

South Carolina Middle School Science Grades 5 - 8

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Middle School Science	Boardworks Middle School Presentations
2005 Science Curriculum	
<b>GRADE 5</b>	
Standard 5-2: The student will demonstrate an understanding of relationships among biotic and abiotic factors within terrestrial and aquatic ecosystems.	
5-2.1 Recall the cell as the smallest unit of life and identify its major structures (including cell membrane, cytoplasm, nucleus, and vacuole).	Animal and Plant Cells
5-2.2 Summarize the composition of an ecosystem, considering both biotic factors (including populations to the level of microorganisms and communities) and abiotic factors.	Habitats
5-2.3 Compare the characteristics of different ecosystems (including estuaries/salt marshes, oceans, lakes and ponds, forests, and grasslands).	Habitats
5-2.4 Identify the roles of organisms as they interact and depend on one another through food chains and food webs in an ecosystem, considering producers and consumers (herbivores, carnivores, and omnivores), decomposers (microorganisms, termites, worms, and fungi), predators and prey, and parasites and hosts.	Feeding Types Food Chains Food Webs Pyramids of Number and Biomass
5-2.5 Explain how limiting factors (including food, water, space, and shelter) affect populations in ecosystems.	Competition
Standard 5-3: The student will demonstrate an understanding of features, processes, and changes in Earth's land and oceans.	
5-3.1 Explain how natural processes (including weathering, erosion, deposition, landslides, volcanic eruptions, earthquakes, and floods) affect Earth's oceans and land in constructive and destructive ways.	Plate Boundaries Physical Weathering Chemical Weathering Biological Weathering Erosion, Transportation and Deposition Earthquakes Flooding
5-3.2 Illustrate the geologic landforms of the ocean floor (including the continental shelf and slope, the mid-ocean ridge, rift zone, trench, and the ocean basin).	What is Plate Tectonics? Plate Boundaries
5-3.3 Compare continental and oceanic landforms.	Plate Boundaries
5-3.4 Explain how waves, currents, tides, and storms affect the geologic features of the ocean shore zone (including beaches, barrier islands, estuaries, and inlets).	-
5-3.5 Compare the movement of water by waves, currents, and tides.	Wind and Ocean Currents

5-3.6 Explain how human activity (including conservation efforts and pollution) has affected the land and the oceans of Earth.	Environmental Change Greenhouse Gases Acid Rain
Standard 5-4: The student will demonstrate an understanding of properties of matter.	
5-4.1 Recall that matter is made up of particles too small to be seen.	What Are Atoms?
5-4.2 Compare the physical properties of the states of matter (including volume, shape, and the movement and spacing of particles).	Particles in Action Changing State
5-4.3 Summarize the characteristics of a mixture, recognizing a solution as a kind of mixture.	What is a Mixture? Solutions
5-4.4 Use the processes of filtration, sifting, magnetic attraction, evaporation, chromatography, and floatation to separate mixtures.	Separating Mixtures Chromatography
5-4.5 Explain how the solute and the solvent in a solution determine the concentration.	Solutions
5-4.6 Explain how temperature change, particle size, and stirring affect the rate of dissolving.	Solutions
5-4.7 Illustrate the fact that when some substances are mixed together, they chemically combine to form a new substance that cannot easily be separated.	Making Compounds
5-4.8 Explain how the mixing and dissolving of foreign substances is related to the pollution of the water, air, and soil.	–
Standard 5-5: The student will demonstrate an understanding of the nature of force and motion.	
5-5.1 Illustrate the effects of force (including magnetism, gravity, and friction) on motion.	Magnetic Materials Magnetic Fields Gravity Friction What Are Forces?
5-5.2 Summarize the motion of an object in terms of position, direction, and speed.	Distance, Time and Speed
5-5.3 Explain how unbalanced forces affect the rate and direction of motion in objects.	What Are Forces? Calculating Resultant Forces
5-5.4 Explain ways to change the effect that friction has on the motion of objects (including changing the texture of the surfaces, changing the amount of surface area involved, and adding lubrication).	Friction
5-5.5 Use a graph to illustrate the motion of an object.	Graphing Speed
5-5.6 Explain how a change of force or a change in mass affects the motion of an object.	What Are Forces? Calculating Resultant Forces
<b>GRADE 6</b>	
Standard 6-2: The student will demonstrate an understanding of structures, processes, and responses of plants that allow them to survive and reproduce.	

6-2.1 Summarize the characteristics that all organisms share (including the obtainment and use of resources for energy, the response to stimuli, the ability to reproduce, and process of physical growth and development).	Animal and Plant Cells Types of Reproduction Where Do Cells Come From? Animal Behavior Human Behavior Types of Animal Behavior
6-2.2 Recognize the hierarchical structure of the classification (taxonomy) of organisms (including the seven major levels or categories of living things—namely, kingdom, phylum, class, order, family, genus, and species).	Classifying Organisms
6-2.3 Compare the characteristic structures of various groups of plants (including vascular or nonvascular, seed or spore-producing, flowering or cone-bearing, and monocot or dicot).	Classifying Organisms
6-2.4 Summarize the basic functions of the structures of a flowering plant for defense, survival, and reproduction.	–
6-2.5 Summarize each process in the life cycle of flowering plants (including germination, plant development, fertilization, and seed production).	–
6-2.6 Differentiate between the processes of sexual and asexual reproduction of flowering plants.	–
6-2.7 Summarize the processes required for plant survival (including photosynthesis, respiration, and transpiration).	What is Photosynthesis? Releasing Energy Roots and Water
6-2.8 Explain how plants respond to external stimuli (including dormancy and the forms of tropism known as phototropism, gravitropism, hydrotropism, and thigmotropism).	–
6-2.9 Explain how disease-causing fungi can affect plants.	–
Standard 6-3: The student will demonstrate an understanding of structures, processes, and responses of animals that allow them to survive and reproduce.	
6-3.1 Compare the characteristic structures of invertebrate animals (including sponges, segmented worms, echinoderms, mollusks, and arthropods) and vertebrate animals (fish, amphibians, reptiles, birds, and mammals).	Classifying Organisms
6-3.2 Summarize the basic functions of the structures of animals that allow them to defend themselves, to move, and to obtain resources.	Adaptations
6-3.3 Compare the response that a warm-blooded (endothermic) animal makes to a fluctuation in environmental temperature with the response that a cold-blooded (ectothermic) animal makes to such a fluctuation.	–
6-3.4 Explain how environmental stimuli cause physical responses in animals (including shedding, blinking, shivering, sweating, panting, and food gathering).	–

6-3.5 Illustrate animal behavioral responses (including hibernation, migration, defense, and courtship) to environmental stimuli.	Animal Behavior Adaptations Types of Animal Behavior
6-3.6 Summarize how the internal stimuli (including hunger, thirst, and sleep) of animals ensure their survival.	Animal Behavior
6-3.7 Compare learned to inherited behaviors in animals.	Animal Behavior Types of Animal Behavior
Standard 6-4: The student will demonstrate an understanding of the relationship between Earth's atmospheric properties and processes and its weather and climate.	
6-4.1 Compare the composition and structure of Earth's atmospheric layers (including the gases and differences in temperature and pressure within the layers).	The Atmosphere
6-4.2 Summarize the interrelationships among the dynamic processes of the water cycle (including precipitation, evaporation, transpiration, condensation, surface-water flow, and groundwater flow).	The Water Cycle Precipitation
6-4.3 Classify shapes and types of clouds according to elevation and their associated weather conditions and patterns.	Precipitation What is Weather?
6-4.4 Summarize the relationship of the movement of air masses, high and low pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions.	What is Weather? Hurricanes Tornados
6-4.5 Use appropriate instruments and tools to collect weather data (including wind speed and direction, air temperature, humidity, and air pressure).	–
6-4.6 Predict weather conditions and patterns based on weather data collected from direct observations and measurements, weather maps, satellites, and radar.	–
6-4.7 Explain how solar energy affects Earth's atmosphere and surface (land and water).	What is Weather? Wind and Ocean Currents
6-4.8 Explain how convection affects weather patterns and climate.	What is Weather? Wind and Ocean Currents
6-4.9 Explain the influence of global winds and the jet stream on weather and climatic conditions.	Wind and Ocean Currents
Standard 6-5: The student will demonstrate an understanding of the law of conservation of energy and the properties of energy and work.	
6-5.1 Identify the sources and properties of heat, solar, chemical, mechanical, and electrical energy.	What is Energy? What is Light?
6-5.2 Explain how energy can be transformed from one form to another (including the two types of mechanical energy, potential and kinetic, as well as chemical and electrical energy) in accordance with the law of conservation of energy.	What is Energy? How is Electrical Energy Useful?

6-5.3 Explain how magnetism and electricity are interrelated by using descriptions, models, and diagrams of electromagnets, generators, and simple electrical motors.	Electromagnets Uses of Electromagnets
6-5.4 Illustrate energy transformations (including the production of light, sound, heat, and mechanical motion) in electrical circuits.	Energy Transfer in Circuits How is Electrical Energy Useful? Energy Efficiency
6-5.5 Illustrate the directional transfer of heat energy through convection, radiation, and conduction.	Convection and Conduction Radiation
6-5.6 <i>Recognize that energy is the ability to do work (force exerted over a distance).</i>	–
6-5.7 Explain how the design of simple machines (including levers, pulleys, and inclined planes) helps reduce the amount of force required to do work.	Moments
6-5.8 Illustrate ways that simple machines exist in common tools and in complex machines.	Hydraulics Moments Moment Calculations
<b>GRADE 7</b>	
Standard 7-2: The student will demonstrate an understanding of the structure and function of cells, cellular reproduction, and heredity.	
7-2.1 Summarize the structures and functions of the major components of plant and animal cells (including the cell wall, the cell membrane, the nucleus, chloroplasts, mitochondria, and vacuoles).	Animal and Plant Cells
7-2.2 Compare the major components of plant and animal cells.	Animal and Plant Cells
7-2.3 Compare the body shapes of bacteria (spiral, coccus, and bacillus) and the body structures that protists (euglena, paramecium, amoeba) use for food gathering and locomotion.	What Are Microbes?
7-2.4 Explain how cellular processes (including respiration, photosynthesis in plants, mitosis, and waste elimination) are essential to the survival of the organism.	Animal and Plant Cells Releasing Energy What is Photosynthesis? Where Do Cells Come From? Respiration and the Circulatory System
7-2.5 Summarize how genetic information is passed from parent to offspring by using the terms genes, chromosomes, inherited traits, genotype, phenotype, dominant traits, and recessive traits.	Genes and Alleles Inheritance Causes of Variation
7-2.6 Use Punnett squares to predict inherited monohybrid traits.	Gregor Mendel Inheritance
7-2.7 Distinguish between inherited traits and those acquired from environmental factors.	Types of Variation

Standard 7-3: The student will demonstrate an understanding of the functions and interconnections of the major human body systems, including the breakdown in structure or function that disease causes.	
7-3.1 Summarize the levels of structural organization within the human body (including cells, tissues, organs, and systems).	Cells to Organisms
7-3.2 Recall the major organs of the human body and their function within their particular body system.	Cells to Organisms Digestion Human Sex Cells and Systems Respiration and the Circulatory System The Respiratory System The Endocrine System The Nervous System The Musculoskeletal System
7-3.3 Summarize the relationships of the major body systems (including the circulatory, respiratory, digestive, excretory, nervous, muscular, and skeletal systems).	Respiration and the Circulatory System The Respiratory System Digestion The Nervous System The Endocrine System The Musculoskeletal System
7-3.4 Explain the effects of disease on the major organs and body systems (including infectious diseases such as colds and flu, AIDS, and athlete's foot and noninfectious diseases such as diabetes, Parkinson's, and skin cancer).	Human Behavior Fighting Disease
Standard 7-4: The student will demonstrate an understanding of how organisms interact with and respond to the biotic and abiotic components of their environment.	
7-4.1 Summarize the characteristics of the levels of organization within ecosystems (including populations, communities, habitats, niches, and biomes).	Habitats
7-4.2 Illustrate energy flow in food chains, food webs, and energy pyramids	Food Chains Food Webs Pyramids of Number and Biomass
7-4.3 Explain the interaction among changes in the environment due to natural hazards (including landslides, wildfires, and floods), changes in populations, and limiting factors (including climate and the availability of food and water, space, and shelter).	Competition Weather Hazards Food Webs
7-4.4 Explain the effects of soil quality on the characteristics of an ecosystem.	–

7-4.5 Summarize how the location and movement of water on Earth's surface through groundwater zones and surface-water drainage basins, called watersheds, are important to ecosystems and to human activities.	–
7-4.6 Classify resources as renewable or nonrenewable and explain the implications of their depletion and the importance of conservation.	Renewable Energy Nonrenewable Energy Resources Fossil Fuels Using Rocks
Standard 7-5: The student will demonstrate an understanding of the classifications and properties of matter and the changes that matter undergoes.	
7-5.1 Recognize that matter is composed of extremely small particles called atoms.	What Are Atoms?
7-5.2 Classify matter as element, compound, or mixture on the basis of its composition.	Elements and Compounds What is a Mixture?
7-5.3 Compare the physical properties of metals and nonmetals.	Metals and Nonmetals
7-5.4 Use the periodic table to identify the basic organization of elements and groups of elements (including metals, nonmetals, and families).	The Periodic Table
7-5.5 Translate chemical symbols and the chemical formulas of common substances to show the component parts of the substances (including table salt, water, simple sugar, oxygen gas, carbon dioxide, and nitrogen gas).	Naming Compounds Making Compounds Formulae of Compounds
7-5.6 Distinguish between acids and bases and use indicators (including litmus paper, pH paper, and phenolphthalein) to determine their relative pH.	What Are Acids and Alkalis? What Are Indicators? The pH Scale
7-5.7 Identify the reactants and products in chemical equations.	Types of Chemical Reactions
7-5.8 Explain how a balanced chemical equation supports the law of conservation of matter.	Conservation of Mass Balancing Equations
7-5.9 Compare physical properties of matter (including melting or boiling point, density, and color) to the chemical property of reactivity with a certain substance (including the ability to burn or to rust).	Types of Chemical Reactions Changes of Matter
7-5.10 Compare physical changes (including changes in size, shape, and state) to chemical changes that are the result of chemical reactions (including changes in color or temperature and formation of a precipitate or gas).	Changing State Types of Chemical Reactions
GRADE 8	
Standard 8-2: The student will demonstrate an understanding of Earth's biological diversity over time.	
8-2.1 Explain how biological adaptations of populations enhance their survival in a particular environment.	Adaptations

8-2.2 Summarize how scientists study Earth's past environment and diverse life-forms by examining different types of fossils (including molds, casts, petrified fossils, preserved and carbonized remains of plants and animals, and trace fossils).	Evolution Sedimentary Rocks
8-2.3 Explain how Earth's history has been influenced by catastrophes (including the impact of an asteroid or comet, climatic changes, and volcanic activity) that have affected the conditions on Earth and the diversity of its life-forms.	–
8-2.4 Recognize the relationship among the units—era, epoch, and period—into which the geologic time scale is divided.	–
8-2.5 Illustrate the vast diversity of life that has been present on Earth over time by using the geologic time scale.	–
8-2.6 Infer the relative age of rocks and fossils from index fossils and the ordering of the rock layers.	Sedimentary Rocks
8-2.7 Summarize the factors, both natural and man-made, that can contribute to the extinction of a species.	Environmental Change Greenhouse Gases Acid Rain Evolution
Standard 8-3: The student will demonstrate an understanding of materials that determine the structure of Earth and the processes that have altered this structure.	
8-3.1 Summarize the three layers of Earth—crust, mantle, and core—on the basis of relative position, density, and composition.	The Structure of the Earth
8-3.2 Explain how scientists use seismic waves—primary, secondary, and surface waves—and Earth's magnetic fields to determine the internal structure of Earth.	–
8-3.3 Infer an earthquake's epicenter from seismographic data.	–
8-3.4 Explain how igneous, metamorphic, and sedimentary rocks are interrelated in the rock cycle.	Igneous Rocks Metamorphic Rocks Sedimentary Rocks The Rock Cycle
8-3.5 Summarize the importance of minerals, ores, and fossil fuels as Earth resources on the basis of their physical and chemical properties.	Using Rocks Fossil Fuels
8-3.6 Explain how the theory of plate tectonics accounts for the motion of the lithospheric plates, the geologic activities at the plate boundaries, and the changes in landform areas over geologic time.	What is Plate Tectonics? Plate Boundaries
8-3.7 Illustrate the creation and changing of landforms that have occurred through geologic processes (including volcanic eruptions and mountain-building forces).	Plate Boundaries
8-3.8 Explain how earthquakes result from forces inside Earth.	Plate Boundaries Earthquakes

8-3.9 Identify and illustrate geologic features of South Carolina and other regions of the world through the use of imagery (including aerial photography and satellite imagery) and topographic maps.	–
Standard 8-4: The student will demonstrate an understanding of the characteristics, structure, and predictable motions of celestial bodies.	
8-4.1 Summarize the characteristics and movements of objects in the solar system (including planets, moons, asteroids, comets, and meteors).	The Solar System
8-4.2 Summarize the characteristics of the surface features of the Sun: photosphere, corona, sunspots, prominences, and solar flares.	–
8-4.3 Explain how the surface features of the Sun may affect Earth.	–
8-4.4 Explain the motions of Earth and the Moon and the effects of these motions as they orbit the Sun (including day, year, phases of the Moon, eclipses, and tides).	Days, Years and Seasons The Earth, Moon and Sun
8-4.5 Explain how the tilt of Earth's axis affects the length of the day and the amount of heating on Earth's surface, thus causing the seasons of the year.	Days, Years and Seasons
8-4.6 Explain how gravitational forces are influenced by mass and distance.	Gravity
8-4.7 Explain the effects of gravity on tides and planetary orbits.	Gravity
8-4.8 Explain the difference between mass and weight by using the concept of gravitational force.	Gravity
8-4.9 Recall the Sun's position in the universe, the shapes and composition of galaxies, and the distance measurement unit (light year) needed to identify star and galaxy locations.	–
8-4.10 Compare the purposes of the tools and the technology that scientists use to study space (including various types of telescopes, satellites, space probes, and spectroscopes).	Satellites
Standard 8-5: The student will demonstrate an understanding of the effects of forces on the motion of an object.	
8-5.1 Use measurement and time-distance graphs to represent the motion of an object in terms of its position, direction, or speed.	Distance, Time and Speed Graphing Speed
8-5.2 Use the formula for average speed, $v = d/t$ , to solve real-world problems.	Distance, Time and Speed
8-5.3 Analyze the effects of forces (including gravity and friction) on the speed and direction of an object.	What Are Forces? Calculating Resultant Forces Friction Gravity
8-5.4 Predict how varying the amount of force or mass will affect the motion of an object.	Calculating Resultant Forces
8-5.5 Analyze the resulting effect of balanced and unbalanced forces on an object's motion in terms of magnitude and direction.	What Are Forces?
8-5.6 Summarize and illustrate the concept of inertia.	–

Standard 8-6: The student will demonstrate an understanding of the properties and behaviors of waves.	
8-6.1 Recall that waves transmit energy but not matter.	Electromagnetic Waves What is Sound? What is Light?
8-6.2 Distinguish between mechanical and electromagnetic waves.	Electromagnetic Waves What is Sound?
8-6.3 Summarize factors that influence the basic properties of waves (including frequency, amplitude, wavelength, and speed).	Electromagnetic Waves What is Sound?
8-6.4 Summarize the behaviors of waves (including refraction, reflection, transmission, and absorption).	Reflection Refraction
8-6.5 Explain hearing in terms of the relationship between sound waves and the ear.	What is Sound? The Ear and Hearing
8-6.6 Explain sight in terms of the relationship between the eye and the light waves emitted or reflected by an object.	What is Light?
8-6.7 Explain how the absorption and reflection of light waves by various materials result in the human perception of color.	Reflection Refraction Color
8-6.8 Compare the wavelength and energy of waves in various parts of the electromagnetic spectrum (including visible light, infrared, and ultraviolet radiation).	Electromagnetic Waves