Course Description: Basic scientific vocabulary, reading and writing will be expanded. This course introduces a variety of topics ranging from the study of living things to environmental problems including cells, classification, heredity, evolution and ecosystems. A special emphasis will be placed on students doing the work of investigation, as well as reading, discussing and resolving biologically related issues and topics.

Full Year Plan for 7th Grade Science

unit Title	Timing and Duration	Essential Questions	standard #	NGSS standard	Content	Science and Engineering Practices	Cross Cutting Concepts	I can....
Ecology and Ecosystems	9 weeks (Sep Oct, Nov)	How are living and nonliving things connected? How do energy and nutrients flow through an ecosystem? How do ecosystems respond to change?	LS2-1.	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	• Resource availability • Populations	• Analyze • Provide evidence	• Cause and effect	• I can determine the effects of food abundance on populations and individuals. • I can analyze how resources affect an ecosystem.
			LS2-2.	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	• Interactions among organisms	• Construct an explanation	• patterns	• I can predict patterns of interaction among organisms.
			LS2-3.	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	• Cycling of matter • Food chains and webs	• Develop a model	• Energy and matter	• I can describe how energy flows in an ecosystem. • I can create a food web to explain how energy moves. • I can interpret a nutrient cycle diagram and a food web.
			LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	• Changes in ecosystems • Succession • Keystone species • Invasive species	• Construct an argument	• Stability and change	• I can explain how abiotic and biotic factors affect ecosystems. • I can provide evidence of the impacts of non-native species on an ecosystem.
			LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*	• Biodiversity • Ecosystem services	• Evaluate designs	• Stability and Change	
From Cells to Syste	(Nov, Dec, Jan, Feb)	How do scientists study life? What is a cell? How is life	LS1-1	Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.	• Cell theory	• Conduct an investigation	• Scale, proportion, quantity	• I can describe living things. • I can describe cells.

MS		specialized? ~~How do cells organize to form organisms?~~ ~~Why do molecules move?~~ Why do molecules and energy flow inside living things?	LS1-2	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.	• Cell parts and function • Emergent properties	• Develop and use a model	• Structure and function	• I can identify the parts of the cell with their functions. • I can explain emergent properties.
			LS1-3	Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	• Body Systems • Emergent properties • Levels of organization	• Argue from Evidence	• Systems and system models	• I can explain how the human body systems work together. • I can make connections between the structures and functions of CTOSO.
			LS1-4	Use argument 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.	• Animal behaviors • Plant structures • Successful reproduction	• Argue from Evidence • Construct an explanation	• Cause and effect	• I can explain how some organisms have more reproductive success than others.
			LS1-5	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	• Environmental and genetic growth factors	• Construct an explanation	• Cause and effect	• I can explain how the environment and genetics impacts the growth of organisms.
			LS1-6	Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	• Photosynthesis • Cell Transport	• Construct an explanation	• Energy and Matter	• I can explain how photosynthesis works. • I can connect photosynthesis to the flow of energy in ecosystems.
			LS1-7	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.	• Cellular Respiration ○ ATP • Cell Transport	• Develop a model	• Energy and Matter	• I can explain how food is broken down and forms new molecules for growth and energy. • I can explain why energy and molecules move in living things.
			LS1-8	Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.	• Information processing ○ Brain function	• Obtaining information	• Cause and effect	• I can explain how the structure of nerves and the brain allow for memories and behavior.
Genetics	9 weeks (Feb, Mar, Apr)	How do living organisms pass observable traits from one generation to the next? (macroscopic level) How do living organisms pass traits from one generation to the next at the microscopic level?	LS3-1.	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.	• Mutations • Central Dogma •	• Develop and use a model	• Structure and Function	• I can describe how mutations can affect proteins. • I can describe how genes determine protein shape and function.
			LS3-2.	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.	• Types of reproduction	• Construct an explanation	• Energy and Matter	• I can describe the results of reproduction. • I can compare and contrast sexual and asexual reproduction.

		What are the contributions of scientists & technology to the study of genetics?						
Evolution/Continuity and Diversity of Life	7 weeks (Apr/May)	What is the evidence for evolution? How does evolution occur?	LS4-1.	Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	• Fossil Record	• Analyze and interpret	• Stability and Change • patterns	• I can interpret the fossil record and document the history of life on Earth.
			LS4-2.	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.	• Comparative anatomy	• Construct an explanation	• patterns	• I can explain how organisms are related using anatomy.
			LS4-3.	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.	• Embryological evidence	• analyze	• patterns	• I can analyze images of embryos to identify relationships between organisms.
			LS4-4.	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.	• Natural selection •	• Construct an explanation	• Cause and effect	• I can explain how natural selection works.
			LS4-5.	Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms.	• Artificial selection	• Obtaining, evaluating, and communicating	• Cause and Effect	• I can explain how technology has changed the way humans influence heredity.
			LS4-6.	Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.	• Adaptation	• Mathematical and computational thinking	• Cause and Effect	• I can explain how adaptations arise. • I can explain how organisms are suited for their environments.
BioTech	2 weeks (May)	How does Nature…?			• All biology and engineering	• Designing solutions	• Patterns • Scale proportion • Structure and function • Energy and matter	• I can design a solution for a 1st world problem using nature as inspiration.