Grade 5 Science Standards

Domain: Structure and Properties of Matter			
Code:	**Strand:**	**Rating**	**Completed**
5.S5.C1.DPO1	Identify that matter is made of smaller units called: molecules and atoms	Priority	
5.PS1.1	Create a model to explain that matter is made of particles too small to be seen.	Supporting	
5.PS1.2	Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.	Supporting	
5.PS1.3	Make observations and measurements to identify materials based on their properties	Supporting	
5.PS1.4	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	Supporting	
5S5.C1.DPO2	Distinguish between mixtures and compounds	Supporting	

Catholic Identity

- If students are using technology/devices, they should demonstrate Catholic responsibility through proper use of digital communication and apply digital citizenship.
- Discuss how evidence, observations, and logic are essential to scientific explanations, but not necessarily a part of belief based explanations (e.g. You don't need to see God to believe in Him.)
- Reference the story of Doubting Thomas who had to see the Risen Lord in order to believe. Faith, in any discipline, is believing and knowing without actually seeing.

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
Develop a model to describe phenomena. (5.PS1.1)

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

Disciplinary Ideas

PS1.A: Structure and Properties of Matter

- Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. (5.PS1.1)
- The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5.PS1.2)

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified, test, and used to explain change. (5.PS1.4)

Scale, Proportion, and Quantity

- Natural Objects exist from the very small to the immensely large. (5.PS1.1)
- Standard units are used to measure and describe physical quantities such as weight, time, temperature, volume. (5.PS1.2),(5.PS1.3)

• Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (5.PS1.4) • Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5.PS1.3) **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. • Measure and graph quantities such as weight to address scientific and engineering questions and problems. (5.PS1.2)	• Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5.PS1.3) **PS1.B: Chemical Reactions** • When two or more different substances are mixed, a new substance with different properties may be formed. (5.PS1.4) • No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) (5.PS1.2)	

Domain: Matter and Energy in Organisms and Ecosystems			
Code:	**Strand:**	**Rating**	**Completed**
5.PS3.1	Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.	Priority	
5.LS1.1	Support an argument that plants get the materials they need for growth chiefly from air and water.	Supporting	
5.LS2.1	Create a model to describe the movement of matter among plants, animals, decomposers, and the environment.	Supporting	
5.S4.C3.DPO5	Explain the interrelationships among plants and animals in different environments: producers, consumers, decomposers.	Priority	

Catholic Identity

- If students are using technology/devices, they should demonstrate Catholic responsibility through proper use of digital communication and apply digital citizenship.
- Understanding that all plants and animals are God's creation.
- Define and apply stewardship to all life on earth.
- Respect life at all stages as a gift given freely by God.

Science and Engineering Practices

Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Use models to describe phenomena. (5.PS3.1)
- Develop a model to describe phenomena. (5.LS2.1)

Engaging in Argument from Evidence Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model. (5.LS1.1)

- -

Connections to Nature of Science

Disciplinary Ideas

DPS3.D: Energy in Chemical Processes and PS3.D: Energy in Chemical Processes and Everyday Life

- The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5.PS3.1)

LS1.C: Organization for Matter and Energy Flow in Organisms

- Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary to 5.PS3.1)
- Plants acquire their material for growth chiefly from air and water. (5.LS1.1)

LS2.A: Interdependent Relationships in Ecosystems

- The food of almost any kind of animal can be traced back toplants. Organisms are related in food webs in which some animals eat plants for food and

Crosscutting Concepts

Systems and System Models

- A system can be described in terms of its components and their interactions. (5.LS2.1)

Energy and Matter

- Matter is transported into, out of , and within systems. (5.LS1.1)
- Energy can be transferred in various ways and between objects. (5.PS3.1)

Science Models, Laws, Mechanisms, and Theories **Explain Natural Phenomena** Science explanations describe the mechanisms for natural events. (5.LS2.1)	other animals eat the animals that eat plants. • Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relativelystable web of life. Newly introduced species can damage the balance of an ecosystem. (5.LS2.1) **LS2.B: Cycles of Matter and Energy Transfer in Ecosystems** • Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5.LS2.1)	

Domain: Earth Systems			
Code:	**Strand:**	**Rating**	**Completed**
5.ESS2.1	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	Priority	
5.ESS2.2	Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.	Supporting	
5.S6.C3.DPO2	Describe the distribution of water on the Earth's surface.	Supporting	
5.ESS3.1.	Obtain and compare information about ways individual communities use science ideas to protect the Earth's resources and environment.	Supporting	

Catholic Identity

- If students are using technology/devices, they should demonstrate Catholic responsibility through proper use of digital communication and apply digital citizenship.
- Take this opportunity to develop an understanding of what it means to be responsible stewards of God's earthly gifts, both as individuals and as communities.
- Propose a solution, resource, or product that addresses a specific solution to protect the earth's resources and environment.
- Evaluate the possible strengths and weaknesses of a proposed solution relevant to protecting the earth's resources and environment.

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model using an example to describe a scientific principle. (5.ESS2.1)

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 3– 5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

- Describe and graph quantities such as area and volume to address scientific questions. (5.ESS2.2)

Obtaining, Evaluating, and communicating Information

Disciplinary Ideas

ESS2.A: Earth Materials and Systems

- Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5.ESS2.1)

ESS2.C: The Roles of Water in Earth's Surface Processes

- Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5.ESS2.2)

ESS3.C: Human Impacts on Earth Systems

Crosscutting Concepts

Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight and volume. (5. ESS2.2)

Systems and System Models

- A system can be described in terms of its components and their interactions. . (5.ESS2.1),(5.ESS3.1)

Connections to Nature of Science

- Science Addresses Questions About the Natural and Material World
- Science findings are limited to questions that can be answered within Empirical Evidence. (5. ESS3.1)

Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5.ESS3.1)	• Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5.ESS3.1)	

Domain: Space Systems: Stars and the Solar System			
Code:	**Strand:**	**Rating**	**Completed**
5.PS2.1	Support an argument that the gravitational force exerted by Earth on objects is directed toward the center of the planet.	Priority	
5.S.6.C2.DPO1	Describe how the Moon's appearance changes during a four-week lunar cycle.	Priority	
5.S.6.C2.DPO2	Describe how Earth's rotation results in day and night at any particular location.	Priority	
5.ESS1.1	Support an argument that differences in the brightness of the sun compared to other stars is due to their relative distances from Earth.	Supporting	
5.ESS1.2	Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	Supporting	
5.S.6.C2.DPO3	Distinguish between revolution and rotation.	Supporting	

Catholic Identity

- If students are using technology/devices, they should demonstrate Catholic responsibility through proper use of digital communication and apply digital citizenship.
- Students will relate Easter to the lunar cycle recognizing that Easter is held on the first Sunday After the first full moon occurring on or after the vernal equinox.
- Relate the story in Genesis to Earth's rotation resulting in day and night.
- Reference how the days get shorter during Advent in relation to winter solstice and shortest day of the year while waiting for the light of Christ as Christmas.

Domain: Engineering Design			
Code:	**Strand:**	**Rating**	**Completed**
3.5.ETS1.1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	Priority	
3.5.ETS1.2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	Supporting	
3.5.ETS1.3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	Supporting	

Catholic Identity

- Share materials and work together in small groups, listen to the ideas of others. Be respectful and treat others as you wish to be treated.
- Use the God given gift of intellect to be resourceful and use simple tools to make tasks easier.
- Consider the pastoral as well as the practical nature of the problems and solutions we address.

Science and Engineering Practices

Asking Questions and Defining Problems

Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5.ETS1.1)

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the

Disciplinary Ideas

ETS1.A: Defining and Delimiting Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5.ETS1.1)

ETS1.B: Developing Possible Solutions

- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5.ETS1.2)
- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5.ETS1.2)
- Tests are often designed to

Crosscutting Concepts

Influence of Science, Engineering, and Technology on Society and the Natural World

- People's needs and wants change over time, as do their demands for new and improved technologies. (3-5.ETS1.1)
- Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3- 5.ETS1.2)

number of trials considered. (3- 5.ETS1.3) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5.ETS1.2)	identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5.ETS1.3) **ETS1.C: Optimizing the Design Solution** • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5.ETS1.3)	