

Four-Year Science Curriculum

	Biology	Chemistry	Earth Science	Physics
9th Grade	<p>Anatomy and Physiology The primary goal is to understand the function of the organs and the connections that make up each body system. Cells, tissues, and systems are all looked at. Students also complete dissections and relate the content to their own bodies.</p>	<p>Organic Chemistry Students work in this block to uncover the capacities of carbon. The destructive distillation of wood, alcohol distillation, and ester synthesis are all labs that are completed. Through working with the various functional groups of organic chemistry, including alcohols, esters, ethers, and carboxylic acids students begin to uncover a holistic understanding of all the ways carbon presents itself in nature.</p>	<p>Geology Students in this grade work with the major forces that shape the Earth. Plate tectonics is looked at in depth including the evidence and mechanisms that exist. Plate boundary types, the rock cycle, identification, and geological features are all worked with. Students typically also spend time outside looking at natural phenomena such as caves, quarries, and faults.</p>	<p>Thermal Physics Key thermal concepts begin with polarity and equilibrium. Demonstrations explore how substances expand and contract when warm or cooled which leads to the concept of temperature and the derivation of the thermometer. Specific heat, latent heat, phase changes, and the ideal gas laws are all studied and explored through mathematical calculations. The block also explores these in the internal combustion engine.</p>
10th Grade	<p>Embryology Students study the human being in his/her development from a single cell. Cell biology including organelles, mitosis, meiosis, and respiration are all worked with. Students also raise chicken eggs as a way of observing the developmental changes that species go through as they age and develop.</p>	<p>Stoichiometry Stoichiometry concerns itself with chemical equations, reactions, and the mathematical relationships between substances having gone through chemical reactions. This field can be described as the logic of chemistry. Students uncover these chemical relationships and learn how to use them to predict chemical reactions.</p>	<p>Hydrology Included are the hydrological cycles from an Earth, plant, and animal perspective. A major part of this course is spent in the field. Students observe, collect, interpret, and analyze data from local rivers and water sources. Chemical and physical properties of water are also examined.</p>	<p>Mechanics This block begins with vectors as an extension from Trigonometry. The phenomena of displacement, velocity and acceleration are explored through demonstrations and experiments where the students collect data, create plots and interpret the results. The exploration of projectile geometry requires rigorous application of the principles in mechanics and trigonometry.</p>
11th Grade	<p>Botany Traditionally, Botany meant all life that was not an animal. Because of this, students begin the block trying to understand the differences between different domains of life, bacteria, archaea, and protists, before moving into the plant and fungi kingdoms. Classification and ecological interplay are major themes. Students also work with tree identification and cultivation.</p>	<p>Atomic Theory Over the course of the block, students learn about the historical derivations that lead to our modern understanding of the atom. Periodic trends are examined through class demonstrations of various elements. Chemistry skills are also developed in chemical bonding, nomenclature, and formulae.</p>	<p>Meteorology Students examine atmospheric phenomena with a focus of forecasting as a major theme. Students look at current weather maps and measuring instruments that help meteorologists communicate atmospheric conditions. Severe weather is also studied.</p>	<p>Electricity and Magnetism The principle of polarity and fields as a conceptual framework tie together the invisible interactions that result in visible movements of objects. Electrical induction, the Van De Graff generator, resistance, voltage and current are all worked with. Coulomb's law, Ohm's law, and how these relate to today's technology including electromagnets, microphones, speakers, electric motors and the distribution of electrical power grid.</p>
12th Grade	<p>Zoology Students work with understanding the major phyla of animals. Evolution, classification, ecology, and interrelatedness of all life are major themes that students work with. Students also spend a week on Hermit Island in Maine studying marine invertebrates. The class comes back from Hermit Island with the task of studying mammals.</p>	<p>Biochemistry Genetics, neuroscience, and major biological molecules are all examined. The structure of DNA, the history of how it was discovered, and the interplay of genetics and evolution are all worked with. Genetic engineering and various biochemical relationships are both examined. The block ends with looking at epigenetics and neural oscillation.</p>	<p>Astronomy Students explore astronomy through history, mathematics, and observations. The block includes an experiential field trip to observe the night sky with both the naked eye and a telescope. Students also study heliocentric and geocentric astronomy. The motion of the celestial bodies in our solar system are explored through mathematics.</p>	<p>Physics of Vision Topics include an investigation of the various conditions that influence the color we see, how the juxtaposition of color is the basis for us organizing visual patterns into conceptual images and scenes, the role of intentionality in what we see, the laws of reflection and refraction, binocular vision as well as the other visual cues used to form the concept of a three-dimensional world.</p>