Dennis-Yarmouth Regional School District
Science Scope and Sequence
Grade 6

Unit Name	Unit Description / Overview	Stage 1: Desired Results Enduring Understandings - Students will understand that...	Essential Questions	Standards
Master Unit 1 Molecules to Organisms, Cells	This unit discusses that the organization and development of living things relies on cells working together as a system to support life. Structure influences function. This Project Based Learning unit includes The Organelle Trail which is a series of sequential lessons designed to comprehensively cover the related standards. Microscope skills and Cell Theory are also taught in this unit.	• the organization and development of living things relies on cells working together so that organisms can survive. • macroscopic patterns are related to the nature of microscopic and atomic-level structure. • models of complex and microscopic structures and systems help us visualize how function depends on the structural shapes, composition, and relationships among its parts.	• How do organisms survive? • How does cell structure influence cell function? • How does cellular function act to sustain life?	LS1. From Molecules to Organisms: Structures and Processes 6.MS-LS1-1. Provide evidence that all organisms (unicellular and multicellular) are made of cells. 6.MS-LS1-2. Develop and use a model to describe how parts of cells contribute to the cellular functions of obtaining food, water, and other nutrients from its environment, disposing of wastes, and providing energy for cellular processes.
Master Unit 2 Molecules to Organisms - Human Body Systems	This unit includes the major systems in the human body and how they interact to carry out the essential functions of life.In the Human Body 2.0 Project Based Learning series of 6 lessons students will learn the functions and interactions of the 7 body systems required by MA state standards.	• systems may interact with other systems, and that they may have sub-systems and be a part of larger complex systems. • many complex natural and designed structures and systems determine their function. • the structure, function, and levels of organization of a selected group of human body systems and how they maintain homeostasis and are supported by the processing of nutrients.	• What are the levels of organization of the the human body? • What are some of the human body systems? • How are nutrients (food) obtained, processed and utilized by living things? • How do the systems of the human body interact?	6.MS-LS1-3. Construct an argument supported by evidence that the body systems interact to carry out essential functions of life.
Master Unit 3 Biological Evolution: Unity and diversity	Unit 3 includes fossil and anatomical evidence of evolutionary relationships to support changes to life forms throughout the history of Earth.Students will look at common ancestors, similar traits matched to similar functions and environments, and traits that are no longer needed due to evolution and changing environments.	• stability and change in systems can be explained by examining changes over time and changes in one part of a system might cause large changes in another part. • systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by sudden events or gradual changes that accumulate over time. • by analyzing and interpreting fossils through comparative anatomy, biochemistry and embryology of organisms, ancient organisms and their habitat can be identified.	• How does the fossil record describe organisms and their environments in the past? • What are evolutionary relationships? • How do fossil organisms support a relationship with modern organisms?	LS4. Biological Evolution: Unity and Diversity 6.MS-LS4-1. Analyze and interpret evidence from the fossil record to describe organisms and their environment, extinctions, and changes to life forms throughout the history of Earth. 6.MS-LS4-2. Construct an argument using anatomical structures to support evolutionary relationships among and between fossil organisms and modern organisms.

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Master Unit 4 Matter and its Interactions	Unit 4 includes the study of chemical reactions that release or absorb energy. Students learn that materials can be separated into pure substances and apply proportional reasoning to compare and calculate relative densities of liquids and solids.	• matter is conserved because atoms are conserved in physical and chemical processes and that within a system the transfer of energy drives the cycling of matter. • energy may take different forms (e.g. thermal energy, motion energy, energy in fields) and the transfer of energy in a chemical reaction can be tracked as the energy flows (absorbed/released) through a system. • reversible physical changes in matter can also occur, such as in mixtures which can be separated into pure substances, but are not the same as a chemical reaction. • they can represent and calculate proportional relationships (e.g. mass to volume) to gather information about the magnitude of properties and processes (density), and represent scientific relationships through the use of algebraic expressions and equations.	• How is energy transferred to and from the environment during a chemical reaction? • When substances are combined, is the result a physical change only and not a chemical change in a chemical reaction? • What is density? • How is it calculated?	6.MS-PS1-6. Plan and conduct an experiment involving exothermic and endothermic chemical reactions to measure and describe the release or absorption of thermal energy. 6.MS-PS1-7(MA). Use a particulate model of matter to explain that density is the amount of matter (mass) in a given volume. Apply proportional reasoning to describe, calculate, and compare relative densities of different materials. 6.MS-PS1-8(MA). Conduct an experiment to show that many materials are mixtures of pure substances that can be separated by physical means into their component pure substances.
Master Unit 5 Earth's Systems	In this Earth Science unit, students will learn about Plate Tectonics - specifically the types of faults, movements and theory. Students will study Relative Dating of rocks and their relationship to fossils. Fossils will be explored by students as they understand how they inform us of our geological history.	• they can use models to represent systems and their interactions - such as inputs, processes, and outputs - which cause energy, matter and information to flow within systems; but that models are limited in that they only represent certain aspects of the system under study. • physical factors over time, such as weathering, erosion, heat and pressure, cause changes in rock type which helps us interpret rock layers, fossil types and locations, and to date the ages of rocks.	• How are the ages of rocks measured? • What is the evidence that Earth's plates have moved great distances, collided and spread apart?	6.MS-ESS1-4. Analyze and interpret rock layers and index fossils to determine the relative ages of rock formations that result from processes occurring over long periods of time. 6.MS-ESS2-3. Analyze and interpret maps showing the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence that Earthâ plates have moved great distances, collided, and spread apart.

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Master Unit 6 Waves and their Applications	In this unit, students will learn all about waves and their applications in technology for information and energy transfer. Students will explore light and sound waves, digital information transfer and mechanical waves.	• phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. • waves have specific characteristics such as wavelength, amplitude and frequency. • a mechanical wave is a vibration of matter. • light waves and mechanical waves may travel through solids, liquids, and gases. • waves are reflected, absorbed or transmitted. • signals can be used as a form of communication to send a message digitally through coding.	• What are the characteristics of a wave? • What is a mechanical wave? • How do light rays and mechanical waves travel through various materials? • How can signals be used to encode and transmit information?	6.MS-PS4-1. Use diagrams of a simple wave to explain that (a) a wave has a repeating pattern with a specific amplitude, frequency, and wavelength, and (b) the amplitude of a wave is related to the energy of the wave. 6.MS-PS4-2. Use diagrams and other models to show that both light rays and mechanical waves are reflected, absorbed, or transmitted through various materials. 6.MS-PS4-3. Present qualitative scientific and technical information to support the claim that digitized signals (sent as wave pulses representing 0s and 1s) can be used to encode and transmit information.
Master Unit 7 Earth's Place in the Universe	This unit explores the relationship and arrangement of the Earth, Sun and Moon and their place in the Solar System. Students will learn about different types of eclipses, be able to identify and explain the lunar phases, and understand that the force of gravity acts upon our solar system.	• the Earth, Sun and Moon possess differing gravitational forces relative to their masses • the Earth, Sun and Moon are arranged in a particular order within a greater galaxy which results in different types of eclipses • phenomena observed at one scale may not be observable at another scale	• What is the relationship that the Earth, the Sun and the Moon have to each other? • What cause a lunar and solar eclipse? • What causes the 8 phases of the moon? • How does the Earth fit into the solar system? • Does the force of gravity cause objects to attract? • Does the mass of the objects affect the amount of attraction?	6.MS-ESS1-1a. Develop and use a model of the Earth-sun-moon system to explain the causes of lunar phases and eclipses of the sun and moon. 6.MS-ESS1-5(MA). Use graphical displays to illustrate that Earth and its solar system are one of many in of the Milky Way galaxy, which is one of billions of galaxies in the universe. 6.MS-PS2-4. Use evidence to support the claim that gravitational forces between objects are attractive and are only noticeable when one or both of the objects have a very large mass.

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Master Unit 8 Engineering Design	There is a growing need for engineers in our ever changing world. Engineering standards for middle school provide a framework for developing student understanding of the engineering design process. This unit provides the persistence needed for problem solving. Engineering design activities are about challenging students to work through the engineering design process until they are successful.	• all human activity draws on natural resources and has consequences for the health of people and the natural environment. • they can design structures to serve particular functions by taking into account properties of different materials, appropriate tools, and how materials can be shaped and used. • engineering advances have led to important discoveries in virtually every field of science, and that scientific discoveries have led to the development of entire industries and engineered systems. • science and technology drive each other forward. • the uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources and economic conditions. • technology use varies over time and from region to region. • teamwork, failure and redesign is important in science and engineering some shapes are stronger than others • even weak materials can be made stronger with good design techniques • distribution of mass is an important consideration when building a tower	• Which properties of materials and tools will help to solve a particular design problem? • How can scale and proportion be applied to provide a successful solution to a design problem?	6.MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution. Include potential impacts on people and the natural environment that may limit possible solutions. 6.MS-ETS1-5(MA). Create visual representations of solutions to a design problem. Accurately interpret and apply scale and proportion to visual representations. 6.MS-ETS1-6(MA). Communicate a design solution to an intended user, including design features and limitations of the solution. 6.MS-ETS2-1(MA). Analyze and compare properties of metals, plastics, wood, and ceramics, including flexibility, ductility, hardness, thermal conductivity, electrical conductivity, and melting point. 6.MS-ETS2-2(MA). Given a design task, select appropriate materials based on specific properties needed in the construction of a solution. 6.MS-ETS2-3(MA). Choose and safely use appropriate measuring tools, hand tools, fasteners, and common hand-held power tools used to construct a prototype.