

Sciences

Subject Group Overview

Year 1: Earth Science Daily lessons Vocab	Key Concept Related Concept(s) and Global Context	Statement of Inquiry	Inquiry Questions	ATL Skill(s)	Summative Assessment (rubrics on first column)	MYP Objective	Content MN State Standards
Unit 1: Scientific Method Unit Planner Summative Rubric Formative p. I Rubric Formative p. II Rubric	Systems Evidence Patterns Scientific and Technical Innovation	The scientific method is an organized system in which to collect evidence and develop patterns seen in the observable world.	Factual: What is the scientific method? What are the steps of the scientific method? What is a variable? What are the D.V, I.V and C.V.? What is a control group? What is the International System of Units? Conceptual: How do you write a hypothesis as a testable question? How can I define or identify the different variables? How can I measure mass, longitude, volume, and density? How can I show my data on charts/datatables? Debatable: How can you change an experiment to improve it? Do we need an International System of Units?	Communication: make inferences and draw conclusions. Research: collect and analyze data to identify solutions and make informed decisions	Crit.B&C Summative I: The Scientific method. Complete a lab report following the steps of the scientific method. The students will come up with a problem/question to investigate and do some initial research to formulate an educated guess. Design an experiment (material end protocol), carry out the experiment, collect data, and write a conclusion detailing what they learned.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	<i>7.1.1.2.2 Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables, ensuring that one variable is systematically manipulated, the other is measured and recorded, and any other variables are kept the same (controlled).</i> <i>7.1.1.2.3 Generate a scientific conclusion from an investigation, clearly distinguishing between results (evidence) and conclusions (explanation).</i> <i>7.1.1.1.2 Understand that when similar investigations give different results, the challenge is to judge whether the differences are significant, and if further studies are required.</i>
Unit 2: Solar System (includes EMS System) Unit Planner Summative Rubric	Relationships Interaction Connection Scientific and Technical Innovation	The solar system consists of objects (including planets, moons, asteroids, etc.) with unique characteristics	Factual: What is a star? What is a planet? What are the main characteristics of each planet? What is a satellite? What are the phases of the moon? What is rotation/translation? What is the structure of the Solar Systems?		Crit.A Summative I Questionnaire. Questionnaire. Students will take an individual exam where knowledge and understanding are	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing	6E.1.1.1.1 Ask questions that arise from observations of patterns in the movement of night sky objects to test the limitations of a solar system model. 6E.4.2.2.1 Communicate how a series of models, including those used by Minnesota American Indian

Summative II: - Ind. option Rubric - Group option Rubric Formative I Rubric Formative II Rubric		all interconnected by the gravitational forces that link them to the Sun.	Conceptual: How and why objects orbit around other objects? Why do we have seasons? How do we differentiate among meteoroids, meteors and meteorites? Why do the Ojibwe measure time using a turtle? Why is it difficult to draw an accurate Solar System to scale? Debatable: Should we go to Mars?		evaluated. Writing and taking notes skills will also be evaluated. Crit. D Summative II - Investigation about asteroids (individual) - Investigation about Mars (groups)	Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	Tribes and communities and other cultures, are used to explain how motion in the Earth-Sun-Moon system causes the cyclic patterns of lunar phases, eclipses and seasons. 6E.2.1.1.1 Analyze and interpret data to determine similarities and differences among features and processes occurring on solar system objects 6E.3.1.1.1 Develop and use scale models of solar system objects to describe the sizes of objects, the location of objects, and the motion of the objects; and include the role that gravity and inertia play in controlling that motion.
Unit 3: Earth's structure and History 3.1 Geologic time (*) Unit Planner Summative Rubric Formative I Rubric	Change Connections Development Globalization and Sustainability	Today's Earth (and the life on it) is the result of millions of years of change and development.	Factual What is Geologic Time? What are the main subdivisions? How are these subdivisions organized? What are the major events that shaped today's Earth and life on it? When did they happen? What is dating? Conceptual How do we know when these events occur? How are they interrelated? How have these events changed life on Earth? How can rocks be dated? How can we use radiometric and relative dating to determine the ages of rocks? Debatable Is the human impact changing our world? To what extent can the consequences of these impacts affect us?		Crit.A Summative I Questionnaire. The students will have to answer questions (i) explaining main concepts of the unit; (ii) locating, explaining or describing events in an Earth Timeline; (iii) relating events to the present state of the Earth planet (for example: how the ozone layer was crucial for life on land); or (iv) explaining how we know when an event did occur (fossils, relative/absolute dating).	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	6E.1.1.1.2 Ask questions to examine an interpretation about the relative ages of different rock layers within a sequence of several rock layers. 6E.3.2.1.1 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.

Unit 3: Earth's structure and History 3.2 Structure Unit Planner Summative Rubric Formative I Rubric Formative II* Rubric <i>*Written requirement for the summative</i>	Change Connections Development Globalization and Sustainability	Today's Earth (and the life on it) is the result of millions of years of change and development.	Factual What is a scale? What are the different layers of Earth, physically and compositionally? What are their properties and their primary components? Conceptual How do we use scale to create a model? How were the layers of Earth discovered and studied? Why do layers of Earth differ physically and chemically? Debatable Is the human impact changing our world? To what extent can the consequences of these impacts affect us?		Crit.C Summative I Students will create a model of Earth. They should find information about the characteristics (including depth) to create the model— layers should be clearly differentiated and accurately depicted. They will calculate their own scale, describe the physical layers, and the characteristics that lead to these classification.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	6E.1.1.2 Ask questions to examine an interpretation about the relative ages of different rock layers within a sequence of several rock layers. 6E.3.2.1.1 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.
Unit 4: Plate tectonics, earthquakes and volcanoes Unit Planner Summative Rubric Formative I Rubric Formative II Part 1 Rubric Formative III Rubric	Change Movement Force Identities and relationships	The planet's features around us are in constant change* due to the interaction between moving tectonic plates *sudden changes (earthquakes) vs. changes in geological scale (creation of a new ocean) <i>Tectonic plates interaction and the forces driving them are major</i>	Factual What is a tectonic plate? What are the evidence for this theory? What are the forces that drive tectonic plates movement? What are the types of limits between tectonic plates? What is an earthquake? What are the main parts of an earthquake? What are the main parts of a volcano? What are the three main types of volcanoes? Conceptual How does the movement of plates relate to the creation of landforms (mountains, oceans, etc.)? How does the movement of plates relate to earthquakes and volcanoes? How does an earthquake travel? How can we know where the epicenter of an earthquake is? Why are volcanoes different in shape, type of lava, etc.?		Crit.D Summative I Students will choose a volcano, research about it and then create a presentation. The classification, specific characteristics and eruption history of their volcano should use scientific language (vocabulary) to communicate understanding. Students will also evaluate the risks associated with their volcano.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	6E.2.1.1.2 Analyze and interpret data on the distribution of fossils, rocks, continental shapes, and seafloor structures to provide evidence of past plate motions. 6E.3.1.1.2 Develop a model, based on observational evidence, to describe the cycling and movement of Earth's rock material and the energy that drives these processes. 6E.2.1.1.3 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. 6E.4.1.1.1 Construct an argument, supported by evidence, for how geoscience processes have changed Earth's surface at varying time and spatial scales. 6E.2.1.1.3 Analyze and interpret data on natural hazards to forecast

		<i>agents of change (?)</i>	Debatable Would you live next to a volcano?				future catastrophic events and inform the development of technologies to mitigate their effects.
Unit 5: Water and rock cycles Summative (video) Rubric Formative Rubric	Systems Balance Transform Consequences Globalization and Sustainability	Altering the balance in our systems compromises the sustainability of life on our planet		Critical thinking skills: Evaluating evidence and arguments Reflection skills: Consider ethical, cultural and environmental implications	Crit.C Summative I Students will analyze data in order to support a scientific hypothesis that claims the factories in the Midwest were responsible for the contamination of a region on the east coast.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	6E.3.1.1.3 Develop a model, based on observational and experimental evidence, to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. 6E.3.2.1.3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*
Unit 6: Weathering and erosion Summative Rubric Formative I Rubric	Change Movement Force Identities and relationships	The earth's landscape is continuously changing due to natural forces	Factual: What is weathering? What is chemical weathering? What is mechanical weathering? What is erosion? What is deposition? Conceptual: How can we differentiate between chemical and mechanical weathering? How do weathering and erosion work together to constantly change Earth? How are these processes related to the water and rock cycles? Debatable: What can we do to protect the glaciers?		Crit.A Summative I Students will identify different landforms that are caused by weathering and erosion and describe the processes that lead to the creation of each landform.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	6E.3.2.1.2 Construct a scientific explanation based on evidence for how the uneven distribution of Earth's mineral, energy, or groundwater resources is the result of past geological processes.

English Version Unit 5 and Unit 6 merged Cycles/Weathering and Erosion Summative Rubric Formative Rubric	Systems and Change Balance Transform Consequences Movement Globalization and Sustainability	Altering the balance in our systems compromising the sustainability of life on our planet.	Factual: What are the main sources of water pollution? Conceptual: Should we prioritize local water resources or invest in technologies like desalination? Debatable: How can we use our understanding of the water cycle to develop sustainable water management practices?	Communication: make inferences and draw conclusions. Research: collect and analyze data to identify solutions and make informed decisions	Crit B and C Summative I Students will research and formulate a complete science experiment using the concept of percolation to develop a water bottle filter to clean muddy water, representing contamination from humans. They will use their knowledge of the water cycle to demonstrate their ability to use the scientific method.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	6E.3.1.1.3 Develop a model, based on observational and experimental evidence, to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. 6E.3.2.1.3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*
Unit 7: Weather and climate Summative Rubric Formative I WS Formative I graphs Rubric	Relationships Patterns Environment Globalization and Sustainability	Patterns in weather and climate shape the environment which affects our daily lives <i>*Or why you wouldn't probably play ice hockey in Ecuador.</i>	Factual: What is the weather? What is the climate? Conceptual: How are weather and climate related? How do you read a climograph? Debatable:		Crit. B Summative I ...	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	6E.1.2.1.1 Collect data and use digital data analysis tools to identify patterns to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. 6E.1.1.1.3 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Year 2: Life Science Daily lessons Vocab	Key Concept Related Concept(s) and Global Context	Statement of Inquiry	Inquiry Questions	ATL Skill(s)	Summative Assessment (rubrics on first column)	MYP Objective	Content MN State Standards
Unit 1: Scientific Method Unit Planner Summative Spanish v. English v. Rubric Formative I Spanish v. English v. Rubric	Systems Evidence Patterns Scientific and Technical Innovation	The scientific method is an organized system in which to collect evidence and develop patterns seen in the observable world.	Factual: What is the scientific method? What are the steps of the scientific method? What is a variable? What are the D.V, I.V and C.V.? What is a control group? What is the International System of Units? Conceptual: How do you write a hypothesis as a testable question? How can I define or identify the different variables? How can I measure mass, longitude, volume, and density? How can I show my data on charts/datatables? Debatable: How can you change an experiment to improve it? Do we need an International System of Units?	Communication: Make inferences and draw conclusions. Research: Collect and analyze data to identify solutions and make informed decisions Critical thinking skills: Evaluating evidence and arguments	CritB&C Summative I: The Scientific method. Complete a lab report following the steps of the scientific method. Students will be going through the steps of the scientific method: They will come up with a problem/question to investigate and do some initial research to formulate an educated guess. Design an experiment (material end protocol), carry out the experiment, collect data, and write a conclusion detailing what they learned.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	<i>7.1.1.2.2 Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables, ensuring that one variable is systematically manipulated, the other is measured and recorded, and any other variables are kept the same (controlled).</i> <i>7.1.1.2.3 Generate a scientific conclusion from an investigation, clearly distinguishing between results (evidence) and conclusions (explanation).</i> <i>7.1.1.1.2 Understand that when similar investigations give different results, the challenge is to judge whether the differences are significant, and if further studies are required.</i>
Unit 2: Cells (*) Unit Planner Summative Spanish v. English v. Rubric Formative I	Relationships Function Identities and relationships	The relationships between parts of cells and how they function together forms the basis of life.	Factual What are the characteristics of life? What is a cell? What are the organelles of the cell? What are the functions of the organelles? What is an euK/proK? What is the difference between different types of cells? What is cell theory? What are the parts of a microscope?	Creative thinking skills: Generating analogies Communication skills: Take effective notes in class and make elective	CritA&C Summative I: Cells Analogy Project. Students will make an analogy of a cell on paper/slides. Students will relate the different cell organelles and their function to their analogy.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing	7L.1.2.1.1 Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. 7L.3.1.1.1 Develop and use a model to describe the function of a cell as a whole and describe the way

Spanish v. English v. Rubric Formative II Spanish v. English v. Rubric			Conceptual How can we differentiate among types of cells? How are the functions of the organelles related to each other? How can we prepare an onion cell slide? Debatable What is the best analogy to explain how a cell works? What is the most important part/function of the cell?	summary notes Communication: use memory techniques to develop long-term memory		Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	cell parts contribute to the cell's function. 7L.4.1.1.1 Support or refute an explanation by arguing from evidence for how the body is a system of interacting subsystems composed of groups of cells.
Unit 3: Cell Processes Unit Planner Summative Part I Spanish v. English v. Rubric Summative Part II Spanish v. English v. Rubric Formative I Spanish v. English v. Rubric Formative II Spanish v. English v. Rubric	Systems Interaction Transformation Energy Globalization and Sustainability	The transformation* of [inorganic] compounds into chemical energy [organic] it's crucial for any organism to survive on this planet. *Autotrophs: chemosynthesis and photosynthesis	Factual What are the components of a cellular membrane (levels of organization)? What are the different kinds of cellular transport? What is a product and what is a reactant? What are the formulas of photosynthesis and cellular respiration? Conceptual How is matter organized? How do substances move within cells? How do autotrophs and heterotrophs obtain their energy/food? Debatable To what extent can we take advantage of photosynthesis to reduce greenhouse gas emissions?		CritD Summative Part I: Students will create a meme about transport through the membrane including a brief explanation. The explanation of the meme should use scientific language (vocabulary) to communicate understanding. Summative Part II: The students will write an essay explaining the process of photosynthesis, its relation with cellular respiration, which organisms do photosynthesis and its importance. The essay should explain how we can use photosynthesis to improve the air in the cities and if	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	7L.3.1.1.2 Develop and use 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. 7L.3.2.1.2 Construct an explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

					humans can take advantage of photosynthesis to compensate for greenhouse gas emissions.		
Unit 4: Cellular Reproduction Unit Planner Summative Spanish version English version Rubric Formative I Spanish version English version Rubric	Relationships Consequence Interaction Scientific and technical innovation	Our body is formed by cells that interact (communication processes) with each other. A disruption in these processes brings major consequences.	Factual What is the cell cycle? What is the result of the cell cycle? What are the stages in the cycle? What happens during each stage of interphase, mitosis and cytokinesis? What is cancer? Conceptual How does the cell cycle relate to the development of cancer? How do scientists develop cures for cancer (clinical trials)? How JCW changed the way we treat cancer? Debatable What is one significant advancement in cancer treatment?	Communication skills: Take effective notes in class and make elective summary notes	Students will create a presentation that outlines the stages of the cell cycle. Students will also explore what cancer is, its causes, how it relates to the cell cycle, and how scientists* have improved the treatment of cancer along history. *Jane Cook Wright	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	7L.1.1.1 Ask questions about the processes and outcomes of various methods of communication between cells of multicellular organisms.
Unit 5: Genetics (*) Unit Planner Summative Spanish v. English v. Rubric Formative Spanish version English version Rubric	Change Interaction Environment Scientific and technical innovation	Scientific and technical innovations* rely on understanding that traits are the result of the interaction between genetics and environment.	Factual What is a gen? What is an allele? What is a dominant/recessive trait? What is homo-/heterozygous genotype? What are Mendel's laws? What is scientific racism? Conceptual How are phenotypes and genotypes related? What is the difference between natural and artificial selection? What is the relation between scientific racism and genetics?	Critical thinking skills: Draw supported conclusions Reflection skills: Consider ethical, cultural and environmental implications	Students will create an imaginary creature to which they will assign two variable characteristics for a total of 4 phenotypes. They will then create a lab notebook in which they simulate the collection of genetic data on their creature. They will have to transform this data into genotypic and phenotypic frequencies. Then students will produce a genealogy to study how	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D:	7L.3.2.1.1 Construct an explanation based on evidence for how environmental and genetic factors influence the growth of organisms and/or populations. 7L.1.1.1.2 Ask questions that arise from careful observations of phenomena or models to clarify and or seek additional information about how changes in genes can affect organisms.

			Debatable What is the best strategy to avoid scientific racism?		genes are passed on from generation to generation. Finally, they should discuss what their creature would be like if it did not follow a dominant inheritance pattern.	Reflecting on the impact of science	7L.3.1.1.4 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.
Unit 6.1: Evolution Unit Planner Summative Spanish version English version Rubric Formative I Spanish version English version Rubric Formative II English version Spanish version Rubric	Relationships Balance Interaction Environment Globalization and Sustainability	Development is only sustainable if relationships among living things remain in balance.	Factual What is a gen? What is an allele? What is a dominant/recessive trait? Conceptual ...? Debatable ...?		The students will have to design an experiment to demonstrate how a trait on a rabbit's population is affected by natural selection. They will have to create an environment in which the rabbit population remains in balance (does not go extinct/ does not “conquer the world”).	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	7L.2.1.1.2 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth. 7L.2.1.1.3 Analyze visual data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. 7L.2.2.1.1 Use an algorithm to explain how natural selection may lead to increases and decreases of specific traits in populations. 7L.3.2.1.3 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. 7L.3.2.1.4 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. 7L.4.1.1.2 Support or refute an explanation by arguing from evidence and scientific reasoning for how animal behavior and plant structures affect the probability of successful reproduction.
Unit 6.2: Ecology Summative English version (w rubric) Spanish version Formative I English version (Crossword+key, vocabulary, relationships ws) Rubric Spanish version (CrossW + key vocab + relationships ws)	Relationships Balance Interaction Environment Globalization and Sustainability	Development is only sustainable if relationships among living things remain in balance.				Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	7L.2.1.1.1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. 7L.3.1.1.3 Develop and use a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. 7L.4.1.2.1 Construct an argument supported by empirical evidence that changes in physical or biological components of an ecosystem affect populations.* 7L.4.1.2.2 Evaluate competing design solutions for maintaining biodiversity or ecosystem services. 7L.4.2.2.1 Gather multiple sources of information and communicate how

							Minnesota American Indian Tribes and communities and other cultures use knowledge to predict or interpret patterns of interactions among organisms across multiple ecosystems.
--	--	--	--	--	--	--	--

Year 3: Physical Science Daily lessons Vocab	Key Concept Related Concept(s) and Global Context	Statement of Inquiry	Inquiry Questions	ATL Skill(s)	Summative Assessment (rubrics on first column)	MYP Objective	Content MN State Standards
Unit 1: Matter Unit Planner Summative Rubric Summative II Rubric Formative I Rubric Formative II Rubric	Change Energy Movement Interaction Scientific and Technical Innovation	The properties of matter depend on how the sub-particles that form it behave (organization, motion, interactions, etc.).	Factual: What is matter? What is the structure of matter? What is an atom, molecule, element and compound? What is a specific property of matter? What are the states of matter? What is the kinetic theory of matter? Conceptual: How can I know the number of subatomic particles in an atom? How does the number of particles change in ions and isotopes? How can we distinguish between physical and chemical properties? How is the periodic table organized? Debatable: What is the best way to use the physical properties of substances to construct a container that will prevent a change in state of matter in a substance? Which one is the best element?		Crit.B&C Summative I: Design an experiment to demonstrate how the transfer of energy and the amount of mass affect the temperature of a substance (state of matter). Crit.D Summative II: Adopt an element. The students should select an element, find information about its discovery, extraction, current and past use, cost, etc. and then come up with an ad (poster format) for the element including the most important information.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	8P.3.2.1.1 Construct an explanation based on evidence and scientific principles of a common phenomenon that can be explained by the motions of molecules. 8P.3.2.2.3 Design, construct, and test a device that either minimizes or maximizes thermal energy transfer.* 8P.1.2.1.4 Plan and conduct an investigation to determine how the temperature of a substance is affected by the transfer of energy, the amount of mass, and the type of matter. 8P.3.1.1.1 Develop models to describe the atomic composition of simple molecules and crystals. 8P.1.1.1.1 Ask questions about locations of common elements on the periodic table to note patterns in the properties of similarly grouped elements. 8P.1.2.1.1 Plan and conduct an investigation of changes in pure substances when thermal energy is added or

							removed and relate those changes to particle motion.
Unit 2: Chemical reactions Unit Planner Summative Rubric Summative II Rubric Formative I Rubric	Relationships Balance Transformation Consequences Globalization and Sustainability	Synthetic materials are transformed* from natural resources impacting both the environment and society. *following the law of conservation of matter, atoms are rearranged.			Summative I: Test (balancing equations) Summative II: Fashion wars.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	8P.3.1.1.2 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. 8P.2.1.1.1 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. 8P.4.2.1.1 Gather and evaluate information from multiple sources to describe that synthetic materials come from natural resources and impact society. 8P.3.2.2.1 Construct, test and modify a device that either releases or absorbs thermal energy by chemical processes.*
Unit 3: Motion Unit Planner Summative Rubric Formative I Rubric Formative II Rubric	Systems Movement Pattern Scientific and Technical Innovation	Understanding the basic patterns of movement is the first step for designing efficient, cutting-edge mobility technologies	Factual: What are distance and displacement? What are speed and velocity? What is acceleration? What units do we use to measure these magnitudes? What factors affect gravity? Conceptual: How can we represent movement? How do the different graphs relate among each other?		Crit.B&C Summative I: Design an experiment to demonstrate how air resistance can affect the movement of an object when dropped. Students will have to follow the steps of the scientific method to demonstrate, describe and represent graphically the movements of an	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D:	8P.4.1.1.1 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

			How does acceleration relate to gravity? Debatable: What is the best design to protect a raw egg from breaking when dropped from a height?		object with and without air resistance (vacuum is assumed, air resistance is enhanced by incorporating a device).	Reflecting on the impact of science	
Unit 4: Forces *And electromagnetic forces Summative Rubric Formative I Rubric	Systems Interact Function Orientation in space and time	Movement is the result of the interaction among the different components of a system	Factual: What is force? What is a balanced/unbalanced force? What is friction? What are the three Newton's Laws? Conceptual: How do forces combine? How does friction affect movement? How can human beings manipulate forces to control the motion? How do Newton's three law describe the relationship between forces and motion? Debatable: Since gravity and friction force are unavoidable, can human beings really control motion?	Critical Thinking Skills: Consider ideas from multiple perspectives.	Problems, questions regarding Newton's Laws	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	8P.1.2.1.3 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. 8P.1.1.1.2 Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. 8P.3.2.2.2 Design a solution to a problem involving the motion of two colliding objects using Newton's 3rd Law.* 8P.1.2.1.2 Plan and conduct 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.
Unit 5: Energy (*) Unit Planner Summative Rubric Summative II Rubric	Change Transformation Energy Globalization and Sustainability	We cannot create energy, we need to transform the energy that already exists in order to use it.	Factual: What is potential energy? What is kinetic energy? What is the Law of conservation of Energy? What are other types of energies and how can we classify them? What is an energy source? Conceptual:	Thinking: Critical Thinking: make inferences and draw conclusions. Thinking: Transfer Skills: apply skills and knowledge in unfamiliar	Test: Students have to show knowledge on definitions of all forms of energy, how to rank varying levels of potential and kinetic energy, and how one energy transfers to another	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing	8P.2.2.1.2 Create a computer program to illustrate the transfer of energy within a system where energy changes form.** 8P.4.1.1.2 Compare and evaluate evidence to support the claim that when the kinetic energy of an object changes, energy is

Formative I Rubric			How does potential and kinetic energy transfer between each other? How do we see forms of energy in the real world? How can we transform energy in order to take advantage of it? Debatable: Should we keep using nuclear energy?	situations.		Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	transferred to or from the object. 8P.2.1.1.2 Construct and interpret graphical displays of data to describe the relationship of kinetic energy to the mass and speed of an object. 8P.3.1.1.3 Develop and revise 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.
Unit 6: Waves (*) Unit Planner Summative Rubric Formative I Rubric	Change Interaction, environment Scientific and Technical Innovation	The changes in a wave's properties are directly related to the way we perceive our environment.	Factual: What are the properties of a wave (wavelength, frequency, and amplitude)? What are the two kinds of waves? What is refraction and reflection of light/sound? What is absorption and transmission of light/sound? Conceptual: How do waves transfer energy? How do waves determine how we interpret light and sound? How is the amplitude/frequency of a wave related to the energy in a wave? How can we use waves for communication? How can we transmit waves as signals (analog/digitized)? Debatable: Are digitized signals <i>better</i> than analog signals?	Critical Thinking: practice observing carefully in order to recognize problems. Critical Thinking: test generalizations and conclusions. Thinking: Transfer skills: combine knowledge, understanding, and skills to create products or solutions.	The students will have to select an animal species and explain how this animal communicates. The student should explain how this communication is related to waves (mechanical/sound; electromagnetic/light). The students will describe the relationship between frequency, amplitude, and energy in waves. The student should also describe behaviors such as reflection, absorption, and transmission in waveforms.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	8P.4.2.1.2 Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.** 8P.3.1.1.4 Develop and use a model to qualitatively describe that waves are reflected, absorbed, or transmitted through various materials. 8P.2.2.1.1 Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.

Year 4: Earth and Space Science Daily lessons Vocab	Key Concept Related Concept(s) and Global Context	Statement of Inquiry	Inquiry Questions	ATL Skill(s)	Summative Assessment	MYP Objective	Content MN State Standards
Unit 1: Earth's place in the Universe (*) Unit planner SPA Summative Rubric Summative II Rubric Formative I Rubric Formative II Rubric ENG (in the Unit Planner)	Systems Interaction Energy Orientation in space and time	The universe operates through the constant interaction of forces, matter, and energy, governing processes from the fusion of a star to the formation of a mountain on Earth.	Factual What is the Universe? What is the Bing Bang? Which stages followed the Big Bang? What is nucleosynthesis? Which are the Kepler's laws? What are the Earth's layers (dynamic and static models)? What are the tectonic plates and the plate boundaries? Conceptual How was the universe formed? Where do the elements come from? How was the Solar System formed? How do we know the Earth has layers? How do we know the main components in each layer? Which forces move the tectonic plates and how? Debatable How do you imagine the universe before the Big Bang?		Summative I (Crit.B&C): Students will design and experiment, collect data and evaluate their work using a simulation . Students will explore the simulation, select which variables are changing (orbits, eccentricity, etc.) and go through the steps of the scientific method in order to demonstrate one of Kepler's Laws. Summative II (Crit.A): Students will take an individual exam where knowledge and understanding are evaluated. Writing and taking notes skills will also be evaluated.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	9E.3.2.1.1 Construct an explanation that links astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe to the Big Bang. 9E.3.2.1.2 Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. 9E.2.1.1.1 Analyze data to make a valid scientific claim about the way stars, over their life cycle, produce elements. 9E.2.2.1.1 Use mathematical and computational representations to predict the motion of natural and human-made objects that are in orbit in the solar system.** 9E.1.1.1.1 Ask questions to clarify how seismic energy traveling through Earth's interior can provide evidence for Earth's internal structure. 9E.4.1.1.1 Evaluate the evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.

							9E.4.1.1.2 Evaluate the evidence and reasoning for the explanatory model that Earth's interior is layered and that thermal convection drives the cycling of matter. 9E.3.1.1.2 Develop and use a model based on evidence to explain how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.
Unit 2: Earth's Systems and Processes Unit planner SPA Summative Rubric Summative II Rubric Summative III Rubric Formative I Rubric ENG Summative Rubric Summative II Rubric Summative III Rubric Formative I Rubric	Systems Balance Transformation Consequences Globalization and Sustainability	Altering the balance in our systems compromises the sustainability of life on our planet	Factual What are the 4 main systems on the planet? What are the reservoirs and the processes that intervene in the water, rock and carbon cycles? What are the three types of rocks? What are the differences between the natural and the anthropogenic carbon cycle? Conceptual How do systems interact? How can you identify the 3 different types of rocks? How are geographical features—such as canyons, speleothems, etc.—formed? Debatable To what extent are humans impacting the natural cycles?		Summative I (Crit.B&C): Students will design and experiment, collect data and evaluate their work following the steps of the scientific method. Students will build the model of a canyon and explore how the hydrosphere and the rock cycle interact. Summative II (Crit.A): Students will take an individual exam where knowledge and understanding are evaluated. Writing and taking notes skills will also be evaluated. Summative III (Crit.D): The impact of fracking. The students should select a place on the Earth and conduct a research to explain the	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	9E.3.1.1.1 Develop and use a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation. (Connect Unit 1 & 2) 9E.1.2.1.1 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. 9E.1.2.1.2 Plan and conduct an investigation of the properties of soils to model the effects of human activity on soil resources. 9E.2.2.1.2 Develop a computational model, based on observational data, experimental evidence, and chemical theory, to describe the cycling of carbon among Earth's systems.**

					social/economical and environmental impact of fracking.		
Unit 3: Climate and climate change Unit planner SPA Summative Rubric Formative I Rubric Formative II Rubric ENG Summative Rubric Formative I Rubric Formative II Rubric	Change Consequences Interaction Environment Scientific and Technical Innovation	The drastic consequences of climate change require us to listen to science and rethink the way we interact with our environment.	Factual What are the 5 main systems on the planet? What is the weather and climate? What are the differences between weather and climate? What factors affect climate? What is climate change? Conceptual How are regional climates determined? How does climate change affect each system? How an alteration on one of the systems can affect the rest of them? How does climate change affect life at every level? Debatable What is the best way to mitigate climate change?	Creative and innovative thinking skills: Generate a testable hypothesis Critical thinking skills: Evaluating evidence and arguments	Summative I (Crit.B&C): Students will design and experiment, collect data and evaluate their work following the steps of the scientific method to analyze how small changes can affect enzyme activity. Students will need to link their own research with enzyme activity in real life (permafrost, soil fertility, etc.).	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	9E.3.1.1.3 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. 9E.3.1.1.4 Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. 9E.2.1.1.2 Analyze geoscience data to make a claim that one change to the Earth's surface can create feedbacks that cause changes to other Earth systems. 9E.2.1.1.3 Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth's systems and human infrastructure.* 9E.4.2.2.1 Apply place-based evidence, including those from Minnesota American Indian Tribes and communities and other cultures, to construct an explanation of how a warming climate impacts the hydrosphere, geosphere, biosphere, or atmosphere.
Unit 4: Human Impact Unit planner SPA	Relationships Balance Interaction Environment	Development is only sustainable if relationships among living things	Factual Conceptual Debatable		Summative Part I (Crit.D): The impact of biodiversity loss. Students will have to construct an explanation about biodiversity and the causes of biodiversity loss.	Criterion A: Knowledge and Understanding Criterion B: Inquiring and Designing	9E.1.2.1.2 Plan and conduct an investigation of the properties of soils to model the effects of human activity on soil resources. 9E.3.2.2.1 Evaluate or refine a technological solution to reduce the human impacts on a natural system and base the evaluations or

Summative Template Rubric Crit.D Rubric Crit.A Formative I Rubric Formative II Rubric ENG Summative Template Rubric Crit.D Rubric Crit.A Formative I Rubric Formative II. Rubric Formative II.B Rubric	Globalization and Sustainability	remain in balance.			They will have to do research to describe possible individual and collective solutions. Summative Part II (Crit.A): Students will choose an endangered species and make a presentation with basic information (distribution, habitat, etc.), analyze the main threats, and apply scientific knowledge and understanding to make a prediction about future perspectives on the species.	Criterion C: Processing and evaluating Criterion D: Reflecting on the impact of science	refinements on evidence and analysis of pertinent data.* 9E.4.2.1.1 Compare, integrate and evaluate sources of information in order to determine how specific factors, including human activity, impact the groundwater system of a region. 9E.2.2.1.3 Develop or use an algorithmic representation, based on investigations of causes and effects in complex Earth systems, to illustrate the relationships within some part of the Earth system and how human activity might affect those relationships. 9E.4.1.1.3 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.*
--	----------------------------------	--------------------	--	--	---	--	---

Year 5: Physics	Key Concept Related Concept(s) and Global Context	Statement of Inquiry	Inquiry Questions	ATL Skill(s)	Summative Assessment	MYP Objective	Content MN State Standards
Unit 1: Motion in One Dimension	Change Movement Orientation in space and time	Humans study the change of movement in order to control movement.	Factual— What do we need to know in order to describe motion?	Communication: use and interpret a range of discipline-specific terms and symbols and	Build a car that can travel down a ramp. Students will test it and analyze position vs time and velocity vs time graph, and	Criterion B: Inquiring and designing	9P.2.2.1.1 Use vectors and free-body diagrams to describe force, position, velocity and acceleration of objects

			Conceptual— How can humans describe the motion in different ways? Debatable— Can humans predict an object's motion?	understand and use mathematical notation	compile and analyze the data in a google slides presentation.	Criterion C: Processing and evaluating	
Unit 2: Free Fall	Change Patterns, Movement Orientation in space and time	Understanding the patterns of change of movement can help us understand the natural world.	Factual—What are the patterns of change of movement? Conceptual—Why are there patterns of change of movement? Debatable—Do the changes of movement always fit the same patterns?	Thinking: Critical Thinking skills: must propose and evaluate a variety of solutions	Calculate falling distance according time, calculate time according falling distance. Analyze graph. Design an experiment to figure out the Hang Time while a person jumps up.	Criterion A: Knowing and understanding Criterion B: Inquiring and designing	9P.2.2.1.3 Use gravitational force to explain the motion of objects near Earth and in the universe.
Unit 3: Forces and Motion	Relationship, Movement, consequence ORientation in space and time	Movements of objects are the consequence of the forces acting on the objects.	Factual— What are different forces and how they were produced? Conceptual— How do forces affect motion? Debatable— Can human beings really manipulate motion?	Self management: Develop new skills, techniques and strategies for effective learning	Design and make a rocket. Analyze and test the design with the knowledge of forces and Newton's Laws.	Criterion A: Knowing and understanding Criterion B: Inquiring and designing Criterion C: Processing and evaluating	9P .2.2.1.1 Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion.
Unit 4: Energy	Systems Transformation, interaction Scientific and technical innovation	Humans use the transformation of energy in a system to interact with their environment.	Factual—What is energy? How does energy transform between different forms? Conceptual—How can human beings use energy more efficiently? Debatable—Do humans use energy in a right way?	Communication: use and interpret a range of discipline-specific terms and symbols Thinking: Critical Thinking skills: identify obstacles and challenges	Design and Build a Roller Coaster, test it, analyze and present data in google slides presentation.	Criterion B: Inquiring and designing Criterion C: Processing and evaluating	9P.2.2.2.1 Explain and calculate the work, power, potential energy and kinetic energy involved in objects moving under the influence of gravity and other mechanical forces.

Unit 5: Projectile Motion	Change Movement Orientation in space and time	Humans study the change of movement in order to control movement.	Factual— What force causes projectile motion? Conceptual— How does a projectile move in horizontal and vertical direction? Debatable— How does air resistance affect projectile motion?	Thinking: Critical Thinking skills: must draw reasonable conclusions and generalizations	Use photogate and projectile launcher to measure the initial speed of the marble with a given angle. Predict how high and how far the marble will reach by calculating with formulas.. Measure the real distance that the marble moves horizontally. Present and compare the data from calculation and experiment and explain results using scientific reasoning. Explain how to improve the experiment method in order to get the data that is closer to the experiment result.	Criterion A: Knowing and understanding Criterion B: Inquiring and designing Criterion C: Processing and evaluating	9P .2.2.1.1 Use vectors and free-body diagrams to describe force, position, velocity and acceleration of objects in two-dimension motion. 9P .2.2.1.2 Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion 9P .2.2.1.3 Use gravitational force to explain the motion of objects near Earth and in the universe.
Unit 6: Circular Motion	Coming soon!						
Unit 7: Electricity	Coming soon!						

Unit 8: Sound and Light	Coming soon!						
--	--------------	--	--	--	--	--	--

Year 5: Chemistry	Key Concept Related Concept(s) and Global Context	Statement of Inquiry	Inquiry Questions	ATL Skill(s)	Summative Assessment	MYP Objective	Content MN State Standards
Unit 1: Scientific methods	Systems Evidence Patterns Scientific and Technical Innovation	The scientific method is an organized system in which to collect evidence and develop patterns seen in the observable world.	Factual— How do you write a hypothesis as a testable question? What factors need to be included in the steps of an experiment? How to do scientific measurements? Conceptual— What is the difference between a dependent and independent variable? What is the difference between the variables and the control? Debatable— When is a hypothesis correct? How do you improve/change an experiment in the future?	Communication: make hypothesis, make inferences and draw conclusions. Research: collect and analyze data to identify solutions and make informed decisions	Student experiment: Student will be using the supplied materials to design an experiment and investigate problems and solve using scientific method. They will need to complete a lab report on their own.	Criterion B: Inquiring and designing Criterion C: Processing and evaluating	9C.1.3.4.1 Use significant figures and an understanding of accuracy and precision in scientific measurements to determine and express the uncertainty of a result.

Unit 2: Atomic Structure	Systems Form Change Movement Transfer Energy Balance Scientific and technical innovation	The development of the atomic model throughout history shows the progression of knowledge that all matter is composed of atoms.	Factual: • What happens when electrons in atoms absorb or release energy? • What are the various ways in which the atom has been represented over the years? Conceptual: • How is it possible that all matter is composed of atoms? Debatable: • How do the various atomic models compare with current scientific evidence?	In order for students to discuss and evaluate the implications of using science and its application to solve a specific problem or issue, interacting with a factor, students must evaluate and select information sources and digital tools based on appropriateness to specific tasks. (ATL Research: Information Literacy Skills) In order for students to explain the ways in which science is applied and used to address a specific problem or issue, students must plan short- and long-term assignments; meet deadlines. (ATL Self-Management:	There will be a written test that covers the following topics: -subatomic particle identification -Bohr Models -Lewis Dot Models -Electron Configuration Models -Scientists and Contributors to the Atomic Model The Isotope Paper relates to the Atomic Structure Unit because it causes the students to consider that not all atoms of the same element look or function the same. It	Criterion A: Knowing and understanding Criterion D: Reflecting the impact of science	9C. 2.1.4.1 Use kinetic molecular theory to explain how changes in energy content affect the state of matter (solid, liquid and gaseous phases) 9C. 2.1.4.2 Use the kinetic molecular theory to explain the behavior of gasses and the relationship among temperature, pressure, volume and the number of particles.
--	---	--	---	--	---	--	--

				Organization Skills) .	also allows them to research direct connections between the static models we have been drawing in class, and how those elemental models are represented in real world application.		
Unit 3: Chemical Bondings	Systems Evidence Patterns Relationships	The relationships between elements on the Periodic Table and the balance of these atoms in nature explain how the natural world is formed.	Factual: (63) - What do electrons do between atoms to create the three major types of bonding? - Why do elements bond in nature? Conceptual: (63) - Would the periodic table be as meaningful if it was organized differently?	ATL Communication-Communication Skills ATL Thinking-Critical Thinking Skills	Ionic vs Covalent Experiment <i>Objective: You are to write up a lab report, from beginning to end, testing whether compounds are ionic or covalent.</i> Your job is to test compounds in an experiment, write the formulas, and explain in detail based on all of	Criterion B: Inquiring and designing Criterion C: Processing and evaluating	The periodic table illustrates how patterns in the physical and chemical properties of elements are related to atomic structure. 9C.2.1.1.1 The periodic table illustrates how patterns in the physical and

			• How can periodic trends be explained? Debatable: (63) • Why is an understanding of intermolecular forces important? • Why is a consistent system of naming compounds necessary?		this gathered information, whether you know that a compound is ionic or covalent. You will complete this by writing a lab report similar to formative experiments you have seen in class. You need to include enough detail that as another chemist is reading it, they understand with full clarity how and what you did in the experiment. There will also be a written test to check students' understanding of the three bond forms.		chemical properties of elements are related to atomic structure. 9C.2.1.1.2 Chemical and physical properties of matter result from the ability of atoms to form bonds. 9C.2.1.2.1 Chemical and physical properties of matter result from the ability of atoms to form bonds. 9C.2.1.2.3 The periodic table illustrates how patterns in the physical and chemical properties of elements are related to atomic structure. 9C.2.1.1.1
--	--	--	---	--	--	--	---

Unit 4: Chemical Equations	Change Balance Consequence	The consequences of a chemical reaction are a highly predictable process that maintain the balance and order of matter.	Factual: (63) - How do chemical reactions obey the law of conservation of mass? Conceptual: (63) - How can you predict the products of a chemical reaction? Debatable: (63) - Why must chemical equations be balanced?	ATL Information and Literacy Skills ATL Communication-Communication Skills ATL Thinking-Critical Thinking Skills	Students will take a test in writing and balancing equations	Criterion A: Knowing and understanding	2.1.1 Students will be able to represent observations and data in order to recognize patterns in the data, the meaning of those patterns, and possible relationships between variables.
Unit 5: Chemical Quantities	Communication Transfer Personal and cultural expression	Understanding the units of measurements that chemists use allow us to better communicate within the scientific community.	Factual: (63) - How do we determine the type of atoms and ratio of each type in a compound to accurately write a chemical formula? Conceptual: (63) - How can scientists quantize the atoms and molecules that make up matter without being able to see them? Debatable: (63)		Students are asked to carry out an experiment to find the limiting reactants in a chemical reaction	Criterion C: Processing and evaluating	1.2.1 Students will be able to design and conduct investigations in the classroom, laboratory, and/or field to test students' ideas and questions, and will organize and collect data to provide evidence to support claims the students make about phenomena. 2.1.1 Students will be able to

			Why is the mole an important measurement in chemistry?				represent observations and data in order to recognize patterns in the data, the meaning of those patterns, and possible relationships between variables.
Unit 6: Stoichiometry	System Energy Scientific and Technical Innovation	The system with which to discuss chemical reactions at different levels of energy uses mathematical relationships and scientific observations.	Factual: (63) - How can quantities of matter be used to calculate mathematical relations between reactants and products? Conceptual: (63) - How can the amount of reactants and products in a chemical reaction be predicted? Debatable: (63) - What is the significance of a limiting reactant in stoichiometric calculations?	ATL Information and Literacy Skills ATL Communication-Communication Skills ATL Thinking-Critical Thinking Skills	Students are asked to design and make the biggest air bag with the reaction of vinegar and baking soda inside	Criterion B: Inquiring and designing Criterion C: Processing and evaluating	9C.2.2.1.2 Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. (P: 5, CC: 5, CI: PS1 2.1.1 Students will be able to represent observations and data in order to recognize patterns in the data, the meaning of those patterns, and possible relationships between variables.

Unit 7: Properties of Gases	Relationships Conditions Globalization and sustainability	The behavior of gases in the real world discuss the unique conditions that gases undergo to execute a variety of functions and products to benefit mankind.	Factual: (63) - What are the relationships that exist between pressure, temperature, volume, and amount of gas? Conceptual: (63) - How do gases respond to changes in temperature, pressure and volume? Debatable: (63) - Why is an ideal gas useful even though ideal gases do not exist? - Why do only certain factors determine the physical state of matter?	ATL Information and Literacy Skills ATL Communication-Communication Skills ATL Thinking-Critical Thinking Skills ATL reflective Skills ATL Information Literacy Skills ATL Collaboration Skills	Students will need to do a debate, using information research online to explain the application of science	Criterion D: Reflecting the impact of science	9C.2.2.1.1 Develop a data simulation, based on observations and experimental data of how the pressure, volume, temperature, and mass of a gas are related to each other, to predict the effect on a system of changing one of those variables.** (P: 5, CC: 2, CI: PS1)
Unit 8: Acids and Bases	Logic Evidence Fairness and Development	The system of principles to define matter as an acid or solid reveal unique characteristics that must be maintained for humanity to survive and coexist.	Factual: (63) - Where does pH play a role in our everyday lives? Conceptual: (63) - How can solutions be described and determined? - What is water? Debatable: (63)	ATL Transfer Skills ATL Thinking-Critical Thinking Skills	Students will take a test about acids and bases, pH and pOH, [H+] and [OH-]. Mostly about balancing equations and calculations.	Criterion A: Knowing and understanding	9C.1.2.1.2 Plan and conduct an investigation of acid-base reactions to test ideas about the concentrations of the hydronium ion in an aqueous solution (pH). (P:3, CC: 3, CI: PS1)

			Why are there various ways to define and quantify an acidic or basic material?				
--	--	--	--	--	--	--	--

Year 6: DP Biology Roadmap	Key Concept Related Concept(s) and Global Context	Statement of Inquiry	Inquiry Questions	ATL Skill(s)	Summative Assessment	MYP Objective	Content MN State Standards
Theme A: Unity and Diversity		Common ancestry has given living organisms many shared features while evolution has resulted in the rich biodiversity of life on Earth.					

Year 6: DP Biology Roadmap	Key Concept Related Concept(s) and Global Context	Statement of Inquiry	Inquiry Questions	ATL Skill(s)	Summative Assessment	MYP Objective	Content MN State Standards
--	---	-------------------------	-------------------	--------------	-------------------------	------------------	----------------------------------

Theme B: Form and Function		Adaptations are forms that correspond to function. These adaptations persist from generation to generation because they increase the chances of survival					
Theme C: Interaction and Interdependence		Systems are based on interactions, interdependence and integration of components. System result in emergence of new properties at each level of biological organization					
Theme D. Continuity and Change		Living things have mechanisms for maintaining equilibrium and for bringing about transformation. Environmental change is a driver					

		of evolution by natural selection.					
--	--	---------------------------------------	--	--	--	--	--