

GRADE 6 SCIENCE

STRAND A Value and Attitudes

Catholic Schools exist so that curriculum may be taught in the light of Gospel teachings. Teachers must reinforce Gospel truths and values so that students may serve as witnesses to their Catholic faith. The values listed below will help students develop a critical conscience in every content area. Values and Attitudes are not necessarily quantifiable but rather identified in a student's respect toward the content area.

- All people are created with minds and the gift to reason.
- God makes each of us as a unique individual.
- Recognize our talents and share them with one another in order to do God's will.
- There is a sense of order, balance and symmetry in God's universe.
- God provides us with all we need to survive. We must appreciate, care for, and protect these gifts through conservation, preservation, and stewardship of natural resources.
- All living things are dependent on their environment to sustain life.
- The Earth is dynamic and resilient, yet fragile and finite.
- Demonstrate a respect for all forms of life and a growing appreciation for the beauty and diversity of God's world.
- Demonstrate responsible and ethical behavior that exemplifies Catholic values, including respect for all life.

(The first three bullets are common to all areas of curriculum.)

STRAND B Physical Science

Forces in Motion

ESSENTIAL STANDARDS	OBJECTIVES	STRATEGIES
1. Understand the properties of waves and the wavelike property of energy. (6.P.1)	1.1 Conclude that vibrating materials generate waves that transfer energy.	
	1.2 Examine the wavelike property of energy in earthquakes, light and sound. (6.P.1.1)	
	1.3 Understand that waves transmit heat, sound, and light energy.	
	1.4 Explain the relationship among visible light, the electromagnetic spectrum and sight. (6.P.1.2)	
	1.5 Identify properties of waves. (EX.6.P.1)	
	1.6 Explain the relationship among the rate of vibration, the medium through which vibrations travel, sound and hearing. (6.P.1.3)	

Physical Science (continued)

Matter, Properties and Change

ESSENTIAL STANDARDS	OBJECTIVES	STRATEGIES
<p>2. Understand the structure, classifications and physical properties of matter. (6.P.2)</p>	<p>2.1 Describe the internal structure of the atom.</p>	
	<p>2.2 Recognize that all matter is made up of atoms (4D/M1a) and atoms of the same element are all alike, but are different from the atoms of other elements. (6.P.2.1)</p>	
	<p>2.3 Explain the effect of heat on the motion atoms and molecules through a description of what happens to particles during a change in phase. (6.P.2.2)</p>	
	<p>2.4 Analyze properties of solids, liquids, and gases.</p>	
	<p>2.5 Compare and contrast physical change with chemical change. Explain how you would know whether or not a chemical change was taking place.</p>	
	<p>2.6 Compare the physical properties of pure substances that are independent of the amount of matter present including density, melting point, boiling point and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight. (6.P.2.3)</p>	

Physical Science (continued)

Energy: Conservation And Transfer

ESSENTIAL STANDARDS	OBJECTIVES	STRATEGIES
<p>3. Understand characteristics of energy transfer and interactions of matter and energy. (6.P.3)</p>	<p>3.1 Evaluate data for qualitative and quantitative relationships associated with energy transfer and/or transformation.</p>	
	<p>3.2 Illustrate the transfer of heat energy from warmer objects to cooler ones using examples of conduction, radiation and convection and the effects that may result. (6.P.3.1)</p>	
	<p>3.3 Explain the effects of electromagnetic waves on various materials to include absorption, scattering, and change in temperature. (6.P.3.2)</p>	
	<p>3.4 Examine the law of conservation of energy.</p>	
	<p>3.5 Explain the suitability of materials for use in technological design based on a response to heat (to include: conduction, expansion, and contraction) and electrical energy (conductors and insulators). (6.P.3.3)</p>	

Strand C Earth Science

Earth Systems, Structures and Processes

ESSENTIAL STANDARDS	OBJECTIVES	STRATEGIES
<p>1. Understand the structure of the earth and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time and the effects of these forces on humans. (6.E.2)</p>	<p>1.1 Summarize the structure of the earth, including the layers, the mantle and core based on the relative position, composition and density. (6.E.2.1)</p>	
	<p>1.2 Compare the structures of the Earth's surface. (EX.6.E.1)</p>	
	<p>1.3 Explain how crustal plates and ocean basins are formed, move and interact using earthquakes, heat flow and volcanoes to reflect forces within the earth. (6.E.2.2)</p>	
	<p>1.4 Explain how the formation of soil is related to the parent rock type and the environment in which it develops. (6.E.2.3)</p>	
<p>2. Understand the composition, formation, and properties of soil; and the effects of biological agents and pollutants on soil.</p>	<p>2.1 Explain the more pollution on the land, the less living organisms can use the land.</p>	
	<p>2.2 Identify common components of soil. Determine how physical and biological agents and processes form soil and affect soil characteristics.</p>	
	<p>2.3 Explain that the good health of humans requires: monitoring the lithosphere, maintaining soil quality and stewardship to protect and conserve natural resources. (6.E.2.4)</p>	

Earth and Science (continued)

Earth in the Universe

ESSENTIAL STANDARDS	OBJECTIVES	STRATEGIES
<p>3. Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe. (6.E.1)</p>	<p>3.1 Identify and classify the parts of our solar system.</p>	
	<p>3.2 Explain how the relative motion and relative position of the sun, Earth and moon affect the seasons, tides, phases of the moon, and eclipses. (6.E.1.1)</p>	
	<p>3.3 Explain why Earth sustains life while other planets do not based on their properties (including types of surface, atmosphere and gravitational force) and location to the Sun.. (6.E.1.2)</p>	
	<p>3.4 Compare and contrast scientific theories concerning the components, patterns, and cycles of the solar system.</p>	
<p>4. Explain the sequence of events for the technologies developed, and the benefits to society, as a result of space exploration.</p>	<p>4.1 Summarize space exploration and the discoveries and understandings gained from them. (6.E.1.3)</p>	

STRAND D Life Science

Ecosystems

ESSENTIAL STANDARDS	OBJECTIVES	STRATEGIES
<p>1. Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment. (6.L.2)</p>	<p>1.1 Summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within food chains and food webs (terrestrial and aquatic) from producers to consumers to decomposers. (6.L.2.1)</p>	
	<p>1.2 Explain how plants respond to external stimuli (including dormancy and forms of tropism) to enhance survival in an environment. (6.L.2.2)</p>	
	<p>1.3 Summarize how the abiotic factors (such as temperature, water, sunlight, and soil quality) of biomes (freshwater, marine, forest, grassland, desert, Tundra) affect the ability of organisms to grow, survive and/or create their own food through photosynthesis. (6.L.2.3)</p>	
	<p>1.4 Diagram how the flow of energy within food webs is interconnected with the cycling of matter (including water, nitrogen, carbon dioxide and oxygen). (8.L.3.3)</p>	
	<p>1.5 Evaluate the variety of organisms an ecosystem can support.</p>	
	<p>1.6 Evaluate the major source of energy for ecosystems (sunlight) and how it is passed from organism to organism in food webs.</p>	

Life Science (continued)

Structures and Functions of Living Organisms

ESSENTIAL STANDARDS	OBJECTIVES	STRATEGIES
2. Understand the structures, processes and behaviors of plants that enable them to survive and reproduce. (6.L.1)	2.1 Summarize the basic structures and functions of flowering plants required for survival, reproduction and defense. (6.L.1.1)	
	2.2 Explain the significance of the processes of photosynthesis, respiration and transpiration to the survival of green plants and other organisms. (6.L.1.2)	
3. Understand the major parts of a plant, including seed, root, stem, leaf, and flower, and their functions. (EX.6.L.1)	3.1 Identify functions of the parts of a plant and the function of cell wall and chloroplasts in plant cells. (EX.6.L.1.1)	
	3.2 Understand how the functions of plant structures are essential for life, e.g., leaves, stem, roots, bloom. (EX.6.L.1.2)	

STRAND E Process Skills (Grade 6-8 appropriate skills necessary for asking meaningful questions and conducting careful investigation.)

Concept: Science process skills need to be practiced in the learning of science content.

<p>PLANNING</p>	<ul style="list-style-type: none"> • Practice habits of careful observation. • Develop and recognize testable questions. • Relate past experience to a current problem. • Develop habits of predicting outcomes of experiments. • Develop habits of questioning information that lacks supporting data (do results make sense?). • Write direction statements and simple procedures of an investigation. • Identify and write a plausible hypothesis for a testable question. • Use a variety of print and electronic resources to collect information and evidence for research. • Develop a hypothesis by evaluating observations and known information.
<p>COLLECTING DATA</p>	<ul style="list-style-type: none"> • Select and use appropriate tools and technology to perform tests, collect and display data. • Identify and analyze variables in a data table. • Construct a data table and record changes in values of two related variables obtained during an investigation. • Identify the type of graph to use to display and analyze data collected. • Understand that measurement is a quantitative observation. • Analyze data and write conclusion statements. • Describe observations made during investigations using appropriate vocabulary. • Identify, understand, and compare SI (metric) and customary units and prefixes of measurement.
<p>INTERPRETING RESULTS</p>	<ul style="list-style-type: none"> • Identify the elements required to construct a line graph from a data table obtained in an investigation putting independent variable on x-axis; dependent variable on y-axis. • Understand the difference between data collection, analysis and conclusions in a scientific investigation. • Interpret data from a bar, circle and line graph. • Communicate steps and results from investigation in written reports and oral presentations. • Recognize whether evidence is consistent with a proposed explanation. • Make inferences, draw conclusions, and differentiate the two. • Understand the meaning of the steps of the scientific method. • Understand and use necessary components of a graph including a meaningful title, labels and units for both axis, and uniform, consistent scale for axis.
<p>SAFETY</p>	<ul style="list-style-type: none"> • Recognize the safety symbols used in science. • Follow all safety rules including dress and behavior in a laboratory situation. • Understand the correct methods of disposal of chemicals and use of scientific instrumentation. • Understand the correct method of using scientific instrumentation.

TOPICS BY GRADE

PHYSICAL SCIENCE	K	1	2	3	4	5	6	7	8
FORCES AND MOTION	Position and motion of objects	How forces affect motion	Relationship between sound and vibration	Motion and factors that affect motion	Motion due to magnetism and electricity	Force and motion in relation to simple machines	Waves and energy	Effects of forces on motion and graphical representations	Relationship between sound and energy
MATTER: PROPERTIES AND CHANGE	Physical properties of objects		Physical properties; changes in solids and liquids	Structure and properties of matter Water cycle	Composition and properties before and after a change	Interaction of matter and energy	Structure and physical properties of matter		Chemical and physical properties of matter
ENERGY: CONSERVATION TRANSFER				Energy transfer from object to object	Simple circuits Different forms of energy	Property changes due to heating and cooling	Energy transfer and interactions with matter	Forms, transfer and transformation and conservation of energy	Environmental issues of obtaining, managing and using energy
EARTH SCIENCE	K	1	2	3	4	5	6	7	8
EARTH SYSTEMS, STRUCTURES AND PROCESSES	Change and patterns of weather	Physical properties of earth materials	Patterns and factors that affect weather Need for clean air		Composition and properties of minerals and rocks Landforms	Weather patterns and phenomena	Structure and changes in the Earth's surface over time Properties of soil	Cycling of matter in Earth's atmosphere and effect on weather, climate and humans Air Quality	Earth's hydrosphere Humans impact and effects on the hydrosphere
EARTH IN THE UNIVERSE		Features and patterns of sun/earth/moon system		Components and patterns of the solar system Causes of day and night Phases of moon			Solar System Structure and motions of celestial bodies Space technology spin-off		
EARTH HISTORY					Fossils as evidence of earth's history				Evidence of change recorded in fossils and landforms

TOPICS BY GRADE

LIFE SCIENCE	K	1	2	3	4	5	6	7	8
ECOSYSTEMS		Characteristics of environments Characteristics of living organisms Needs of living organisms	Characteristics and resources of environments	Needs of plants for survival	Factors enabling organisms to survive in different environments North Carolina ecosystems	Interdependence of living organisms Organisms in an ecosystem	Flow of energy through ecosystems		Organisms interactions and response to components in the environment
STRUCTURES AND FUNCTIONS OF LIVING ORGANISMS	Living and non-living objects		Animal life cycles	Plant life cycles Essential components of human body systems		Structures and systems necessary to perform life functions	Structures, processes and behaviors of plants Plant parts	Processes, structures and functions of organisms for survival and reproduction	Hazards of agents of disease Biological particles that cause disease Biotechnology used for living organisms
EVOLUTION AND GENETICS			Differences and similarities between parents and their young			Why organisms have similarities and differences to their parents		Cellular reproduction, inheritance and external factors to variation in offspring Ethical and scientific issues of research and application of genetic alterations	Evidence, theories, and processes of the evolution of organisms and landforms
MOLECULAR BIOLOGY					Need for nutritional energy				