



SCHOOL DISTRICT OF MONROE

Preparing for the Future, One Child at a Time

Science (Grade 7)

Course Description:

The curriculum for this required course is developed from the Next Generation Science Standards:

<http://www.nextgenscience.org/>. The following practices are essential for all students to learn and be successful in science:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

We use a variety of instructional strategies and provide students with the opportunity to develop the above skills while learning about Chemistry, Cellular Respiration, Digestive and the Nervous Systems. Additionally, we include Engineering/Design challenges that encourage students to problem solve and work collaboratively. The information in this course overview outlines what students should understand and be able to do by the end of the semester/year.

Mastery Standards:

MS-ETS1 Engineering Design:

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 people and the natural environment that may limit possible solutions. (MS-ETS1-1)

Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2)

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. (MS-ETS1-3)

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. (MS-ETS1-4)

MS-LS1 From Molecules to Organisms: Structures and Processes

Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. (MS-LS1-1)

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. (MS-LS1-2)

Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (MS-LS1-3)

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. (MS-LS1-7)

Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. (MS-LS1-8)

MS-PS1-2 Matter and its Interactions:

Develop models to describe the atomic composition of simple molecules and extended structures. (MS-PS1-1)

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)

Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. (MS-PS1-3)

Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. (MS-PS1-4)

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. (PS-PS1-5)

Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (MS-PS1-6)

Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. (MS-PS3-3)

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. (MS-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. (MS-PS3-5)

Unit	Description of Unit and Learning Targets
<p>Unit Title: Safety</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> Why does a society require rules? 	<p>Students will.....</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> I can identify the three main components of a fire. I can correctly use and identify lab equipment to accurately measure mass and volume.
<p>Unit Title: Observations and Inferences</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> How do scientists come up with answers to questions? How can I identify a substance? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> I can make qualitative and quantitative observations and make inferences based on those observations. I can differentiate between common name, chemical name and chemical formula of substances.
<p>Unit Title: Atomic Structure</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> What makes up the world around us? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> I can define the relationship between elements and matter.

	<ul style="list-style-type: none"> • I can use the periodic table to identify the atomic number, atomic mass, and other chemical properties of elements. • I can describe what subatomic particles make up an atom and where they are located. • I can determine the number of protons, neutrons, and electrons of an atom for any element. • I can differentiate between elements, compounds and types of mixtures.
<p>Unit Title: Kinetic Energy</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • What causes matter to change? • How can one explain the structure, properties, and interactions of matter? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • I can describe the characteristics of each phase of matter at the particle level • I can identify the 6 phase changes and the exchange of energy necessary for each. • I can differentiate chemical (acidity, alkalinity (basic), combustibility, and reactivity) and physical (color, odor, density, solubility, melting point, boiling point, and electrical conductivity) properties. • I can cite evidence of how a change can be either physical or chemical. • I can differentiate expansion and contraction.
<p>Unit Title: Law of Conservation of Matter</p> <p><u>Essential Question:</u></p> <ul style="list-style-type: none"> • How do substances combine or change to form new substances? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • I can identify the amount of atoms and elements that make up compounds. • I can recognize parts of chemical equations: subscript, coefficient, yield sign, product, reactant, phase symbol • I can balance chemical equations to prove the Law of Conservation of Matter
<p>Unit Title: System Connections</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • How do the structures of organisms enable life's functions? • How do the systems interact to benefit the organism? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • I can construct a flowchart to demonstrate the way structures are organized in living things from cells to organisms. • I can analyze and explain how body systems interact with one another to contribute to the function of the whole organism (homeostasis).
<p>Unit Title: Supporting Cells</p> <p><u>Essential Question:</u></p> <ul style="list-style-type: none"> • How does the energy in food become the energy we use? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • I can write ideas about how cells in the body get resources • I can describe a resource delivery model for muscle cells • I can acquire information about heart and breathing rates during rest and exercise to understand the need for energy • I can discuss needs of cells
<p>Unit Title: The Nervous System</p> <p><u>Essential Question:</u></p> <ul style="list-style-type: none"> • How do humans detect, process, and use information about the 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • I can describe the six main parts of the brain (location and function).

<p>environment?</p>	<ul style="list-style-type: none"> ● I can describe the parts of a neuron. ● I can describe how a message travels through the body from stimulus to response. ● I can describe how enriched versus impoverished environments affect brain development.
<p>Unit Title: Seasons</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> ● What factors interact to influence weather and climate? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> ● I can explain how the tilt of the Earth causes the seasons.