



Grade 7 Overview: The clusters below are bench-marked against the Next Generation Science Standards: <http://www.nextgenscience.org/>

Unit 1: Engineering Design/Unit of Science

Introduce and build a scientific classroom within the first three weeks by exposing children to the design process and the scientific method through hands-on experiences. Teaching lab safety processes ensures safe practices throughout the year and ensures proper identification and usage of lab equipment. The Engineering Design and Nature of Science practices should be implemented within each unit throughout the course of the entire year.

Teachers are encouraged to incorporate STEM and hands-on activities throughout each unit.

Unit 2: Introduction to Life

This unit is an introduction to biology. As 7th grade is a biology (and ecology) course, use this unit to set the stage for a year of study in the biological sciences.

- Analyze objects/living things to determine if they are alive.
- Compare and contrast characteristics of living and nonliving things.
- Categorize living things based on the nine characteristics of life.
- Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
- Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function.
- Organize living things based on their characteristics.

Unit 3: Cell Processes

In this unit, students will learn about how cells operate and work together. Students will learn about cell parts, cellular actions, and cellular organization.

- Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism
- Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories
- Describe and model the phases of mitosis and explain what occurs at each step in the cell cycle
- Describe how cells use active and passive transport to move materials through a membrane.

Unit 4: Genetics

In this unit, students will learn about DNA and genetics. Be sure to connect information from previous units to help students understand how traits are passed on and how cell processes are involved.

- Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
- Predict using a model the expected outcomes or traits of the offspring of two parent organisms.
- Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
- Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms.
- Discuss the ramifications of selective breeding, cloning, bioengineering, gene therapy, gene doping

Unit 5: Natural Selection & Evolution

In this unit, students will learn the basics of natural selection and evolution. Prepare yourself by understanding the Catholic perspective on evolution..

- Students will extend their knowledge of living organisms to investigate how organisms obtain favorable traits that increase their chance of survival and passing on those traits to offspring.
- A variety of factors within an environment can change the traits of an organism.
- Species are grouped based on common traits and evolutionary relationships.
- The traits of current and past organisms can be explained through the creation theory and evolution theory
- Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
- Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
- Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.
- Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
- Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.
- Use the classification system for living organisms to describe how all life is related.

Unit 6: Human Body Systems

In this unit, students will learn how the body works by exploring the different organ systems that work together to create a functioning organism. Make sure to carefully preview resources for this unit.

- Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
- Create a model showing the parts and the functions of each of the human body systems.
- Understand that each body system has its function; however all body systems work together for the overall good of the human.
- Categorize the methods in which multicellular organisms and unicellular organisms respond to stimuli.

Unit 7: Ecology

In this unit, students will learn about ecosystems from a biological perspective by exploring population dynamics, energy flow, and interactions between living things.

- Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations
- Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
- Construct an argument supported by evidence for how human use of resources affects the environment.