

North Carolina Science Standards Grades 6 - 8
North Carolina Middle School Science

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MIDDLE SCHOOL SCIENCE		Boardworks Middle School Science Presentation
Grade 6		
COMPETENCY GOAL 3: The learner will build an understanding of the geological cycles, forces, processes, and agents which shape the lithosphere.		
3.01 Evaluate the forces that shape the lithosphere including crustal plate movement, folding and faulting, deposition, volcanic activity and earthquakes		What is Plate Tectonics? Plate Boundaries Earthquakes
3.02 Examine earthquake and volcano patterns.		Plate Boundaries Earthquakes
3.03 Explain the model for the interior of the earth.		The Structure of the Earth
3.04 Describe the processes which form and the uses of earth materials. Rock cycle, minerals, characteristics of rocks, economic uses of rocks and minerals, value of gems and precious metals and common gems, minerals, precious metals and rocks found in N.C.		The Rock Cycle Using Rocks
3.05 Analyze soil properties that can be observed and measured to predict soil quality including color, horizon profile, infiltration, soil temperature, structure, consistency, texture, particle size, pH, fertility and soil moisture.		Soil The pH Scale
<i>3.06 Evaluate ways in which human activities have affected Earth's pedosphere and the measures taken to control the impact, including vegetative cover, agriculture, land use, nutrient balance and soil as a vector.</i>		-
<i>3.07 Assess the use of technology and information systems in monitoring lithospheric phenomenon.</i>		-
3.08 Conclude that the good health of environments and organisms requires monitoring of the pedosphere, taking steps to maintain soil quality and stewardship.		Soil The pH Scale
COMPETENCY GOAL 4: The learner will investigate the cycling of matter.		
4.01 Describe the flow of energy and matter in natural systems. Energy flows through ecosystems in one direction, from the sun through producers to consumers to decomposers. Matter is transferred from one organism to another and between organisms and their environments. Water, nitrogen, carbon dioxide, and oxygen are substances cycled between the living and non-living environments.		Feeding Types Food Chains Food Webs Recycling Nutrients
4.02 Evaluate the significant role of decomposers		Pyramids of Number and Biomass Recycling Nutrients

4.03 Examine evidence that green plants make food. Photosynthesis is a process carried on by green plants and other organisms containing chlorophyll. During photosynthesis, light energy is converted into stored energy which the plant, in turn, uses to carry out its life processes.	What is Photosynthesis?
4.04 Evaluate the significance of photosynthesis to other organisms: The major source of atmospheric oxygen is photosynthesis. Carbon dioxide is removed from the atmosphere and oxygen is released during photosynthesis. Green plants are the producers of food that is used directly or indirectly by consumers.	Pyramids of Number and Biomass Feeding Types Food Chains Food Webs Plants as Food What is Photosynthesis?
<i>4.05 Evaluate designed systems for ability to enable growth of certain plants and animals.</i>	–
COMPETENCY GOAL 5: The learner will build understanding of the Solar System.	
5.01 Analyze the components and cycles of the solar system including the Sun, planets and moons, asteroids and meteors, comets, phases, seasons, day/year, and eclipses.	The Solar System Days, Years and Seasons The Earth, Moon and Sun
5.02 Compare and contrast the Earth to other planets in terms of size, composition, relative distance from the sun and ability to support life.	The Solar System
<i>5.03 Relate the influence of the sun and the moon's orbit to the gravitational effects produced on Earth. Including solar storms and tides.</i>	–
5.04 Describe space explorations and the understandings gained from them including NASA, technologies used to explore space, historic timeline, apollo mission to the moon, space shuttle and international space station and future goals.	Exploring Space
5.05 Describe the setting of the solar system in the universe including galaxy, size and uniqueness of Earth.	The Solar System
<i>5.06 Analyze the spin-off benefits generated by space exploration technology including medical, materials, transportation, processes and future research.</i>	–
COMPETENCY GOAL 6: The learner will conduct investigations and examine models and devices to build an understanding of the characteristics of energy transfer and/or transformation.	
6.01 Determine how convection and radiation transfer energy.	Conduction and Convection Radiation
6.02 Analyze heat flow through materials or across space from warm objects to cooler objects until both objects are at equilibrium.	Conduction and Convection

6.03 Analyze sound as an example that vibrating materials generate waves that transfer energy. Including frequency, amplitude, loudness, how sound travels through different material and form and function of the human ear.	What is Sound? Speed of Sound The Ear and Hearing
6.04 Evaluate data for qualitative and quantitative relationships associated with energy transfer and/or transformation.	What is Energy? Energy Changes How is Electrical Energy Useful? Energy Efficiency
6.05 Analyze the physical interactions of light and matter, including absorption, scattering, color perception and form and function of the human eye.	What is Light? Color
6.06 Analyze response to heat to determine the suitability of materials for use in technological design, including conduction and expansion.	Conduction and Convection Particles in Action Changes of Matter Changing State
6.07 Analyze the Law of Conservation of Energy. Conclude that energy cannot be created or destroyed, but only changed from one form into another. Conclude that the amount of energy stays the same, although within the process some energy is always converted to heat. Some systems transform energy with less loss of heat than others.	What is Energy? How is Electrical Energy Useful? Energy Efficiency
COMPETENCY GOAL 7: The learner will conduct investigations and use technologies and information systems to build an understanding of population dynamics.	
7.01 Describe ways in which organisms interact with each other and with nonliving parts of the environment. Including coexistence/cooperation/competition, symbiosis and mutual dependence.	Feeding Types Habitats Competition Animal Behavior Types of Animal Behavior
7.02 Investigate factors that determine the growth and survival of organisms including light, temperature range, mineral availability, soil/rock type, water and energy	Habitats Soil The pH Scale
7.03 Explain how changes in habitat may affect organisms.	Environmental Change
7.04 Evaluate data related to human population growth, along with problems and solutions. Including waste disposal, food supplies, resource availability, transportation and socio-economic patterns.	–

7.05 Examine evidence that overpopulation by any species impacts the environment.	Environmental Change Feeding Types Food Webs Competition
7.06 Investigate processes which, operating over long periods of time, have resulted in the diversity of plant and animal life present today, including natural selection and adaptation.	Evolution Adaptations
Grade 7	
COMPETENCY GOAL 3: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of the atmosphere.	
3.01 Explain the composition, properties and structure of the atmosphere. Including the mixture of gases, stratified layers, each layer has distinct properties, as altitude increases air pressure decreases and equilibrium.	The Atmosphere
3.02 Describe properties that can be observed and measured to predict air quality, including particulate matter and ozone.	–
3.03 Conclude that the good health of environments and organisms requires the monitoring of air quality, taking steps to maintain healthy air quality and stewardship.	Environmental Change Greenhouse Gases Acid Rain Reducing Our Energy Bills
3.04 Evaluate how humans impact air quality including air quality standards, point and non-point sources of air pollution in North Carolina, financial and economic trade-offs and local air quality issues.	–
3.05 Examine evidence that atmospheric properties can be studied to predict atmospheric conditions and weather hazards. Including humidity, temperature, wind speed and direction, air pressure, precipitation, tornados, hurricanes, floods and storms.	What is Weather? Weather Hazards Precipitation Hurricanes Tornados Flooding
3.06 Assess the use of technology in studying atmospheric phenomena and weather hazards, including satellites, weather maps, predicting, recording and communicating information about conditions.	–
COMPETENCY GOAL 4: The learner will conduct investigations, use models, simulations, and appropriate technologies and information systems to build an understanding of the complementary nature of the human body system.	

<p>4.01 Analyze how human body systems interact to provide for the needs of the human organism, including musculoskeletal, cardiovascular, endocrine and nervous, digestive and circulatory, excretory, reproductive, respiratory, immune and nervous system.</p>	<p>Cells to Organisms Digestion Human Sex Cells and Systems Respiration and the Circulatory System The Circulatory System The Endocrine System The Nervous System The Musculoskeletal System</p>
<p>4.02 Describe how systems within the human body are defined by the functions it performs.</p>	<p>Cells to Organisms Digestion Human Sex Cells and Systems Respiration and the Circulatory System The Circulatory System The Endocrine System The Nervous System The Musculoskeletal System</p>
<p>4.03 Explain how the structure of an organ is adapted to perform specific functions within one or more systems - liver, heart, lung, brain, stomach and kidney.</p>	<p>Cells to Organisms Digestion Human Sex Cells and Systems Respiration and the Circulatory System The Circulatory System The Endocrine System The Nervous System The Musculoskeletal System</p>
<p>4.04 Evaluate how systems in the human body help regulate the internal environment.</p>	<p>The Endocrine System</p>
<p>4.05 Analyze how an imbalance in homeostasis may result from a disruption in any human system.</p>	<p>–</p>
<p>4.06 Describe growth and development of the human organism.</p>	<p>Embryo Development and Birth Puberty Where Do Cells Come From?</p>

4.07 Explain the effects of environmental influences on human embryo development and human health including smoking, alcohol, drugs and diet	–
4.08 Explain how understanding human body systems can help make informed decisions regarding health.	–
Competency Goal 5: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of heredity and genetics.	
5.01 Explain the significance of genes to inherited characteristics: Genes are the units of information. Parents transmit genes to their offspring. Some medical conditions and diseases are genetic.	Genes and Alleles Causes of Variation Inheritance
5.02 Explain the significance of reproduction: Sorting and recombination of parents' genetic material. Potential variation among offspring.	Causes of Variation Types of Variation
5.03 Identify examples and patterns of human genetic traits: Dominant and recessive. Incomplete dominance.	Genes and Alleles Inheritance
5.04 Analyze the role of probability in the study of heredity: Role of each parent in transfer of genetic traits. Analysis of pedigrees.	Gregor Mendel Inheritance
5.05 Summarize the genetic transmittance of disease.	–
5.06 Evaluate evidence that human characteristics are a product of: Inheritance. Environmental factors, and Lifestyle choices.	Types of Variation
Competency Goal 6: The learner will conduct investigations, use models, simulations, and appropriate technologies and information systems to build an understanding of motion and forces.	
6.01 Demonstrate ways that simple machines can change force.	Moments Hydraulics
6.02 Analyze simple machines for mechanical advantage and efficiency.	Moments Moment Calculations

<p>6.03 Evaluate motion in terms of Newton's Laws:</p> <ul style="list-style-type: none"> • The force of friction retards motion. • For every action there is an equal and opposite reaction. • The greater the force, the greater the change in motion. • An object's motion is the result of the combined effect of all forces acting on the object: • A moving object that is not subjected to a force will continue to move at a constant speed in a straight line • An object at rest will remain at rest. 	<p>What Are Forces? Calculating Resultant Force Friction</p>
<p>6.04 Analyze that an object's motion is always judged relative to some other object or point.</p>	<p>Distance, Time and Speed</p>
<p>6.05 Describe and measure quantities that characterize moving objects and their interactions within a system:</p> <ul style="list-style-type: none"> • Time. • Distance. • Mass. • Force. • Velocity. • Center of mass. • Acceleration. 	<p>Distance, Time and Speed Average and Instantaneous Speed What Are Forces? Graphing Speed</p>
<p>6.06 Investigate and analyze the real world interactions of balanced and unbalanced forces:</p> <ul style="list-style-type: none"> • Sports and recreation. • Transportation. • The human body. 	<p>What Are Forces? Calculating Resultant Force</p>
<p>Grade 8</p>	
<p>COMPETENCY GOAL 3: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of the hydrosphere.</p>	
<p><i>3.01 Analyze the unique properties of water including, universal solvent, cohesion and adhesion, polarity, density and buoyancy, and specific heat.</i></p>	<p>–</p>
<p><i>3.02 Explain the structure of the hydrosphere including, water distribution on earth, local river basin and local water availability.</i></p>	<p>–</p>
<p><i>3.03 Evaluate evidence that Earth's oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms. Including estuaries, marine ecosystems, upwelling, behavior of gases in the marine environment, value and sustainability of marine resources and deep ocean technology and understandings gained.</i></p>	<p>–</p>
<p>3.04 Describe how terrestrial and aquatic food webs are interconnected.</p>	<p>Food Chains Food Webs</p>

3.05 Analyze hydrospheric data over time to predict the health of a water system including temperature, dissolved oxygen, pH, nitrates, turbidity and bio-indicators.	–
3.06 Evaluate technologies and information systems used to monitor the hydrosphere.	–
3.07 Describe how humans affect the quality of water. Including point and non-point sources of water pollution in North Carolina, possible effects of excess nutrients in North Carolina waters, economic trade-offs and local water issues.	Acid Rain
3.08 Recognize that the good health of environments and organisms requires monitoring of the hydrosphere, water quality standards, methods of water treatment, maintaining safe water quality and stewardship.	Acid Rain
COMPETENCY GOAL 4: The learner will conduct investigations and utilize technology and information systems to build an understanding of chemistry.	
4.01 Understand that both naturally occurring and synthetic substances are chemicals.	Elements and Compounds
4.02 Evaluate evidence that elements combine in a multitude of ways to produce compounds that account for all living and nonliving substances.	Elements and Compounds What Are Atoms?
4.03 Explain how the periodic table is a model for classifying elements and identifying the properties of elements.	The Periodic Table
4.04 Describe the suitability of materials for use in technological design. Including electrical conductivity, density, magnetism, solubility and malleability.	Metals and Nonmetals Metalloids Conduction and Convection
4.05 Identify substances based on characteristic physical properties, including density, boiling/melting points, solubility, chemical reactivity and specific heat	Metals and Nonmetals Metalloids Conduction and Convection
4.06 Describe and measure quantities related to chemical/physical changes within a system, including temperature, volume, mass, precipitate and gas production	Energy Changes Making Gases Conservation of Mass
4.07 Identify evidence supporting the law of conservation of matter. During an ordinary chemical reaction matter cannot be created or destroyed. In a chemical reaction, the total mass of the reactants equals the total mass of the products.	Conservation of Mass
4.08 Identify evidence that some chemicals may contribute to human health conditions including cancer, autoimmune disease, birth defects, heart disease, diabetes, learning and behavioural disorders, kidney disease and asthma.	–
4.09 Describe factors that determine the effects a chemical has on a living organism including exposure, potency, dose and the resultant concentration of chemicals in the organism, individual susceptibility and possible means to eliminate or reduce effects.	–
4.10 Describe risks and benefits of chemicals including medicines, food preservatives, crop yield, sanitation	Types of Chemical Reactions Everyday Chemical Reactions Growing Plants

COMPETENCY GOAL 5: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of evidence of evolution in organisms and landforms.	
5.01 Interpret ways in which rocks, fossils, and ice cores record Earth's geologic history and the evolution of life including geologic time scale, index fossils, law of superposition, unconformity, evidence for climate change, extinction of species and catastrophic events.	–
5.02 Correlate evolutionary theories and processes: biological, geological and technological.	Evolution
5.03 Examine evidence that the geologic evolution has had significant global impact including distribution of living things, major geological events and mechanical and chemical weathering.	–
5.04 Analyze satellite imagery as a method to monitor Earth from space: Spectral analysis and Reflectance curves.	–
5.05 Use maps, ground truthing and remote sensing to make predictions regarding changes over time, land use, urban sprawl and resource management.	–
COMPETENCY GOAL 6: The learner will conduct investigations, use models, simulations, and appropriate technologies and information systems to build an understanding of cell theory.	
6.01 Describe cell theory: All living things are composed of cells. Cells provide structure and carry on major functions to sustain life. Some organisms are single cell; other organisms, including humans, are multi-cellular. Cell function is similar in all living things.	Animal and Plant Cells
6.02 Analyze structures, functions, and processes within animal cells for capture and release of energy, feedback information, dispose of wastes, reproduction, movement and specialized needs.	Animal and Plant Cells
6.03 Compare life functions of protists: <i>Euglena</i> , <i>Amoeba</i> , <i>Paramecium</i> and <i>Volvox</i> .	–
6.04 Conclude that animal cells carry on complex chemical processes to balance the needs of the organism. Cells grow and divide to produce more cells. Cells take in nutrients to make the energy for the work cells do. Cells take in materials that a cell or an organism needs.	Animal and Plant Cells Where Do Cells Come From? Releasing Energy
COMPETENCY GOAL 7: The learner will conduct investigations, use models, simulations, and appropriate technologies and information systems to build an understanding of microbiology.	
7.01 Compare and contrast microbes: Size, shape, structure and whether they are living cells.	What Are Microbes?
7.02 Describe diseases caused by microscopic biological hazards including viruses, bacteria, parasites, contagions and mutagens.	How Microbes Cause Disease
7.03 Analyze data to determine trends or patterns to determine how an infectious disease may spread including carriers, vectors, conditions conducive to disease and calculate reproductive potential of bacteria.	How Microbes Cause Disease Types of Reproduction

7.04 Evaluate the human attempt to reduce the risk of and treatments for microbial infections including solutions with anti-microbial properties, antibiotic treatment and research.	Fighting Disease
7.05 <i>Investigate aspects of biotechnology including specific genetic information available, careers, economic benefits to North Carolina, ethical issues and impact for agriculture.</i>	-