



Course Title: Seventh Grade Science		
<p>Description: In seventh grade science, the content focuses on concepts of Life, Physical, Earth and Space Science while using engineering practices.</p> <ul style="list-style-type: none"> • Investigate electric, magnetic and gravitational forces and the fields that surround them. • Develop models to understand the solar system and its components, including how they cause seasons, eclipses, and moon phases. • Investigate how Earth’s history is organized based on rock strata. • Develop models and investigate potential energy, kinetic energy and thermal energy transfer. • Develop an understanding of the energy flow in ecosystems and how each component of an ecosystem impacts this flow. • Develop an understanding of the growth and development of plants and animals and how this impacts genetic diversity. 		
<i>Physical Sciences</i>		
<u>Reporting Topic</u>	<u>Grade Level Standards</u>	<u>Standard Summary</u>
Forces	<ul style="list-style-type: none"> • Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. (7-PS2-3) • Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. (7-PS2-4) 	<p>Students will:</p> <ul style="list-style-type: none"> • Determine factors that affect strength of electric and magnetic forces • Explain how gravity and mass are related
Force Fields	<ul style="list-style-type: none"> • Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. (7-PS2-5) 	<p>Students will:</p> <ul style="list-style-type: none"> • Find evidence showing fields exists between objects that may not be in contact.
Potential and Kinetic Energy	<ul style="list-style-type: none"> • Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. (7-PS3-2) 	<p>Students will:</p> <ul style="list-style-type: none"> • Show how a change in distance changes potential energy in a system



<p>Thermal Energy and Temperature</p>	<ul style="list-style-type: none"> Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. (7-PS3-4) Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. (7-PS3-5) 	<p>Students will:</p> <ul style="list-style-type: none"> Show how the energy transferred, type of matter, and mass of a substance affect the average kinetic energy
<p><i>Life Sciences</i></p>		
<p><u>Reporting Topic</u></p>	<p><u>Grade Level Standards</u></p>	<p><u>Standard Summary</u></p>
<p>Growth and Development of Organisms</p>	<ul style="list-style-type: none"> 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. (7-LS1-4) Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. (7-LS1-5) 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. (7-LS3-1) 	<p>Students will:</p> <ul style="list-style-type: none"> Explain how certain characteristic animal behaviors and plant structures affect survival and reproduction of offspring. Explain how genetic and environmental factors affect growth of an organism.
<p>Matter and Energy in Organisms within Ecosystems</p>	<ul style="list-style-type: none"> 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. (7-LS1-6) 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. (7-LS1-7) Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. (7-LS2-3) 	<p>Students will:</p> <ul style="list-style-type: none"> Explain the role of photosynthesis to show how energy is transferred. Show the process of molecules being broken apart and put back together to release energy. Show the cycling of energy and matter among organisms.



<p>Ecosystem Dynamics</p>	<ul style="list-style-type: none"> Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. (7-LS2-1) Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. (7-LS2-4) Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. (7-LS2-2) 	<p>Students will:</p> <ul style="list-style-type: none"> Explain changes to populations of organisms caused by resource availability. Explain how organisms may interact in different ecosystems.
<p><i>Earth and Space Science</i></p>		
<p>Reporting Topic</p>	<p>Grade Level Standards</p>	<p>Standard Summary</p>
<p>The Solar System</p>	<ul style="list-style-type: none"> 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. (7-ESS1-1) 	<p>Students will:</p> <ul style="list-style-type: none"> Make a model to show why seasons and the moon change due to the tilt of the Earth.
<p>Gravity and Scale in the Solar System</p>	<ul style="list-style-type: none"> Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. (7-ESS1-2) Analyze and interpret data to determine scale properties of objects in the solar system. (7-ESS1-3) 	<p>Students will:</p> <ul style="list-style-type: none"> Show the role of gravity in the formation of our solar system.
<p>Earth's History</p>	<ul style="list-style-type: none"> Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. (7-ESS1-4) 	<p>Students will:</p> <ul style="list-style-type: none"> Explain how absolute and relative dating are used to determine the age of rock layers.
<p><i>Engineering</i></p>		
<p>Reporting Topics</p>	<p>Grade Level Standards</p>	<p>Standard Summary</p>
<p>Defining Problems</p>	<ul style="list-style-type: none"> Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on 	<p>Students will:</p> <ul style="list-style-type: none"> Identify criteria and constraints of a given design problem.



	people and the natural environment that may limit possible solutions. (7-ETS1-1)	<ul style="list-style-type: none">Describe how relevant scientific principles apply to a given design solution
Evaluating Solutions	<ul style="list-style-type: none">Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (7-ETS1-2)	Students will: <ul style="list-style-type: none">Compare data sets on multiple designs to determine which are the most successful
Analyzing Data	<ul style="list-style-type: none">Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (7-ETS1-3)	Students will: <ul style="list-style-type: none">Use a systematic evaluation process for comparing solutions and determine which meets all criteria and constraints.
Testing Solutions	<ul style="list-style-type: none">Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. (7-ETS1-4)	Students will: <ul style="list-style-type: none">Create and repeatedly test a design model for a specific purpose.