Science 7th Grade

1st Quarter

Standard 1: Students will learn that science is the process of trying to understand the world,

Topic: The Nature of Science

Week	Performance Objectives	Performance Indicators	SA	TA
1	• Explain the science of archaeology • Compare and contrast science and technology	I can explain what archaeology is		
		I can describe several common forms of technology used in science		
		I can list some examples of cultural remains studied by archaeologists		
	• Explain the steps taken in scientific methods • Compare and contrast scientific variables and constants • Explain how a control is used during an experiment	I can list the steps followed in a typical scientific method		
		I can explain how observations are different from inferences		
		I can compare and contrast a control and constant		
Standard 2: Students will learn that minerals compose much of Earth's crust and can be identified by their physical properties.				
Topic: Minerals				
2	• Describe characteristics that all minerals share • Explain how minerals form	I can list at least four characteristics that all minerals share		
		I can describe two ways that minerals can form from solution		
		I can describe how crystals of minerals are classified		
	• Describe physical properties used to identify minerals • Identify minerals using physical properties such as hardness and steak	I can explain how an unglazed porcelain tile can be used to identify a mineral		
		I can compare and contrast a mineral fragment that has one cleavage direction with one that has only fracture		
		I can explain why streak often is more useful for mineral identification than color		
	• Describe characteristics of gems that make them more valuable than other minerals • Identify useful elements that are contained in minerals	I can describe how vein minerals form		
		I can list some uses for gems		
		I can name useful metals that are commonly extracted from minerals		
Standard 3: Students will learn that rocks continuously change as they are subjected to the processes of the rock cycle.				
Topic: Rocks				
3	• Distinguish between a rock and a mineral • Describe the rock cycle and some changes that a rock could undergo	I can explain how rocks differ from minerals		
		I can describe the processes of the rock cycle		
		I can list the three major types of rock		
3	• Recognize magma and lava as the materials that cool to form igneous rocks • Contrast the formation of intrusive and extrusive igneous rocks • Contrast granitic and basaltic igneous rocks	I can name two ways igneous rocks are classified		
		I can explain why some types of magma form igneous rocks that are dark colored and dense		
		I can identify the property of magma that causes it to be forced upward toward Earth's surface		

4	• Describe the conditions in Earth that cause metamorphic rocks to form • Classify metamorphic rocks as foliated or nonfoliated	I can explain what role fluids play in rock metamorphism		
		I can give examples of foliated and nonfoliated rocks		
		I can determine how a metamorphic rock is classified		
	• Explain how sedimentary rocks form from sediments • Classify sedimentary rocks as detrital, chemical, or organic in origin • Summarize the rock cycle	I can identify where sediments come from		
		I can explain why compaction is important in the formation of coal		
		I can compare and contrast detrital and chemical sedimentary rock		
Standard 4: Students will learn that Earth's atmosphere helps regulate the absorption and distribution of energy received from the Sun.				
Topic: Atmosphere				
5	• Identify the gases in Earth's atmosphere • Describe the structure of Earth's atmosphere • Explain what causes air pressure	I can identify the layers of the atmosphere		
		I can list what makes up our atmosphere		
		I can learn about the ozone layer		
	• Describe what happens to the energy Earth receives from the Sun • Compare and contrast radiation, conduction, and convection • Explain the water cycle and its effect on weather patterns and climate	I can state how the Sun transfers energy to Earth		
		I can describe the water cycle		
		I can explain the different ways heat is transmitted		
	• Explain why different latitudes on Earth receive different amounts of solar energy • Describe the Coriolis effect • Explain how land and water surfaces affect the overlying air	I can conclude why come parts of Earth's surface receive more of the Sun's heat than other regions		
		I can explain how the Coriolis effect influences winds		
		I can describe what causes air movement and wind		
Standard 5: Students will learn that weather refers to the state of the atmosphere at a specific time and place.				
Topic: Weather				
6	• Explain how solar heating and water vapor in the atmosphere affect weather • Discuss how clouds form and how they are classified • Describe how rain, hail, sleet, and snow develop	I can explain why weather is important		
		I can summarize how clouds form		
		I can compare and contrast humidity and relative humidity		
6	• Describe how weather is associated with fronts and high- and low-pressure areas • Explain how tornadoes develop from thunderstorms • Discuss the dangers of severe weather	I can describe how a cold front affects weather		
		I can explain what causes lightning and thunder		
		I can compare and contrast a watch and a warning		
	• Explain how data are collected for weather maps and forecasts • Identify the symbols used in a weather station model	I can list some instruments that are used to collect weather data		
		I can list items of data that are recorded in a station model		
		I can define what a meteorologist is		

Standard 6: Students will learn that climate is the pattern of weather that occurs in an area over many years.				
Topic: Climate				
7	• Describe what determines climate • Explain how latitude, oceans, and other factors affect the climate of a region	I can explain how places in the same latitude can have different climates		
		I can describe how mountains affect climate		
		I can compare and contrast tropical and polar climates		
	• Describe a climate classification system • Explain how organisms adapt to a particular climate	I can define adaptation		
		I can identify the classification groups of climates		
		I can list examples of structural adaptation that help animals survive		
	• Explain what causes seasons • Describe how El Nino affects climate • Explore possible causes of climate change	I can explain how Earth's tilted axis is responsible for seasons		
		I can compare and contrast El Nino and La Nina		
		I can list different human activities that increase carbon dioxide		

*** END OF FIRST QUARTER ***

2nd Quarter

Standard 1: Students will learn that many observations on Earth can be attributed to Earth's place in space.

Topic: Earth in Space

Week	Performance Objectives	Performance Indicators	SA	TA
1	• Identify Earth's shape and other physical properties • Compare and contrast Earth's rotation and revolution • Explain the causes of Earth's seasons	I can explain how planets develop their physical shapes		
		I can describe whether the shape of Earth's orbit affect or does not affect the seasons		
		I can describe what causes day and night		
	• Identify the moon's surface features and interior • Explain the moon's phases • Explain the causes of solar and lunar eclipses • Identify the origin of the Moon	I can name some features of the moon's surface		
		I can compare and contrast a solar and lunar eclipses		
		I can explain the collision hypothesis of lunar formation		
	• List the important characteristics of inner planets • Identify how other inner planets compare and contrast with Earth • List the important characteristics of outer planets	I can describe what astronomers use to measure distance in space		
		I can list all the planets of the solar system		
		I can describe one hypothesis of the origin of the solar system		

Standard 2: Students will learn that life science includes the study and classification of living things.				
Topic: Life's Structure and Classification				
2	• Distinguish between living and nonliving things • Identify what living things need to survive	I can define what an organism is		
		I can list the needs of living things		
		I can identify what living things are made up of		
	• Describe how early scientists classified living things • Explain the system of binomial nomenclature • Demonstrate how to use a dichotomous key	I can identify the two parts that make up binomial nomenclature		
		I can explain the purpose of classification		
		I can identify what scientists use to determine classification		
3	• Describe the development of the cell theory • Identify names and functions of each part of a cell • Explain how important a nucleus is in a cell • Compare tissues, organs, and organ systems	I can state the cell theory		
		I can explain how cells are organized		
		I can describe how cells work in many-celled organisms		
	• Explain how a virus makes copies of itself • Identify the benefits of vaccines • Investigate some uses of viruses	I can define what a virus is		
		I can list the steps an active virus follows when attacking a cell		
		I can explain how vaccines prevent infection		
Standard 3: Students will learn that each cell undergoes processes that ensure its survival and often, the survival of other organisms				
Topic: Cell Processes				
4	• List the differences among atoms, elements, molecules, and compounds • Explain the relationship between chemistry and life science • Discuss how organic compounds are different from inorganic compounds	I can compare and contrast atoms and molecules		
		I can list the four types of organic compounds found in all living things		
		I can explain why water is one of the most important inorganic compounds		
	• Describe the function of a selectively permeable membrane • Explain how the processes of diffusion and osmosis move molecules in living cells • Explain how passive transport and active transport differ	I can describe how cell membranes are selectively permeable		
		I can compare and contrast the processes of osmosis and diffusion		
		I can explain why endocytosis and exocytosis are important processes to cells		
	• List the differences between producers and consumers • Explain how the processes of photosynthesis and cellular respiration store and release energy • Describe how cells get energy from glucose through fermentation	I can compare producers and consumers		
		I can describe what fermentation is		
		I can explain how photosynthesis, cellular respiration and fermentation are related		
Standard 4: Students will learn that reproduction must occur for species to survive.				
Topic: Cell Reproduction				
5	• Explain why mitosis is important • Examine the steps of mitosis	I can enumerate the steps of mitosis		
		I can identify two examples of asexual reproduction		

	• Compare mitosis in plant and animal cells • List the two examples of asexual reproduction	I can determine the difference in mitosis between plant and animal cells		
	• Describe the stages of meiosis • Explain why meiosis is needed for sexual reproduction • Name the cells that are involved in fertilization • Explain how fertilization occurs in sexual reproduction	I can describe a zygote and how it is formed		
		I can explain where sex cells form		
		I can compare what happens to chromosomes during anaphase I and anaphase II.		
5	• Identify the parts of a DNA molecule and its structure • Explain how DNA copies itself • Describe the structure and function of each kind of RNA	I can describe how DNA makes a copy of itself		
		I can explain how the codes for proteins are proteins are carried from the nucleus to the ribosomes		
		I can explain what happens if DNA is not copied exactly		
Standard 5: Students will learn that inherited genes determine an organism's traits				
Topic: Heredity				
6	• Explain how traits are inherited • Identify Mendel's role in the history of genetics • Use a Punnett square to predict the results of crosses • Compare and contrast the difference between an individual's genotype and phenotype	I can define heredity		
		I can identify Mendel's contributions to genetics		
		I can describe how dominant and recessive alleles are represented in a Punnett square		
	• Explain how traits are inherited by incomplete dominance • Compare multiple alleles and polygenic inheritance, and give examples of each • Describe two human genetic disorders and how they are inherited • Explain how sex-linked traits are passed to offspring	I can compare how inheritance by multiple alleles and polygenic inheritance are similar		
		I can explain what happens when errors occur in the copying of DNA		
		I can determine what controls many human genetic disorders		
	• Evaluate the importance of advances in genetics • Sequence the steps in making genetically engineered organisms	I can explain why genetics is important		
		I can describe how selective breeding differs from genetic engineering		
		I can infer some benefits of genetically engineered crops		
Standard 6: Student will learn that life-forms have changed over time.				
Topic: Adaptations Over Time				
7	• Describe Lamarck's hypothesis of acquired characteristics and Darwin's theory of natural selection • Identify why variations in organisms are important • Compare and contrast gradualism and punctuated equilibrium	I can compare Lamarck's and Darwin's theories on evolution		
		I can explain why variations are important to understanding change in a population over time		
		I can describe how geographic isolation contributes to evolution		
	• Identify the importance of fossils as evidence of evolution • Explain how relative and radiometric dating are used to estimate the age of fossils • List examples of five types of evidence for evolution	I can compare and contrast relative dating and radiometric dating		
		I can explain how DNA can provide some sense of evolution		
		I can list three examples of direct evidence for evolution		

7	• Describe the differences among living primates • Identify the adaptations of primates • Discuss the evolutionary history of modern primates	I can list characteristics that separate primates from other mammals		
		I can identify three groups most scientists consider to be direct ancestors of modern humans		
		I can name evidence suggesting all primates share a common ancestor		

*** END OF SECOND QUARTER ***

3rd Quarter

Standard 1: Students will learn that the circulatory and immune systems interact and keep the body healthy.

Topic: Circulation and Immunity

Week	Performance Objectives	Performance Indicators	SA	TA
1	• Identify the parts and functions of blood • Explain why blood types are checked before a transfusion • Give examples of diseases of blood	I can list the four functions of blood in the body		
		I can compare and contrast red blood cells, white blood cells, and platelets		
		I can explain why blood type and Rh factor are checked before a transfusion		
	• Compare and contrast arteries, veins, and capillaries • Explain how blood moves through the heart. • Identify the functions of the pulmonary and systemic circulation systems • Describe functions of the lymphatic system	I can compare and contrast the three types of blood vessels		
		I can describe the functions of the lymphatic system		
		I can explain how blood flows through the heart		
	• Explain the difference between an antigen and an antibody • Compare and contrast active and passive immunity	I can describe how harmful bacteria can cause infections in our bodies		
		I can list the natural defenses our bodies have against diseases		
		I can explain how an active vaccine works to protect the human body		
2	• Describe the work of Pasteur, Koch, and Lister in the discovery and prevention of disease • Identify diseases caused by viruses and bacteria • Explain how HIV affects the immune system • Define noninfectious diseases and list their causes • Explain what happens during an allergic reaction	I can identify the contributions made by Pasteur, Koch, and Lister in the prevention of diseases		
		I can compare and contrast how HIV and other viruses affect the immune system		
		I can recognize how poor hygiene is related to the spread of disease		

Standard 2: Students will learn that your digestive, respiratory, and excretory systems work together to keep your body healthy

Topic: Digestion, Respiration, and Excretion

2	• Distinguish the differences between mechanical digestion and chemical digestion • Identify the organs of the digestive system and what takes place in each • Explain how homeostasis is maintained in digestion	I can list the four stages of digestion		
		I can explain why enzymes are important		
		I can describe how the accessory organs aid digestion		
	• Distinguish among the six classes of nutrients • Identify the importance of each type of nutrient • Explain the relationship between diet and health	I can list an example of a food source for each class of nutrients		
		I can explain how our body uses each class of nutrients		
		I can explain the importance of water in the body		
3	• Describe the functions of the respiratory system • Explain how oxygen and carbon dioxide are exchanged in the lungs and in tissues • Identify the pathway of air in and out of the lungs • Explain the effects of smoking on the respiratory system	I can state the main function of the respiratory system		
		I can explain what cellular respiration is		
		I can name different diseases of the respiratory system		
	• Distinguish between the excretory and urinary systems • Describe how the kidneys work • Explain what happens when urinary organs don't work	I can list the functions of a person's urinary system		
		I can explain how kidneys remove waste and keep fluids and salts in balance		
		I can compare the excretory system and urinary system		
Standard 3: Students will learn the structures and functions of the skin and the muscular, skeletal, and nervous systems help maintain our body's homeostasis.				
Topic: Support, Movement, and Responses				
3	• Distinguish between the epidermis and dermis of the skin • Identify the functions of the skin • Explain how skin protects the body from disease and how it heals itself	I can compare and contrast the epidermis and dermis		
		I can identify the major functions of the skin		
		I can explain how skin helps prevent disease in the body		
4	• I can identify the major function of the muscular system • Compare and contrast the three types of muscles • Explain how muscle action results in the movement of body parts	I can describe the function of muscles		
		I can describe how a muscle attaches to a bone		
		I can compare and contrast the three types of muscle tissue		
	• Identify the five functions of the skeletal system • Compare and contrast movable and immovable joints	I can explain immovable joints and give an example		
		I can describe ligaments and their functions in the skeletal system		
		I can explain the functions of cartilage in our skeletal system		
	• Describe the hair structure of a neuron and how impulses move across a synapse • Compare and contrast the central and peripheral nervous systems • List the sensory receptors in each sense organ • Explain what type of stimulus and sense each organ responds to and how drugs work	I can name the sensory receptors for the eyes, ears, and nose		
		I can identify the role of saliva in tasting		
		I can compare and contrast the central and peripheral nervous systems		

Standard 4: Students will learn that human reproduction and growth and development involve the interactions of all body systems				
Topic: Regulation and Reproduction				
5	• Define how hormones function • Identify different endocrine glands and the effects of the hormones they produce • Describe how a feedback system works in your body	I can explain the function of hormones		
		I can identify the control systems of our body		
		I can describe a negative-feedback system		
5	• Identify the function of the reproductive system • Compare and contrast the major structures of the male and female reproductive systems • Sequence the stages of menstrual cycle	I can identify the major function of male and female reproductive systems in humans		
		I can tell the difference between the major organs and structures of the male and female reproductive systems		
		I can enumerate the stages of the menstrual cycle in a female		
	• Describe the fertilization of a human egg • List the major events in the development of an embryo and fetus • Describe the developmental stages of infancy, childhood, adolescence, and adulthood	I can explain what fertilization is		
		I can describe how pregnancy starts		
		I can describe the major events that occur during childbirth		
Standard 5: Students will learn that the diverse plants on Earth provide humans and other organisms with food, shelter, and oxygen				
Topic: Plants				
6	• Identify the characteristics common to all plants • Explain which plant adaptations make it possible for plants to survive on land • Compare and contrast vascular and nonvascular plants	I can list the characteristics of plants		
		I can identify three adaptations that allow plants to survive on land		
		I can explain why binomial nomenclature is used to name plants		
	• Distinguish between characteristics of seedless nonvascular plants and seedless vascular plants • Identify the importance of some nonvascular and vascular plants	I can compare and contrast the characteristics of mosses and ferns		
		I can summarize the functions of vascular tissues		
		I can describe the importance of seedless plants		
	• Identify the characteristics of seed plants • Explain the structures and functions of roots, stems, and leaves • Describe the main characteristics and importance of gymnosperms and angiosperms • Compare similarities and differences between monocots and dicots	I can identify the common characteristics of seed plants		
		I can explain why the root system might be the largest part of a plant		
		I can compare and contrast the characteristics of gymnosperms and angiosperms		
Standard 6: Students will learn that organisms interact with both the living and nonliving parts of their environment.				
Topic: Interactions of Living Things				
7	• Identify biotic and abiotic factors in an ecosystem • Describe the different levels of biological organization • Explain how ecology and the environment are related	I can compare and contrast abiotic factors and biotic factors		
		I can describe a population and a community		
		I can explain how ecology and environment correlate with each other		

7	• Identify the characteristics that describe populations • Examine the different types of relationships that occur among populations in a community • Determine the habitat and niche of a species in a community	I can describe how limiting factors can affect a population		
		I can explain the difference between a habitat and a niche		
		I can describe symbiosis and provide an example		
	• Explain the difference between a food chain and a food web • Describe how energy flows through ecosystems • Examine how materials such as water, carbon, and nitrogen are used repeatedly	I can create a food web that includes the food I've eaten today		
		I can compare and contrast producers, consumers, and decomposers		
		I can explain how carbon flows through ecosystems		

*** END OF THIRD QUARTER ***

4th Quarter

Standard 1: Students will learn that many of Earth's resources are limited.

Topic: Conserving Resources

Week	Performance Objectives	Performance indicators	SA	TA
1	• Compare renewable and nonrenewable resources • List uses of fossil fuels • Identify the alternatives to fossil fuel use	I can define natural resources		
		I can compare and contrast renewable and nonrenewable resources		
		I can describe the advantages and disadvantages of using nuclear power		
	• Describe types of air pollution • Identify causes of water pollution • Explain methods that can be used to prevent erosion	I can list ways that air pollution affects the environment		
		I can describe possible causes and effects of ozone depletion		
		I can explain different causes of air and water pollution		
	• Recognize ways you can reduce your use of natural resources • Explain how you can reuse resources to promote conservation • Describe how many materials can be recycled	I can identify the three Rs of conservation		
		I can list three ways to reduce the use of natural resources		
		I can explain why reusing is better than recycling		

Standard 2: Students will learn that matter is classified by physical and chemical properties and changes

Topic: Properties and Changes of Matter

2	• Identify physical and chemical properties of matter • Classify objects based on physical properties	I can explain how our senses are important for identifying physical properties of matter		
		I can describe the physical properties of a baseball		
		I can compare and contrast chemical and physical properties		
	• Compare several physical and chemical changes • Identify examples of physical and chemical changes	I can list five common physical changes		
		I can compare and contrast physical and chemical changes		
		I can state the law of conservation of mass		

Standard 3: Students will learn that matter can be classified as a substance (element or compound) or a mixture (homogeneous or heterogeneous)				
Topic: Substances, Mixtures, and Solubility				
3	• Distinguish between substances and mixtures • Describe the two different types of mixtures • Explain how solutions form • Describe different types of solutions	I can compare and contrast substances and mixtures		
		I can tell the difference between heterogeneous and homogeneous mixtures		
		I can explain how a solution forms and give an example		
	• Explain why water is a good general solvent • Describe how the structure of a compound affects solvents it dissolves in • Identify factors that affect how much of a substance will dissolve in a solvent • Describe how temperature affects reaction rate • Explain how solute particles affect physical properties of water	I can identify the property of water that makes it the universal solvent		
		I can describe the two methods to increase the rate at which a substance would dissolve		
		I can determine the difference between a polar and nonpolar molecule		
	• Compare acids and bases and their properties • Describe practical uses of acids and bases • Explain how pH is used to describe the strength of an acid or base • Describe how acids and bases react when they are brought together	I can use the pH scale to determine an if a substance is a base or an acid		
		I can name three acids and bases and list industrial uses for each		
		I can explain how the concentration of hydronium ions and hydroxide ions are related to pH		
Standard 4: Students will learn that the particles in solids, liquids, and gases are always in motion				
Topic: States of Matter				
4	• Recognize that matter is made of particles in constant motion • Relate the three states of matter to the arrangement of particles within them	I can define two properties of matter that determine its state		
		I can describe the movement of particles within solids, liquids, and gases		
		I can name the property liquids and solids share		
	• Define and compare thermal energy and temperature • Relate changes in thermal energy to changes in state • Explore energy and temperature changes on a graph	I can list three changes of state during which energy is stored		
		I can describe the two types of vaporization		
		I can state all the changes between states		
	• Explain why some things float but others sink • Describe how pressure is transmitted through fluids	I can describe what happens to pressure as the force exerted on a given area increases		
		I can state Pascal's principle		
		I can describe how atmospheric pressure changes as altitude increases		
Standard 5: Students will learn that the change in motion of an object depends on all the forces that act on the object.				
Topic: Newton's Laws of Motion				
5	• Contrast distance and displacement • Define speed, velocity, and acceleration • Calculate speed, velocity, and acceleration	I can determine a person's speed, velocity, and acceleration		
		I can state the equation for speed		
		I can describe how to solve for acceleration		

	• Define force • Describe Newton's first law of motion • Contrast balanced and unbalanced forces	I can explain what a force is		
		I can describe the information that must be given to specify a force		
		I can state Newton's first law of motion		
6	• Predict changes in motion using Newton's second law • Describe the gravitational force between objects • Contrast different types of friction	I can state Newton's second law		
		I can explain what gravitational force is		
		I can describe friction and its different types		
	• Interpret motion using Newton's third law • Analyze motion using all three laws	I can state Newton's third law of motion		
		I can identify what action and reaction forces are		
		I can compare and contrast all three laws of motion		
Standard 6: Students will learn that changes occur when energy is transferred from one place to another				
Topic: Energy and Energy Resources				
7	• Explain what energy is • Distinguish between kinetic energy and potential energy • Identify the various forms of energy	I can define energy		
		I can describe the two main types of energy		
		I can identify different forces of energy		
	• Apply the law of conservation of energy to energy transformations • Identify how energy changes form • Describe how electric power plants produce energy	I can describe a process that converts chemical energy into thermal energy		
		I can state the law of conservation of energy		
		I can identify the steps that power plants use to change forms of energy		
	• Explain what renewable, nonrenewable, and alternative resources are • Describe the advantages and disadvantages of using various energy resources.	I can explain why solar energy is considered an inexhaustible source of energy		
		I can identify examples of renewable and nonrenewable resources		
		I can compare nonrenewable, renewable, and alternative resources		

*** END OF FOURTH QUARTER ***