

Thomaston Public Schools - Curriculum Overview and Pacing Guide

Course Title: Grade 8 Science		
School: Thomaston High School	Grade: 8	Curriculum Pacing: 36 weeks
Unit One: Matter and Its Interaction	Unit Two: Forces and Motion	Unit Three: Genes and Heredity
Unit Pacing: 6 weeks	Unit Pacing: 6 weeks	Unit Pacing: 6 weeks
<p>Unit Overview: In this unit students will explore the properties, structure, and interactions of matter. Students will analyze the observable features of matter, and then explain how substances can combine or change [react] to make new substances. Students will apply the properties of matter and the interactions between different substances to real world situations in order to solve problems.</p>	<p>Unit Overview: In this unit, students will identify forces to analyze how they impact motion. Students will use mathematical and computational thinking to investigate speed and acceleration. Students will then develop and use models to demonstrate each of Newton's three laws of motion, and will then apply their knowledge of forces and motion to real-world situations.</p>	<p>Unit Overview: In this unit, students will begin by investigating Gregor Mendel's discoveries in the fields of genetics and inheritance. Students will explore the relationship between genes, chromosomes, and traits. Students will then learn about DNA and how changes in the DNA can lead to trait variations in individuals and species. Finally, students will investigate how humans use genetic information for the benefit of society.</p>
<p>Compelling Questions</p> <ol style="list-style-type: none"> 1. How do atoms combine? 2. How can you determine when a chemical reaction has occurred? 	<p>Compelling Questions</p> <ol style="list-style-type: none"> 1. How is the motion of an object affected by the forces that act on it? 2. How can you take the crash out of a collision? 	<p>Compelling Questions</p> <ol style="list-style-type: none"> 1. How do offspring inherit traits from their parents? 2. Why do living things look the way they do? 3. How can we use our knowledge of genetics?
<p>Priority Learning Target</p> <ol style="list-style-type: none"> 1. I can develop models to describe the atomic composition of simple molecules and extended structures. (MA-PS1-1) 2. I can analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. (MS-PS1-2) 3. I can develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (MS-PS1-5) 	<p>Priority Learning Targets</p> <ol style="list-style-type: none"> 1. I can plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. (MS-PS2-2) 2. I can construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. (MS-PS2-4) 3. I can apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. (MS-PS2-1) 	<p>Priority Learning Targets</p> <ol style="list-style-type: none"> 1. I can 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. (MS-LS3-1) 2. I can 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. (MS-LS3-2) 3. I can gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms. (MS-LS4-5)

Unit Four: Natural Selection and Change Over Time	Unit Five: Atmosphere, Oceans and Climate	Unit Six: Earth in the Universe
Unit Pacing: 6 weeks	Unit Pacing: 6 weeks	Unit Pacing: 6 weeks
Unit Overview: In this unit, students will investigate the theory of evolution, and investigate the various evidence that supports this theory. Students will use comparative anatomy to infer common ancestry, and will investigate other forms of evidence such as comparative embryology and fossil records, that also support the theory of evolution. Students will then learn about factors that drive evolution, such as natural selection. They will then apply the evidence of evolution to study the modern evolution of a species.	Unit Overview: In this unit, students will investigate and model how energy is distributed throughout Earth’s atmosphere. They will then explore historical and recent data to recognize the impact of human activity as it pertains to the changes in our climate. Finally, students will design ways in which we can lessen the effects of climate change on living organisms, and develop ways in which they reduce their own carbon footprint.	Unit Overview: In this unit, students will investigate the motions of the Earth, sun, and moon to create models that explain how these motions affect the Earth. Students will use these models to demonstrate the phase of the moon, eclipses of the sun and moon, and the seasons that occur during the year. Students will then explore gravity, and how it, along with inertia, keep all of the objects in the universe in motion. Finally, students will investigate the relative sizes of the objects in the solar system to create scales to model the differences.
Compelling Questions 1. How and why do living things change over time? 2. Why do some organisms become extinct?	Compelling Questions 1. How does energy move throughout Earth? 2. Why has Earth’s climate changed?	Compelling Questions 1. How do the sun and moon affect Earth? 2. How can we understand the universe?
Priority Learning Targets 1. I can 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. (MS-LS4-2) 2. I can 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. (MS-LS4-4) 3. I can use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. (MS-LS4-6)	Priority Learning Targets 1. I can develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process. (MS-ESS2-1) 2. I can develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. (MS-ESS2-6) 3. I can ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. (MS-ESS3-5)	Priority Learning Targets 1. I can develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. (MS-ESS1-1) 2. I can develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. (MS-ESS1-2) 3. I can analyze and interpret data to determine scale properties of objects in the solar system. (MS-ESS1.3)