

NEVADA GRADE 5 SCIENCE

Benchmarks and Item Specifications – July 2009

C-1 Physical Science		
Standard	Matter – Matter has various states with unique properties that can be used as basis for organization. The relationship between the properties of matter and its structure is an essential component of study in the physical sciences. The understanding of matter and its properties leads to practical applications, such as the capability to liberate elements from ore, create new drugs, manipulate the structure of genes and synthesize polymers.	
Indicator	DOK**	Item Specifications
P.5.A.1 Students know matter exists in different states (i.e., solid, liquid, gas) which have distinct physical properties. E/S	DOK 2	<ul style="list-style-type: none"> • Identify common examples of matter in different states. • Recognize properties of water in all three states. • Understand that everything that has mass and takes up space is a form of matter. • Describe distinct physical properties of solids and liquids.
P.5.A.2 Students know heating or cooling can change some common materials, such as water, from one state to another. E/S	DOK 2	<ul style="list-style-type: none"> • Describe examples of matter changing state by heating or cooling. • Identify physical changes in a substance that indicate changes of state. • Predict the sequence of change of state from solid to liquid to gas, or gas to liquid to solid, based on increased heating or cooling. • Use evaporation, condensation, and freezing to describe changes in state based on heating or cooling.
P.5.A.3 Students know materials can be classified by their observable physical and chemical properties (e.g., magnetism, conductivity, density). E/S	DOK 2	<ul style="list-style-type: none"> • Use tools or observations (e.g., rulers, thermometers, graduated cylinders, scales, clocks, magnets, electrical circuits, and magnifying lenses) to compare or measure physical properties of materials and objects (e.g., mass, volume, size, shape, hardness, texture, odor, hardness, and temperature). • Identify and describe physical properties of materials and objects. • Classify materials and objects by physical properties.

P.5.A.4 Students know that, by combining two or more materials, the properties of that material can be different from the original materials. E/S	DOK 2	<ul style="list-style-type: none"> Identify examples of mixtures including solutions (e.g., sand, iron filings and gravel; and salt or sugar dissolved in water). Describe changes in physical properties that occur by creating a mixture.
P.5.A.5 Students know the mass of a material remains constant whether it is together, in parts, or in a different state. E/S	DOK 2	<ul style="list-style-type: none"> Understand conservation of matter when a material or an object changes state, is separated into parts, or parts are combined. Recognize that the total mass of a material remains the same whether it is together or in parts. Understand conservation of matter when substances are combined or separated from mixtures.
P.5.A.6 Students know materials are composed of parts that are too small to be seen without magnification. E/S	DOK 2	<ul style="list-style-type: none"> Identify that all materials are made up of smaller parts

** DOK essence – on state level assessments, at least 50% of items at the indicted DOK level or above

C-1 Physical Science		
Standard	Force and Motion – The laws of motion are used to describe the effects of forces on the movement of objects.	
Indicator	DOK**	Item Specifications
P.5.B.1 Students know that, when an unbalanced force is applied to an object, the object either speeds up, slows down, or goes in a different direction. E/S	DOK 2	<ul style="list-style-type: none"> Understand that an unbalanced force applied to an object will change its motion. Recognize unbalanced and balanced forces acting on objects. Represent forces as pushes or pulls.
P.5.B.2 Students know how the strength of a force and mass of an object influence the amount of change in an object's motion. E/S	DOK 2	<ul style="list-style-type: none"> Apply forces to a variety of objects in investigations. Record and graph results from investigations. Draw conclusions from results of investigations.
P.5.B.3 Students know a magnetic force causes certain kinds of objects to attract and repel each	DOK 2	<ul style="list-style-type: none"> Classify materials and objects that can be attracted by magnetic forces.

other. E/S		<ul style="list-style-type: none"> Identify materials and objects that can be attracted by magnetic forces. Describe how magnets attract and repel materials and objects including other magnets.
P.5.B.4 Students know electrically charged particles can attract or repel other electrically-charged material (e.g., static electricity). E/S	DOK 2	<ul style="list-style-type: none"> Predict what will happen with two electrically charged materials are moved together.
P.5.B.5 Students know Earth's gravity pulls any object toward it without touching it. E/S	DOK 2	<ul style="list-style-type: none"> Understand that Earth's gravity is a non-contact force that can cause an object to change speed and/or direction. Identify the effects of gravity on objects near the Earth's surface.

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C-1 Physical Science		
Standard	Energy – The total energy of the universe is constant. All events involve the transfer of energy in one form or another. In all energy transfers, the overall effect is that energy is spread out uniformly.	
Indicator	DOK**	Item Specifications
P.5.C.1 Students know light can be described in terms of simple properties (e.g., color, brightness, reflection). I/S	DOK 2	<ul style="list-style-type: none"> Understand that white light is composed of a spectrum of colors. Describe how the brightness of light varies depending on the distance from the light source. Understand that smooth, shiny surfaces (e.g., mirrors) reflect light.
P.5.C.2 Students know the wave characteristics of sound. E/S	DOK 2	<ul style="list-style-type: none"> Understand that sound is caused by the vibration of matter. Understand that sound can travel through solids, liquids, and gases. Recognize that pitch and volume are characteristics of sound waves. Describe how sound travels from a source to a receiver.

<p>P.5.C.3 Students know heat is often produced as a byproduct when one form of energy is converted to another form (e.g., when machines and living organisms convert stored energy to motion). E/S</p>	<p>DOK 2</p>	<ul style="list-style-type: none"> • Understand that energy is the ability to do work. • Understand that stored energy has the potential to do work. • Describe common examples where heat is produced as a byproduct of energy conversion from one form to another form (e.g., fuel burning produces heat and light, electricity powering a light bulb produces heat and light, friction caused by mechanical parts rubbing against each other produces heat, and muscles moving produces heat).
<p>P.5.C.4 Students know heat can move from one object to another by conduction, and some materials conduct heat better than others. E/S</p>	<p>DOK 2</p>	<ul style="list-style-type: none"> • Describe and compare examples of heat moving from one object to another by conduction. • Identify examples of common heat conductors and insulators.
<p>P.5.C.5 Students know the organization of a simple electrical circuit (i.e., battery or generator, wire, a complete loop through which the electrical current can pass). I/S</p>	<p>DOK 2</p>	<ul style="list-style-type: none"> • Identify all the components of a simple complete electrical circuit. • Draw/Label/Diagram a simple complete series electrical circuit that includes an energy source (e.g., battery or electrical outlet), wires, and object that demonstrates that an electrical current is flowing (e.g., light bulb, bell, alarm, and motor). • Identify and use materials that are electrical conductors and insulators in electrical circuits.

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C-2 Life Science

Standard	Heredity – Heredity is the genetic passing of a set of instructions from generation to generation. These instructions are encoded as DNA and may manifest themselves as characteristics. Some characteristics are inherited, and some result from interactions with the environment.	
Indicator	DOK**	Item Specifications
L.5.A.1 Students know some physical characteristics and behaviors that are inherited in animals and plants. E/S	DOK2	<ul style="list-style-type: none"> • Identify inherited physical characteristics and behaviors in animals and plants (e.g., eye color, fish being able to swim, birds building nests, fur color, leaf shape, and flower color). • Understand that many physical characteristics and behaviors of an organism are inherited from the parents of the organism.
L.5.A.2 Students know reproduction is an essential characteristic for the continuation of every species. E/S	DOK 2	<ul style="list-style-type: none"> • Identify that reproduction is essential for species to continue to exist. • Give examples of how a species might become extinct (e.g., human land use encroaching on specific breeding habitat).
L.5.A.3 Students know that, while offspring resemble their parents and each other, they also exhibit differences in characteristics. E/S	DOK 2	<ul style="list-style-type: none"> • Recognize that offspring usually resemble their parents in many characteristics. • Explain that offspring may exhibit differences from their parents in some or many characteristics.
L.5.A.4 Students know how to observe and describe variations among individuals within the human population. E/S	DOK 2	<ul style="list-style-type: none"> • Observe and describe variations in human physical characteristics (e.g., hair color, eye color, and heart rate).
L.5.A.5 Students know some animal behaviors are learned. E/S	DOK 2	<ul style="list-style-type: none"> • Distinguish between inherited behaviors and learned behaviors in animals. • Describe examples of learned behaviors in animals.

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C-2 Life Science		
Standard	Structure of Life – All living things are composed of cells. Cells can range from very simple to very complex and have structures which perform functions for the organism. Cells and cell structures can be damaged or fail because of intrinsic failures or disease	
Indicator	DOK**	Item Specifications
L.5.B.1 Students know plants and animals have structures that enable them to grow, reproduce, and survive. E/S	DOK 2	<ul style="list-style-type: none"> • Compare basic animal structures and their functions (e.g., skin, antenna, bones, skeleton, appendages, lungs/gills, brain, heart, ears, eyes, nose, mouth, muscle, stomach). • Compare basic plant structures and their functions (e.g., leaves, stems, roots, flowers, fruits, and seeds). • Plan an investigation that compares how different plant structures enable them to grow, reproduce, and survive.
L.5.B.2 Students know living things have predictable life cycles. E/S	DOK 2	<ul style="list-style-type: none"> • Understand the sequence of general life stages for animals and plants (i.e., germination/birth, growth, adulthood, reproduction, and death). • Understand that life stages occur in a continuous cycle for a species, but start and end in a sequence for an individual organism.

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C-2 LIFE SCIENCE		
Standard	Organisms and their Environment – A variety of ecosystems and communities exist on Earth. Ecosystems are dynamic interactions of organisms and their environment. Ecosystems have distinct characteristics and components that allow certain organisms to thrive. Change in one of more components can affect the entire ecosystem	
Indicator	DOK**	Item Specifications
L.5.C.1 Students know the organization of simple food webs. E/S	DOK 2	<ul style="list-style-type: none"> • Understand that plants are producer organisms that produce their own food. • Understand that animals are consumer organisms. • Understand that food chains make up food webs. • Understand that a food web shows the transfer of energy in an ecosystem. • Understand that sunlight is the original source of energy

		for food webs.
L.5.C.2 Students know organisms interact with each other and with the non-living parts of their ecosystem. E/S	DOK 2	<ul style="list-style-type: none"> Identify living and non-living parts of an ecosystem. Identify examples of organisms in a variety of ecosystems interacting with each other. Describe how organisms interact with each other and with non-living parts of their ecosystem.
L.5.C.3 Students know changes to an environment can be beneficial or detrimental to different organisms. E/S	DOK 2	<ul style="list-style-type: none"> Describe how changes to an environment are beneficial and/or detrimental to organisms in the environment. Describe causes and effects of both natural and human-made changes to an environment. Evaluate possible outcomes of natural and human caused changes to an environment.
L.5.C.4 Students know all organisms, including humans, can cause changes in their environments. E/S	DOK 2	<ul style="list-style-type: none"> Describe advantages of conservation practices by humans (e.g., water conservation, reuse, reduce, recycle, soil conservation, and energy conservation). Predict unintended consequences of human changes to the environment. Understand effects of non-native species on native species. Describe causes and effects of air, water, and land pollution.
L.5.C.5 Students know plants and animals have adaptations allowing them to survive in specific ecosystems. E/S	DOK 2	<ul style="list-style-type: none"> Identify the common basic needs of most organisms (i.e., air, water, food, and light). Understand that organisms can survive only in environments in which their basic needs can be met. Identify, compare, and contrast some of the common characteristics of, and organisms found in, a variety of ecosystems (e.g., desert, prairie/grassland, temperate forest, rain forest, arctic/polar, marine, and lake/pond).

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C2 – LIFE SCIENCE	
Standard	Diversity of Life – Evidence suggests that living things change over periods of time. These changes can be attributed to genetic and/or environmental influences. This process of change over time is called biological evolution. The Diversity of life on Earth is classified using objective characteristics. Scientific classification uses a hierarchy of groups and subgroups based on similarities that reflect evolutionary relationships.

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Indicator	DOK**	Item Specifications
L.5.D.1 Students know animals and plants can be classified according to their observable characteristics. E/S	DOK2	<ul style="list-style-type: none"> Classify animals and plants based on observable characteristics (e.g., body covering, appendages, method of breathing, leaf vein patterns, leaf shape, and seed type).
L.5.D.2 Students know fossils are evidence of past life. E/S	DOK 2	<ul style="list-style-type: none"> Recognize and describe how fossils are evidence of past life.
L.5.D.3 Students know differences among individuals within a species give them advantages and/or disadvantages in surviving and reproducing. E/S	DOK 2	<ul style="list-style-type: none"> Explain how differences in a population would give an individual an advantage or disadvantage in a given environment.

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C-3 EARTH/SPACE SCIENCE		
Standard	Atmospheric Processes and the Water Cycle - Earth systems have internal and external sources of energy, both of which create heat. Driven by sunlight and Earth's internal heat, a variety of cycles connect and continually circulate energy and material through the components of the earth systems.	
Indicator	DOK**	Item Specifications
E.5.A.1 Students know the Sun is the main source of energy for planet Earth. E/S	DOK 2	<ul style="list-style-type: none"> Understand that solar energy is the primary source of light and heat for sustaining living organisms (e.g., light for plants to make their own food, heat and light to maintain temperature range for living organisms, and light for seeing to find food). Recognize that heat and light from the sun are the source of energy for weather and climate. Recognize that solar energy can be used to generate electricity.
E.5.A.2 Students know the processes of the water cycle, including the role of the Sun. E/S	DOK 2	<ul style="list-style-type: none"> Describe common examples of water changing state in the water cycle (i.e., evaporation, condensation, freezing, and precipitation).

		<ul style="list-style-type: none"> • Understand that the sun is the primary source of energy for the water cycle in the natural environment. • Understand that water vapor is water in the gas state.
E.5.A.3 Students know most of Earth's surface is covered with fresh or salt water. W/L		
E.5.A.4 Students know the role of water in many phenomena related to weather (e.g., thunderstorms, snowstorms, flooding, drought). E/S	DOK 2	<ul style="list-style-type: none"> • Understand the role of water in local weather conditions. • Identify various weather conditions and the situations that would generate the particular conditions. • Understand the causes and effects of flooding and drought. • Use a rain gauge and thermometer to measure weather conditions.
E.5.A.5 Students know air is a substance that surrounds us, takes up space, and moves around us as wind. I/S	DOK 2	<ul style="list-style-type: none"> • Recognize/identify that air is a mixture of gases. • Recognize that air has mass. • Understand that air is present in an "empty" glass, inside a balloon, or in between the rocks in a container. • Recognize that wind speed is measured using an anemometer.

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C-3 EARTH/SPACE SCIENCE		
Standard	Solar System and Universe - The universe is a dynamic system of matter and energy. The universe is extremely large and massive with its components separated by vast distances. Tools of technology will continue to aid in the investigation of the components, origins, processes and age of the universe. Earth is one part of our solar system, which is within the Milky Way galaxy. The Sun is the energy producing star for our solar system. Most objects in our solar system are in predictable motion, resulting in phenomena such as day/night, year, phases of the moon, tides, and eclipses.	
Indicator	DOK**	Item Specifications
Students know there are more stars than anyone can easily count, but they are not scattered evenly, and they are not all the same in brightness or color. W/L		
E.5.B.1 Students know the solar system includes the Sun, planets, and moons. E/S	DOK 2	<ul style="list-style-type: none"> • Identify the differences between a star that produces its own energy, a planet that orbits a star, and a moon that orbits a planet. • Describe that the Sun is the center of a system that contains planets and moons that move around the Sun.

		<ul style="list-style-type: none"> Understand that gravitational forces hold the solar system together.
E.5.B.2 Students know stars are like the Sun, but they are so far away that they look like points of light. W/S	DOK 2	<ul style="list-style-type: none"> Understand the basic characteristics of the stars we see in the night sky (e.g., very large in size, very distant from Earth, have high temperatures, and produce their own light).
E.5.B.3 Students know there are cyclical patterns of observable objects in the solar system. I/S	DOK 2	<ul style="list-style-type: none"> Identify the position of the sun throughout the day (e.g., appears highest in the sky in Nevada at noon on a summer day and appears to move from east to west). Understand why day and night occur on Earth. Understand that the moon changes appearance in a regular, repeatable cycle.
E.5.B.4 Students know the patterns of stars in the sky stay the same (e.g., the constellations), although they appear to move across the sky nightly, and different stars can be seen in different seasons. W/S	DOK2	<ul style="list-style-type: none"> Understand that a constellation is a group of stars that appear together in the same region of the night sky. Recognize that the North Star appears in the same position in the night sky at all times of the year. Understand that other stars and constellations change position throughout the night and throughout times of the year in a repeatable pattern. Understand that the observed relative positions of all the stars that make up a constellation remain the same even though the entire constellation changes position in the night sky.

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C-3 EARTH/SPACE SCIENCE		
Standard	Earth's Composition and Structure - Earth is composed of materials that move through the biogeochemical cycles. Earth's features are shaped by ongoing and dynamic processes. These processes can be constructive or destructive and occur over geologic time scales.	
Indicator	DOK**	Item Specifications
E.5.C.1 Students know fossils are evidence of past life. E/S	DOK 2	<ul style="list-style-type: none"> Describe how Earth processes can result in the formation of fossils. Recognize and describe how fossils are evidence of past life.

<p>E.5.C.2 Students know water, wind, and ice constantly change the Earth's land surface by eroding rock and soil in some places and depositing them in other areas. E/S</p>	<p>DOK 2</p>	<ul style="list-style-type: none"> • Describe examples of ways that water, wind, and ice break down rock from larger to smaller pieces. • Describe examples of ways that water, wind, and ice move rock and soil from one location to another location and change landforms. • Predict and provide justification on how different levels of water flow will change the land's surface.
<p>E.5.C.3 Students know landforms may result from slow processes (e.g. erosion and deposition) and fast processes (e.g. volcanoes, earthquakes, landslides, flood, and human activity). E/S</p>	<p>DOK 2</p>	<ul style="list-style-type: none"> • Understand how each geologic process occurs. • Describe changes in landforms that result from each geologic process. • Understand how human activity (e.g., building neighborhoods, farming, damming rivers, mining, and logging) can affect landforms. • Understand how other animals can affect landforms (e.g., beaver dam causing flooding and overgrazing causing erosion). • Understand that fires that change the vegetation in an area can lead to increased erosion.
<p>E.5.C.4 Students know rock is composed of different combinations of minerals. E/S</p>	<p>DOK 2</p>	<ul style="list-style-type: none"> • Explain that rock is composed of different combinations of minerals.
<p>E.5.C.5 Students know soil varies from place to place and has both biological and mineral components. E/S</p>	<p>DOK 2</p>	<ul style="list-style-type: none"> • Recognize how soil is created. • Understand that soil components include particles of clay, sand, silt, and decomposed organic material. • Identify that different soils are found in different locations. • Understand that different soils have differing amounts of soil components. • Describe that soils have different characteristics in different places (e.g., color, texture, and size of particles).

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C-4 NATURE OF SCIENCE

Standard	Inquiry - Scientific Inquiry is the process by which humans systematically examine the natural world. Scientific inquiry is a human endeavor and involves observation, reasoning, insight, energy, skill, and creativity. Scientific inquiry is used to formulate and test explanations of nature through observation, experiments and theoretical or mathematical models. Scientific explanations and evidence are constantly reviewed and examined by others. Questioning, response to criticism and open communication are integral to the process of science.	
Indicator	DOK**	Item Specifications
N.5.A.1 Students know scientific progress is made by conducting careful investigations , recording data, and communicating the results in an accurate method. E/S	DOK 2	<ul style="list-style-type: none"> • Understand that science investigates the natural world. • Understand that science attempts to describe and explain natural phenomenon. • Understand that scientific progress involves exploration, questioning, forming hypotheses, investigation, trial and error, observation, data collection and recording, analysis of results, and communication of results. • Recognize that a hypothesis is based on prior experience and information. • Understand that tools and instruments are extensions of the senses and allow for measurement and gathering data. • Understand that data is based on observations and measurements. • Describe that useful results of investigations must provide accurate details of observations and measurements. • Understand that scientific conclusions are supported by data. • Understand that science may have no right, wrong, or final answers.
N.5.A.2 Students know how to compare the results of their experiments to what scientists already know about the world. I/L		
N.5.A.3 Students know how to draw conclusions from scientific evidence . E/S	DOK 2	<ul style="list-style-type: none"> • Analyze and interpret data results from investigations to draw conclusions. • Evaluate conclusions to determine if they are well supported by evidence. • Relate conclusions to the hypotheses/question of the investigation

N.5.A.4 Students know graphic representations of recorded data can be used to make predictions. E/S	DOK 2	<ul style="list-style-type: none"> • Represent data graphically (e.g., tables, charts, graphs, and diagrams). • Read, analyze, and interpret data. • Make predictions based on data organized graphically.
N.5.A.5 Students know how to plan and conduct a safe and simple investigation. E/S	DOK2	<ul style="list-style-type: none"> • Plan and conduct a fair test including testing only one variable at a time and controlling variables that are not tested. • Recognize that multiple trials increase the reliability of results. • Determine safety requirements (e.g., following directions and teacher instructions, clothing, goggles, storage, clean-up, fire safety, and procedures in case of an accident) that are appropriate for the materials and activities used during an investigation.
N.5.A.6 Students know models are tools for learning about the things they are meant to resemble. I/S	DOK 2	<ul style="list-style-type: none"> • Understand the purpose of models in representing science concepts and phenomenon. • Compare and contrast the properties of a model (e.g., similarities, differences, strengths, and limitations) with what the model is intended to represent. • Develop different types of models for representing science concepts and phenomenon (e.g., graphical or physical)
N.5.A.7 Students know observable patterns can be used to organize items and ideas. E/S	DOK2	<ul style="list-style-type: none"> • Recognize phenomena that are random and discrete vs. phenomena that occur in patterns or cycles. • Recognize patterns in data. • Organize data based on patterns (e.g., classify, order, sequence, seriate, and prioritize

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C-4 NATURE OF SCIENCE

Standard	Science, Technology, and Society - Technology defines a society or era. It can shape the environment in which people live, and it has increasingly become a larger part of people's lives. While many of technology's effects on society are regarded as desirable, other effects are seen as less desirable. These concepts are shared across subject areas such as science, math, technology, social studies, and language arts. The development and use of technology affects society and the environment in which we live, and at the same time, society influences the development of technology and its impact on culture	
Indicator	DOK**	Item Specifications
N.5.B.1 Students know that, throughout history, people of diverse cultures have provided scientific knowledge and technologies. E/S	DOK 2	<ul style="list-style-type: none"> • Understand that individuals of all cultures, genders, and ethnicities have contributed to scientific knowledge and technologies
N.5.B.2 Students know technologies impact society, both positively and negatively. E/S	DOK 2	<ul style="list-style-type: none"> • Describe the positive and negative impacts of various technologies on society.
N.5.B.3 Students know the benefits of working with a team and sharing findings. E/L		

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