individual properties (interactions of matter & energy)						

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PS.4.6	Knows that energy tends to move spontaneously from hotter to cooler objects by conduction, convection, or radiation: similarly, any ordered state tends to spontaneously become less ordered over time. (interactions of matter & energy)						
PS.4.7	Knows that heat energy consists of random motion and the vibrations of atoms, molecules, and ions; the higher the temperature, the greater the atomic or molecular motion. (interactions of matter & energy)						
PS.4.8	Knows that fission is the splitting of a large nucleus into smaller pieces, and fusion is the joining of two nuclei at extremely high temperature and pressure						
PS.4.9	Knows that gravity is a universal force that each mass exerts on any other mass (motion and forces)						
PS.4.10	Knows that materials have different states and some common materials such as water can be changed from one state to another by heating or cooling (structure & properties of matter)						
PS.4.11	Knows that atoms in solids are close together and don't move about easily; in liquids, atoms are close together and stick to each other, but more about easily; atoms in gas are quite far apart and move about freely. (structure & properties of matter)						
PS.4.12	Understands how elements are arranged in the periodic table, and how this arrangement shows repeating patterns among elements with similar properties (structure & properties of matter)						
PS.4.13	Explain that atoms may be bonded together into molecules or crystalline solids, and compounds are formed from chemical bonds between two or more different kinds of atoms (structure & properties of matter)						
PS.4.14	Knows that the number of electrons in an atom determines whether the atom is electrically neutral or an ion (structure & properties of matter)						
PS.4.15	Know and apply how force and change in momentum are related (motion and forces)						

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PS.4.16	Illustrates that objects change their motion only when a net force is applied: whenever one object exerts force on another, an equal amount of force is exerted back on the first object. The magnitude of the change in motion can be calculated using the relationship $F=ma$						
PS.4.17	Knows that different kinds of materials respond differently to electric forces; in some materials, such as metals, electrons flow easily, whereas in insulating materials, such as glass, they hardly flow at all; semi-conducting materials have intermediate behavior, and at low temperatures some materials become superconductors and offer no resistance to the flow of electrons (motion and forces)						
PS.4.18	Describing, explaining, and quantifying that energy appears in different forms, and can be changed from one form to another according to the conservation of energy						
PS.4.19	Knows that an object's motion can be described, calculated, and represented graphically according to its change in position, direction of motion, and speed (motion & forces)						
PS.4.20	Knows that most chemical reactions involve a transfer of energy (structure & properties of matter)						
PH.4.1	Understands motion and movement (speed, velocity, acceleration, one-dimensional motion and two-dimensional motion)						
PH.4.2	Understands how forces affect motion (gravity, push/pull, friction)						
PH.4.3	Recalls that the strength of the gravitational force between two masses is proportional to the masses and inversely proportional to the square of the distance between them. (forces)						
PH.4.4	Recognize that electrical forces are directly proportional to the charge and inversely proportional to the square of the distance between them (forces)						
PH.4.5	Understands the conservation of momentum						
PH.4.6	Understands Newton's Laws and how they apply						

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PH.4.7	Recognizes that all energy is either potential energy or kinetic energy and it can be transferred between the two						
PH.4.8	Recalls that electromagnetic waves result when a charged particle is accelerated and the energy of the wave is inversely proportional to the wave length (waves)						
PH.4.9	Recognizes that waves have energy and transfers energy when they interact with matter (waves)						
PH.4.10	Knows the range of the electromagnetic spectrum (waves, motion)						
PH.4.11	Knows that moving electrical charged particles create magnetic fields and cutting magnetic fields will create an electrical charge flow (magnetism)						
PH.4.12	Knows that the pitch of a sound depends on the frequency of the vibration producing it. (waves, motion)						
PH.4.13	Knows that apparent changes in wavelength can provide information about changes in motion because the observed wavelength of a wave depends upon the relative motion of the sour and the observer. If either the source or observer is moving toward the other, the observed wavelength is shorter; if either is moving away, the wavelength is longer. (waves, motion)						
PH.4.14	Knows the laws governing the reflection and refraction of light						

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### Standard 5. Learn how scientific knowledge develops and changes over time.

CODE	BENCHMARK	LOCAL	ITBS	ITED	ALT	OTHER	OTHER
3.5.1	Know that people of all ages, backgrounds, and groups have made contributions to science as an ongoing process.						
4.5.1	Uses scientific investigations that involve asking and answering a question and comparing the answer to what scientists already know about the world.						
5.5.1	Knows various careers and settings in which scientists work						
6.5.1	Knows ways in which sciences and society influence one another						
7.5.1	Knows that science helps drive technology, providing knowledge for better understanding, instruments, and techniques.						
8.5.1	Realizing that we're constantly striving for a better explanation of nature and as technology improves, so does our understanding						
ES.5.1	Knows that scientific evidence supports the "big bang" theory. (theories of beginning)						
ES.5.2	Knows that the theory of the center of the universe has changed						
CH.5.1	The student will summarize the development and use of the Periodic Table						
CH.5.2	Describes how the modern atomic theory has evolved						
LS.5.1	Understanding and explaining how organisms change over time in terms of biological evolution and genetics. (evolution)						

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LS.5.2	Knows that inheritable characteristics largely determine what capabilities an organism will have and how likely it is to survive and reproduce. (evolution)						
LS.5.3	Knows features of human inheritance. (genetics)						
LS.5.4	Explain that all organisms are composed of cells which are the fundamental units of life. (cell structure/function)						
PS.5.1	Knows that in science, the testing, revising, and occasional discarding of theories, new and old, never ends; this ongoing process leads to an increasingly better understanding of how things work in the world, but not to absolute truth.						

**Standard 6. Understand personal and societal changes and responsibilities that affect health, world resources, and the earth's environment.**

CODE	BENCHMARK	LOCAL	ITBS	ITED	ALT	OTHER	OTHER
K.6.1	TSW identify harmful and non-harmful substances						
1.6.1	List their responsibilities to the environment						
2.6.1	Develop an awareness of natural resources						
3.6.1	Identify and assess problems in the environment						
4.6.1	Analyze the causes of environmental pollution as to the effect on living organisms.						

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5.6.1	Knows that recycling, reusing, and reducing consumption conserves resources.						
6.6.1	Describe what natural resources are, how they are used on Earth, and the effects of pollution on the Earth.						
7.6.1	Understands the interdependencies of human needs and the nature of science.						
8.6.1	Analyze the impact of scientific contributions by people of various gender, race, and socioeconomic status and how it reflects social and political climate of their time.						
ES.6.1	Knows that human behavior can modify earth processes and systems						
LS.6.1	Knows ways in which humans can modify ecosystems and cause irreversible effects. (ecology)						
LS.6.2	Understanding and explaining the characteristics of living things, the diversity of life, and how living things interact with each other and with their environment. (ecology)						
PS.6.1	Knows that people continue inventing new ways of doing things, solving problems, and getting work done; these new ideas and inventions often affect other people—sometimes the effects are good, and sometimes they are bad.						