

Lucile Erwin Middle School an IB World School

Subject-group overview: Sciences Level 2 (Grade 7)

Unit Length Weeks	4 weeks + ongoing	8 weeks	8 weeks	8 weeks	8 weeks	2 weeks
Unit Name	<b>Scientific Method and Processes</b>	<b>Chemistry of Living Things</b>  (Cells Basic Human Body Systems Interactions) -organization of cells -molecules  *Design your own exercise lab - understanding body system interactions.	<b>Genetics</b>  (DNA, Inherited Traits, Chromosomes, Probability of Traits/Punnett Squares, Genetic Codes Related to Inheritance, Ethics and Genetics, Mutations)  *Bio Ethics Essay, GMO Presentation, Fish Population Lab	<b>Evolution</b>  (Darwin's Evidences, How Genes Act w/Evolution, How Does Climate Drive Evolution, Commonalities between living and nonliving species on the Earth)  * Me as a Scientist, Virulent Viruses, Protist Labs, Simulations	<b>Ecology</b>  (Abiotic and Biotic Factors work together to protect to provide resources essential to the success of the organism)  * Biome Bottles, Minamota Bay Lab, Ecosystems	<b>Energy</b>  (Understand the relationships between kinetic and potential energy, How does mass influence speed? Planets, gravitational potential energy. Transformation of energy. Chemical change, what evidence exists? What are examples of physical vs chemical changes. Law of conservation of mass).  *Simulations, pendulum lab different mass of objects. Neal Armstrong on the moon.
Standard	<b>ETS1-1</b> <b>ETS1-2</b> <b>ETS1-3</b> <b>ETS1-4</b> plus nature of science	<b>PS1-1</b> (atomic composition) <b>PS1-3</b> (origins of synthetic materials) <b>PS1-5</b> (# of atoms - no change in chemical reaction) <b>LS1-1</b> (living things made of cells) <b>LS1-3</b> (body is a system of interacting subsystems) <b>LS1-8</b> (sensory receptors respond to stimuli) <b>LS2-4</b> (changes to physical or biological components affect populations)	<b>LS3-1</b> (mutations may affect proteins) <b>LS3-2</b> (asexual reproduction) <b>LS4-4</b> (genetic variations of traits) <b>LS4-5</b> (technologies that have changed desired traits) <b>LS4-6</b> (natural selection changes traits)	<b>ESS1-3</b> scale properties of objects in solar system) <b>LS1-5</b> (environmental and genetic factors influence growth of organisms) <b>LS4-1</b> (fossil records) <b>LS4-2</b> (anatomical similarities and differences among organisms) <b>LS4-3</b> (embryological development across species)	<b>LS1-4</b> (animal behaviors and plant structures affect reproduction) <b>LS1-5</b> (environmental and genetic factors influence growth of organisms) <b>LS1-6</b> (role of photosynthesis) <b>LS2-1</b> (effects of resource availability in ecosystems) <b>LS2-2</b> (patterns of interactions among organisms) <b>LS2-4</b> (changes to an ecosystem affect populations) <b>ESS2-4</b> (water cycle) <b>ESS3-3</b> (human impact on the environment) <b>ESS3-4</b> (increases in human population impact Earth's systems) <b>PS4-2</b> (waves)	<b>PS1-2</b> (properties of substances) <b>PS1-5</b> (# of atoms - no change in chemical reaction) <b>PS3-1</b> (relationships of kinetic energy) <b>PS3-2</b> (arrangement of objects interacting at a distance)
Key Concepts	<b>Relationships</b> Relationships in sciences indicate the connections found among variables through observation or experimentation. These relationships also can be tested through experimentation. Scientists often search for the connections between form and function.	<b>Systems</b> Systems in sciences describe sets of components that function due to their interdependence or complementary nature. Common systems in science are closed systems, where resources are not removed or replaced, and open systems, where necessary resources	<b>Change</b> Exploring change allows students to examine forces that shape the world: past, present and future. Inquiry into the concept of change invites students to consider causes, processes and consequences: natural and artificial, intentional and unintentional,	<b>Change</b> Exploring change allows students to examine forces that shape the world: past, present and future. Inquiry into the concept of change invites students to consider causes, processes and consequences: natural and artificial,	<b>Systems</b> Systems are sets of interacting or interdependent components. Everything in the known universe is a component of a system and generally also a part of multiple interacting and interdependent systems. Systems provide structure and	<b>Relationships</b> Relationships in sciences indicate the connections found among variables through observation or experimentation. These relationships also can be tested through experimentation. Scientists often search for the connections between form and

	Modelling is also used to represent <b>relationships</b> where factors such as scale, volume of data, or time make other methods impractical.	are renewed regularly.	positive and negative.	intentional and unintentional, positive and negative.	order in both natural and human environments. Dynamic and complex in nature, systems rely on a state of equilibrium and are very vulnerable to change	<b>function</b> . Modelling is also used to represent <b>relationships</b> where factors such as scale, volume of data, or time make other methods impractical.
<b>Related Concepts</b>	<p><b>Models</b> Representations used for testing scientific theories or proposals that can be accurately repeated and validated; simulations used for <b>explaining or predicting processes</b> which may not be observable or to understand the dynamics of multiple underlying phenomena of a complex system</p> <p><b>Patterns</b> The <b>distribution of variables</b> in time or space; <b>sequences of events or features</b>.</p>	<p><b>Interaction</b> The <b>effect</b> or effects two or more <b>systems</b>, bodies, substances or organisms <b>have on one another</b>, so that the overall result is not simply the sum of the separate effects.</p> <p><b>Balance (biology)</b> The <b>dynamic equilibrium</b> that exists among members of a <b>stable natural community</b>; the regulation of the internal environment of an organism.</p>	<p><b>Patterns</b> The <b>distribution of variables</b> in time or space; <b>sequences</b> of events or features.</p> <p><b>Consequences</b> The <b>observable</b> or quantifiable effects, <b>results</b>, or outcomes correlated with an earlier event or events.</p>	<p><b>Evidence</b> Support for a proposition derived from <b>observation and interpretation of data</b>.</p> <p><b>Environment (biology)</b> All of the <b>biotic and abiotic factors</b> that act on an organism, population or community and <b>influence its survival</b>, evolution and development.</p>	<p><b>Interactions</b> The <b>effect</b> or effects two or more <b>systems</b>, bodies, substances or organisms <b>have on one another</b>, so that the overall result is not simply the sum of the separate effects.</p> <p><b>Balance (biology)</b> The <b>dynamic equilibrium</b> that exists among members of a <b>stable natural community</b>; the regulation of the internal environment of an organism.</p>	<p><b>Interactions</b> The <b>effect</b> or effects two or more <b>systems</b>, bodies, substances or organisms <b>have on one another</b>, so that the overall result is not simply the sum of the separate effects.</p> <p><b>Energy</b> The capacity of an object to do work or transfer heat.</p>
<b>Global Context</b>	<p><b>Scientific and technical innovation</b> How do we understand the world in which we live?</p> <p>Students will <b>explore the natural world and its laws</b>; the interaction between people and the natural world; how humans use their understanding of scientific principles; the impact of scientific and technological advances on communities and environments; the impact of environments on human activity; how humans adapt environments to their needs.</p> <p>Possible explorations to develop</p> <ul style="list-style-type: none"> <li>Systems, models, methods; products, processes and solutions</li> <li>Adaptation, ingenuity and progress</li> <li>Opportunity, risk, consequences and responsibility</li> <li>Modernization, industrialization and engineering</li> <li>Digital life, virtual environments and the Information Age</li> <li>The biological revolution</li> <li>Mathematical puzzles, principles and discoveries</li> </ul>	<p><b>Scientific and technical innovation</b> How do we understand the world in which we live?</p> <p>Students will explore the natural world and its laws; the interaction between people and the natural world; how humans use their understanding of scientific principles; the impact of scientific and technological advances on communities and environments; the impact of environments on human activity; how humans adapt environments to their needs.</p> <p>Possible explorations to develop</p> <ul style="list-style-type: none"> <li>Systems, models, methods; products, processes and solutions</li> <li>Adaptation, ingenuity and progress</li> <li>Opportunity, risk, consequences and responsibility</li> <li>Modernization, industrialization and engineering</li> <li>Digital life, virtual environments and the Information Age</li> <li>The biological revolution</li> <li>Mathematical puzzles, principles and discoveries</li> </ul>	<p><b>Identities and relationships</b> Who am I? Who are we?</p> <p>Students will explore <b>identity</b>; beliefs and values; personal, physical, mental, social and spiritual health; human relationships including families, friends, communities and cultures; <b>what it means to be human</b>.</p> <p>Possible explorations to develop</p> <ul style="list-style-type: none"> <li>Competition and cooperation; teams, affiliation and leadership</li> <li>Identity formation; self-esteem; status; roles and role models</li> <li>Personal efficacy and agency; attitudes, motivation, independence; happiness and the good life</li> <li>Physical, psychological and social development; transitions; health and well-being; lifestyle choices</li> <li>Human nature and human dignity; moral reasoning and ethical judgment; consciousness and mind</li> </ul>	<p><b>Orientation in Space and Time</b> What is the meaning of "where" and "when"?</p> <p>Students will explore personal histories; homes and journeys; turning points in humankind; discoveries; explorations and migrations of humankind; the relationships between, and the interconnectedness of, individuals and civilizations, from personal, local and global perspectives.</p> <p>Possible explorations to develop</p> <ul style="list-style-type: none"> <li>Civilizations and social histories, heritage, pilgrimage, migration, displacement and exchange</li> <li>Epochs, eras, turning points and "big history"</li> <li>Scale, duration, frequency and variability</li> <li>Peoples, boundaries, exchange and interaction</li> <li>Natural and human landscapes and resources</li> <li>Evolution, constraints and adaptation</li> </ul>	<p><b>Globalization and sustainability</b> How is everything connected?</p> <p>Students will explore the <b>interconnectedness of human-made systems and communities</b>; the relationship between local and global processes; how local experiences mediate the global; the opportunities and tensions provided by world interconnectedness; the impact of decision-making on humankind and the environment.</p> <p>Possible explorations to develop</p> <ul style="list-style-type: none"> <li>Markets, commodities and commercialization</li> <li>Human impact on the environment</li> <li>Commonality, diversity and interconnection</li> <li>Consumption, conservation, natural resources and public goods</li> <li>Population and demography</li> <li>Urban planning, strategy and infrastructure</li> </ul>	<p><b>Scientific and technical innovation</b> How do we understand the world in which we live?</p> <p>Students will explore the natural world and its laws; the interaction between people and the natural world; how humans use their understanding of scientific principles; the impact of scientific and technological advances on communities and environments; the impact of environments on human activity; how humans adapt environments to their needs.</p> <p>Possible explorations to develop</p> <ul style="list-style-type: none"> <li>Systems, models, methods; products, processes and solutions</li> <li>Adaptation, ingenuity and progress</li> <li>Opportunity, risk, consequences and responsibility</li> <li>Modernization, industrialization and engineering</li> <li>Digital life, virtual environments and the Information Age</li> <li>The biological revolution</li> <li>Mathematical puzzles, principles and discoveries</li> </ul>
<b>Criterion objectives/strand assessment task</b>	<p><b>B-Inquiring and Designing</b></p> <p>i. explain a problem or question to be tested by a scientific investigation</p> <p>ii. formulate a testable hypothesis and explain it using scientific reasoning</p> <p>iii. explain how to manipulate the variables, and explain how data will be collected</p> <p>iv. design scientific investigations.</p> <p><b>C-Processing and evaluating</b></p> <p>i. present collected and transformed data</p> <p>ii. interpret data and explain results using scientific reasoning</p> <p>iii. evaluate the validity of a hypothesis based on</p>	<p><b>A-Knowing and Understanding</b></p> <p>i. explain scientific knowledge</p> <p>ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations</p> <p>iii. analyse and evaluate information to make scientifically supported judgments.</p> <p><b>B-Inquiring and Designing</b></p> <p>i. explain a problem or question to be tested by a scientific investigation</p> <p>ii. formulate a testable hypothesis and explain it using scientific reasoning</p> <p>iii. explain how to manipulate the variables, and</p>	<p><b>A-Knowing and Understanding</b></p> <p>i. explain scientific knowledge</p> <p>ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations</p> <p>iii. analyse and evaluate information to make scientifically supported judgments.</p> <p><b>B-Inquiring and Designing</b></p> <p>i. explain a problem or question to be tested by a scientific investigation</p> <p>ii. formulate a testable hypothesis and explain it using scientific reasoning</p>	<p><b>A-Knowing and Understanding</b></p> <p>i. explain scientific knowledge</p> <p>ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations</p> <p>iii. analyse and evaluate information to make scientifically supported judgments.</p> <p><b>B-Inquiring and Designing</b></p> <p>i. explain a problem or question to be tested by a scientific investigation</p> <p>ii. formulate a testable hypothesis and explain it using scientific reasoning</p>	<p><b>A-Knowing and Understanding</b></p> <p>i. explain scientific knowledge</p> <p>ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations</p> <p>iii. analyse and evaluate information to make scientifically supported judgments.</p> <p><b>B-Inquiring and Designing</b></p> <p>i. explain a problem or question to be tested by a scientific investigation</p> <p>ii. formulate a testable hypothesis and explain it using scientific reasoning</p> <p>iii. explain how to manipulate the variables,</p>	<p><b>A-Knowing and Understanding</b></p> <p>i. explain scientific knowledge</p> <p>ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations</p> <p>iii. analyse and evaluate information to make scientifically supported judgments.</p> <p><b>B-Inquiring and Designing</b></p> <p>i. explain a problem or question to be tested by a scientific investigation</p> <p>ii. formulate a testable hypothesis and explain it using scientific reasoning</p> <p>iii. explain how to manipulate the variables, and explain how data will be collected</p> <p>iv. design scientific investigations.</p>

	<p>the outcome of the scientific investigation</p> <p>iv. evaluate the validity of the method</p>	<p>explain how data will be collected</p> <p>iv. design scientific investigations.</p> <p><b>C-Processing and evaluating</b></p> <p>i. present collected and transformed data</p> <p>ii. interpret data and explain results using scientific reasoning</p> <p>iii. evaluate the validity of a hypothesis based on the outcome of the scientific investigation</p> <p>iv. evaluate the validity of the method</p> <p><b>D-Reflecting on the impacts of science</b></p> <p>i. explain the ways in which science is applied and used to address a specific problem or issue</p>	<p><b>C-Processing and evaluating</b></p> <p>i. present collected and transformed data</p> <p>ii. interpret data and explain results using scientific reasoning</p> <p><b>D-Reflecting on the impacts of science</b></p> <p>i. explain the ways in which science is applied and used to address a specific problem or issue</p> <p>ii. discuss and evaluate the various implications of the use of science and its application in solving a specific problem or issue</p> <p>iii. apply communication modes effectively</p> <p>iv. document the work of others and sources of information used.</p>	<p><b>C-Processing and evaluating</b></p> <p>i. present collected and transformed data</p> <p>ii. interpret data and explain results using scientific reasoning</p> <p>iii. evaluate the validity of a hypothesis based on the outcome of the scientific investigation</p> <p><b>D-Reflecting on the impacts of science</b></p> <p>i. explain the ways in which science is applied and used to address a specific problem or issue</p> <p>ii. discuss and evaluate the various implications of the use of science and its application in solving a specific problem or issue</p>	<p>and explain how data will be collected</p> <p>iv. design scientific investigations.</p> <p><b>C-Processing and evaluating</b></p> <p>i. present collected and transformed data</p> <p>ii. interpret data and explain results using scientific reasoning</p> <p>iii. evaluate the validity of a hypothesis based on the outcome of the scientific investigation</p> <p>iv. evaluate the validity of the method</p> <p><b>D-Reflecting on the impacts of science</b></p> <p>i. explain the ways in which science is applied and used to address a specific problem or issue</p> <p>ii. discuss and evaluate the various implications of the use of science and its application in solving a specific problem or issue</p> <p>iii. apply communication modes effectively</p> <p>iv. document the work of others and sources of information used.</p>	<p><b>C-Processing and evaluating</b></p> <p>i. present collected and transformed data</p> <p>ii. interpret data and explain results using scientific reasoning</p> <p>iii. evaluate the validity of a hypothesis based on the outcome of the scientific investigation</p> <p>iv. evaluate the validity of the method</p>
ATL Skill	<p><b>Thinking Skills</b> (critical thinking - interpret data, evaluate evidence)</p> <p><b>Self-management skills</b> (affective skills - demonstrate persistence and perseverance)</p>	<p><b>Thinking Skills</b></p> <p><b>Communication Skills</b></p>	<p><b>Research Skills</b> Make connections between scientific research and related moral, ethical, social, economic, political, cultural or environmental factors.</p> <p>Present information in a variety of formats and platforms</p> <p><b>Communication</b> Give and receive meaningful feedback</p>	<p><b>Thinking Skills</b></p> <p><b>Communication Skills</b></p>	<p><b>Research Skills</b></p> <p><b>Social Skills</b></p>	
Statement of Inquiry	<p>Scientists use experimentation to develop models and establish patterns through scientific inquiry.</p>	<p>Relationship, balance, and interactions of a system can be understood or explained by using models.</p>	<p>Exploring changes in patterns and their consequences helps us make informed decisions regarding our world.</p>	<p>Gathering and analyzing evidence to explain the impact of environmental factors on change over time.</p>	<p>A system can be affected by its interactions with others and needs to maintain balance in order to survive.</p>	<p>Transformation of energy through various interactions establishes unique and predictable relationships.</p>
LDC Argumentative or Informational/Explanatory Length of Writing			<p>Yes argumentative multi-paragraph</p> <p>Common Assignment</p>		<p>Common Assignment</p>	<p>Yes informational multi-paragraph</p>