Diocese of Green Bay

SCIENCE

In the study of science students learn through natural curiosity about the world God created for us. Learning scientific principles occurs through careful observation and experimentation. Students have the privilege of learning about God's creation from a Catholic perspective leading to responsible stewardship and ultimate respect and love for the Creator. The study of God's creation and how we interact with the world, emphasizes the dignity and sacredness of life in all forms. Students learn to take responsibility for their actions and to be good stewards of God's creation.

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References

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Archdiocese of Milwaukee, Wisconsin

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Next Generation Science Standards

Science as Inquiry (SI)

Students build an understanding, through observation and experimentation, the foundations of science, the study of the structure and behavior of the physical and natural world God created using scientific inquiry.

Third Grade	Fourth Grade	Fifth Grade
1. Observe and ask questions about the natural world God created.	1. Observe and ask questions about the natural world God created.	1. Observe and ask questions about the natural world God created.
2. Plan and conduct simple investigations	2. Plan and conduct simple investigations	2. Plan and conduct simple investigations
3. Employ simple equipment and tools to gather data and extend the senses	3. Employ simple equipment and tools to gather data and extend the senses	3. Employ simple equipment and tools to gather data and extend the senses
4. Use appropriate mathematics with data to construct reasonable explanations	4. Use appropriate mathematics with data to construct reasonable explanations	4. Use appropriate mathematics with data to construct reasonable explanations
5. Communicate about observations, investigations and explanations	5. Communicate about observations, investigations and explanations	5. Communicate about observations, investigations and explanations
6. Review and ask questions about the observations and explanations of others	6. Review and ask questions about the observations and explanations of others	6. Review and ask questions about the observations and explanations of others
7. Apply Catholic values to the development and application of science concepts	7. Apply Catholic values to the development and application of science concepts	7. Apply Catholic values to the development and application of science concepts

Life and Environmental Science (LES)

Students demonstrate an understanding of the characteristics and structure of all God's creation: living things, the processes of life, and how God designed living things to interact with one another and the environment in which they live.

Genesis 1.11 – 2.25 – Central theme: The world and all creation began with God.

Third Grade

Students who demonstrate understanding:

1. **Molecules to Organisms: Structures and Processes**
   a. Know God created all living creatures to be fruitful and multiply (Gen 1:28-31)
   b. Understand all organisms have unique and diverse life cycles but all have, in common, birth, growth, reproduction and death (emphasis is on organisms)
   c. Understand reproduction is essential to the continued existence of every kind of organism (emphasis is on organisms)
   d. Observe that plants and animals have unique and diverse life cycles
   e. Compare/contrast life cycles for different organisms
   f. Explain how an organism can become endangered or extinct
2. **Ecosystems: Interactions, Energy, and Dynamics**
   a. Understand and identify social interactions of animals. Being part

Fourth Grade

Students who demonstrate understanding:

1. **From molecules to Organisms: Structures and Processes**
   a. Understand nothing exists that does not owe its existence to God the Creator. (CCC338)
   b. Explain that plants and animals have internal and external structures that serve various functions in growth, survival, behavior, and reproduction
   c. Explain the terms carnivore, herbivore, and omnivore
   d. Explain the terms predator and prey
   e. Understand each creature possess its own particular goodness and perfection (CCC339)
   f. Explain how plants create their own food source
2. **Interdependence and Adaptations**
   a. Understand God will the

Fifth Grade

Students who demonstrate understanding:

1. **Ecosystems: Interactions, Energy, and Dynamics**
   a. Understand nothing exists that does not owe its existence to God the Creator. (CCC338)
   b. Understand plants acquire their material for growth chiefly from air and water
   c. Understand that matter that is not food is changed by plants into matter that is food
   d. Recognize how plants capture energy from the sun to produce food through *photosynthesis*
   e. Describe the movement of matter among plants, animals, decomposers, and the environment
2. **Interdependence and Adaptations**
   a. Develop a model to show food of almost any kind of animal can be traced back to plants
   b. Organisms are related in food

of a group helps animals obtain food, defend themselves, and cope with changes b. Understand groups may serve different functions and vary dramatically in size c. Identify classification of animals as vertebrates and invertebrates 3. **Heredity: Inheritance and Variation of Traits** a. Understand many characteristics of organisms are inherited from their parents b. Understand different organisms vary in how they look and function because they have different inherited information c. Provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms d. Understand other characteristics result from interactions with the environment e. Understand many characteristics involve both inheritance and environment f. Understand the environment also affects the trait that an organism develops 4. **Biological Evolution: Unity and Diversity** a. Understand and identify some plants	interdependence of creatures (CCC340) b. Explain that animal and plant adaptations are a result of interaction with the environment c. Explain that plants, animals, and the physical surroundings are interdependent d. Discover that plants and animals interact with one another and their surroundings to form an *ecosystem* e. Organize plants and animals using a classification system	webs in which some animals eat plants for food and others eat animals that eat the plants c. Understand organisms such as fungi and bacteria, break down dead organisms operating as "decomposers" d. Understands decomposition eventually restores (recycles) some materials back to the soil e. Understands organisms can survive only in environments in which their particular needs are met f. Understand a healthy *ecosystem* is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life g. Understand newly introduced species can damage the balance of an ecosystem 3. **Cycles of Matter and Energy Transfer in Ecosystems** a. Understands that all matter cycles between the air, soil, and among plants, animals and microbes as the organisms live and die (life cycle) b. Understands organisms obtain gases and water, from the environment and release waste matter (gas, liquid, or solid) back into the environment c. Describes how to care for God's creation through recycling, composting, reducing pollution (*Laudato Si'*)

and animals that once lived on Earth are no longer found anywhere b. Understand fossils provide evidence about the types of organisms that existed long ago and also provide information about the nature of their environment c. Use evidence to explain how variations in characteristics among individual of the same species may provide advantages and/or disadvantages in surviving, finding mates, and reproducing (i.e., plants with larger or smaller thorns) d. Provide evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all (adaptation) e. Understand organisms and their habitat make up a system in which the parts depend on each other		

Physical Science

Students understand and demonstrate that properties of materials and energy change, can be observed, measured, and protected.

Third Grade

Students who demonstrate understanding:

1. **Motion and Stability: Forces and Interactions**
    a. Understand each force acts on one particular object and has both strength and a direction
    b. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object
    c. Understand the patterns of an object's motion can be observed and measured
    d. Understand patterns can be used to make predictions
    e. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion
2. **Electrical and Magnetic Forces and Interactions**
    a. Provides examples of electric and magnetic forces
    b. Understand electric and magnetic forces between a pair of objects do not require that the objects be in

Fourth Grade

Students who demonstrate understanding:

1. **Energy**
    a. Describe how people's use of energy has changed over time
    b. Identify the different types of energy
    c. Understand the faster a given object is moving, the more energy it possesses
    d. Observe and explain that energy can be transferred from place to place by sound, light, heat, and electric currents
2. **Conservation of Energy and Energy Transfer**
    a. Understand energy is present whenever there are moving objects, sound, light, or heat
    b. Understand when objects collide, energy can be transferred from one object to another, thereby changing their motion
    c. Understand light transfers energy from place to place
    d. Understand electric currents transfer energy from place to

Fifth Grade

Students who demonstrate understanding:

1. **Matter and its interactions**
    a. Identify matter in three forms and know it has the ability to change forms
    b. Understands matter is made of particles too small to be seen without special equipment
    c. Gases are made from matter particles that are too small to see and are moving freely around in space
2. **Structure and Properties of Matter**
    a. Understand matter, of any type, can be subdivided into particles that are too small to be seen unaided
    b. Use observations to explain the effects of small particles (*molecules)* moving around in space and the effects of air on larger particles or objects (shape of a balloon)

contact c. Determines cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other d. Define a simple design problem that can be solved by applying scientific ideas about magnets e. Identify ways electricity can be conserved	place e. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another (i.e., electrical to motion, light or sound; passive solar, light to heat) 3. **Waves and Their Applications in Technologies for Information Transfer** a. Understand that waves are regular patterns of motions b. Waves of the same type can differ in *amplitude* (height of the wave) and *wavelength* (spacing between wave peaks) c. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move	3. **Matter and its Interactions** a. Investigate how changing the weight, size, shape, or material of an object will change the way it moves through the air b. Understand no matter what reaction or change (heating, cooling, or mixing substances) in properties occurs, the total weight of the substances does not change c. Understand standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume d. Make observations and measurements to identify materials based on their properties e. Understand when two or more different substances are mixed, a new substance with different properties may be formed 4. **Motion and Stability: Forces and Interactions** a. Support an argument that the gravitational force of Earth acting on an object near Earth's surface pulls that object toward

		the planet's center b. Observe that objects that travel through the air are acted upon by the forces of *thrust, lift, drag* and *gravity* 5. **Energy** a. Understands energy can be transferred in various ways and between objects b. Explains the energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant mater (from air and water)

Earth and Space Science

Students demonstrate an understanding of the characteristics and structures of earth and space.

Genesis 1.1 – 2.25 – Central theme: The universe and all creation began with God.

Third Grade

Students who demonstrate understanding:

1. **Earth's Systems**
    a. Understand scientists record patterns of weather across different times and areas so that they can make predictions about what kind of weather might happen next
    b. Understand cycles and patterns in weather
    c. Relate that the water cycle consists of evaporation, condensation, precipitation, and the accumulation of surface and ground water
    d. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season
    e. Identify rain, snow, hail and sleet as forms of *precipitation*
    f. Describe climate as a range of an area's typical weather conditions and the extent to which they vary over years

Fourth Grade

Students who demonstrate understanding:

1. **Earth's Systems: Processes That Shape the Earth**
    a. Understand that smaller rocks come from the breaking or weathering of bedrock and larger rocks
    b. Identify evidence from patterns in rock formations and fossils in rock layers for changes in a landscape over time to support an explanation for changes in a landscape over time
    c. Relate how erosion is the moving of rocks and soil
    d. Know how features on the Earth's surface are constantly changing by a combination of slow and rapid processes
    e. Identify Earth's materials and systems that help shape the land (rainfall, ice, wind, living organisms)
    f. Make observations and/or

Fifth Grade

Students who demonstrate understanding:

1. **Earth's Place in the Universe**
    a. Understand the sun is a star that appears larger and brighter than other stars because it is closer to Earth
    b. Explain the apparent brightness of the sun compared to other stars due to relative distance from the Earth
    c. Understand objects in the solar system are in constant motion caused by natural forces which impact many changes we see in on Earth
    d. Compare and contrast planets to stars
    e. Explain the orbit of Earth around the sun and of the moon around the Earth
    f. Understand the rotation of the Earth and the axis between North and South poles
    g. Identify and explain observable

g. Describe the climate in different regions of the world 2. **Earth and Human Activity** a. Understand a variety of natural hazards are part of creation b. Understand humans cannot eliminate natural processes c. Identify ways in which humans have designed solutions that reduce the impact of weather-related hazards	measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, vegetation g. Analyze and interpret data from maps to describe patterns of Earth's features h. Understand that living organisms, rainfall, ice and wind affect the physical characteristics and the types of living things in the region 2. **Earth's Structure and Composition** a. Relate that properties of soil impact how people use land b. Identify and differentiate the three types of rocks; metamorphic, sedimentary, igneous c. Know that geologists classify rocks using physical and chemical changes 3. **Earth and Human Activity** a. Use information to describe that energy and fuels are derived from natural resources and their uses affect the environment b. Identify some energy resources as renewable over time and others are not c. Generate and compare multiple solutions on how to reduce the impacts of natural Earth processes on humans and	patterns of change (day/night, length and direction of shadows, positions of the sun, moon, stars) at different times of the day, month, and year 2. **Earth's Systems** a. Differentiate Earth's major systems; geosphere, hydrosphere, biosphere, and atmosphere b. Describe ways the geosphere, biosphere, hydrosphere and/or atmosphere interact c. Develop a model to describe ways Earth's major systems interact d. Understands the role water plays in the balance of the eco-system and Earth's processes e. Describe and graph the percentages of Earth's water resources f. Understand most fresh water is in glaciers and underground, only a tiny fraction is in streams, lakes, wetlands, and the atmosphere 3. **Earth and Human Activity** a. Obtain and use information to describe how human activity impacts Earth's systems b. Research and describe how human activities in agriculture, industry and everyday life have

	reduce the impacts of humans on natural Earth processes *(Laudato Si)*	had major effects on the land, vegetation, streams, ocean, air, and outer space c. Understand humans are stewards of the gift of God's creation *(Laudato Si)* d. Generate and compare multiple solutions to reduce the impacts of human activity on God's creation

Engineering and Technology Science (ETS)

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Third Grade	Fourth Grade	Fifth Grade
Students who demonstrate understanding:	**Students who demonstrate understanding:**	**Students who demonstrate understanding:**
1. Ask questions, make observations, and gathers information about a simple problem that can be solved through the development of a new or improved object or tool.	1. Ask questions, make observations, and gathers information about a simple problem that can be solved through the development of a new or improved object or tool.	1. Ask questions, make observations, and gathers information about a simple problem that can be solved through the development of a new or improved object or tool.
2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
3. Analyze data from testing two objects designed to solve the same problem to compare strengths and weaknesses of how each performs.	3. Analyze data from testing two objects designed to solve the same problem to compare strengths and weaknesses of how each performs.	3. Analyze data from testing two objects designed to solve the same problem to compare strengths and weaknesses of how each performs.

Health Science

Students understand that the human body and its systems are a gift from God and all systems work intricately together. Internal and external factors influence growth and development and the structure and function of human body systems.

Through scripture we know that God values our bodies and we should value our body and the bodies of others.

1 Corinthians 6:19-20 – Do you not know that your body is a temple of the holy Spirit within you, whom you have from God and that you are not your own? For you have been purchased at a price. Therefore glorify God in your body.

1 Corinthians 12:27 - Now you are the body of Christ, and each one of you is a part of it.

1 Corinthians 12:12-26 – One body, many parts

Psalm 100:3 - Know that the Lord is God, he made us, we belong to him.

Third Grade	Fourth Grade	Fifth Grade
Students who demonstrate understanding: 1. **Human Body** a. Identify basic body systems (circulatory, respiratory, skeletal, nervous, muscular) b. Describe internal and external influences on the basic body systems. (nutrition, exercise, sleep, pollution…) 2. **Health Promotion** a. Understand the immune system is your body's defense system to help fight harmful germs b. Bacteria live everywhere. Bacteria	**Reference Diocese of Green Bay Theology of the Body content** **Students who demonstrate understanding:** 1. **Human Body** a. Identify and describe the function of basic body systems; circulatory, respiratory, skeletal, muscular and nervous b. Describe how body systems work together 2. **Health Promotion** a. Identify habits that promote or deter healthy body system functions	**Reference Diocese of Green Bay Theology of the Body content** **Students who demonstrate understanding:** 1. **Human Body** a. Explain that the skeletal, muscular, circulatory, and respiratory systems interact with one another and perform specific functions b. Describe the structure and function of the nervous system, it's component parts and interactions with other systems c. Identify the basic function of

can be both helpful and harmful. c. Identify way to prevent viruses and infection d. Identify ways to keep your immune system healthy (good hygiene, exercise, relaxation, sleep, nutrition, hydration) e. Identify foods that help build a healthy body (food pyramid) f. The body has natural chemicals. Health professionals may prescribe extra chemicals (medicine) to keep a person healthy g. There are many chemicals that can be harmful to your body (smoking, drug abuse, cleaning chemicals…)	b. Identify energy sources common to all living organisms (food, water, oxygen, sunlight) c. Research and identify common diseases and the advances medicine plays in treating illness d. Explain the effects of immunization e. Identify common nutrients found in food (A, D, E, K, iron…) f. Identify ways environmental pollution can be a health risk	the reproductive system d. Explain how cells use oxygen e. Describe energy production with the cell f. Describe the physical advantages of good posture and regular exercise 2. **Health Promotion** a. Compare and contrast habits that promote or deter healthy body system functions b. Explain the effects, short term and potential long term, of poor health habits on one's body c. Explain why a variety of foods is necessary for overall health and identify common nutrients found in foods d. Demonstrate appropriate serving size of food and explain the benefits of using the food pyramid as a guide e. Describe ways to prevent diseases and injury f. Analyze the effects of non-prescribed drugs on the functioning of the body systems.
Vocabulary: heart, veins, artery, lungs, trachea,	**Vocabulary:** heart, veins, artery, lungs, trachea, brain, spinal cord, bones, muscles,	**Vocabulary:** heart, veins, artery, lungs, trachea, brain, spinal cord, bones, muscles,

brain, spinal cord, bones, muscles, nutrition, hygiene, hydration, chemicals, medicine	nutrition, hygiene, hydration, chemicals, medicine	nutrition, hygiene, hydration, chemicals, medicine