MMS Science 8 Subject Group Overview

Unit Name		Atomic Structure & Periodic Table	Classification & Properties of Matter	Energy Forms & Transformations	Thermal Energy & Phase Changes	Waves	Non-Contact Forces	Motion & Newton's Law
Time Frame		5 Weeks	4 Weeks	4 Weeks	4 Weeks	5.5 Weeks	3.5 Weeks	3 Weeks
	Standards	S8P1.c., d., e.	S8P1.a.,d., f.	S8P2.a., b., c.	S8P1.b / S8P2.d	S8P4.a., b., c., d., e., f., g.	S8P5.a., b., c.	S8P3.a., b., c.
	Science & Engineering Practices	Students will: ● Develop models (e.g., atomic level models, including drawings, and computer representations) by analyzing patterns within the periodic table that illustrate the structure, composition, and characteristics of atoms (protons, neutrons, electrons) and simple molecules. ● Plan and carry out investigations to compare and contrast chemical (i.e., reactivity, combustibility) and physical (i.e., density, melting point, boiling point) properties of matter. ● Construct an argument based on observational evidence to support the claim that when a change in a substance occurs, it can be classified as either chemical or physical.	Students will: ● Develop and use a model to compare and contrast pure substances and mixtures. ● Construct an argument based on observational evidence to support the claim that when a change in a substance occurs, it can be classified as either chemical or physical. ● Construct an explanation based on evidence to describe conservation of matter in a chemical reaction including the resulting differences between products and reactants.	Students will: ● Analyze and interpret data to create graphical displays that illustrate the relationships of kinetic energy to mass and speed and potential energy to mass and height of an object. ● Plan and carry out an investigation to explain the transformation between kinetic and potential energy within a system (e.g. roller coasters, pendulums, rubber bands, etc.). ● Construct an argument to support a claim about the type of energy transformations within a system [e.g., lighting a match (light to heat), turning on a light (electrical to light).	Students will: ● Develop and use models to describe the movement of particles in solids, liquids, gasses, and plasma states when thermal energy is added or removed. ● Plan and carry out investigations on the effects of heat transfer on molecular motion as it relates to the collision of atoms (conduction), through space (radiation), or in currents in a liquid or gas (convection).	Students will: ● Ask questions to develop explanations about the similarities and differences between electromagnetic and mechanical waves. ● Construct an explanation using data to illustrate the relationship between the electromagnetic spectrum and energy. ● Design a device to illustrate the practical applications of the electromagnetic spectrum (e.g., communication, medical, military). ● Develop and use a model to compare and contrast how light and sound waves are reflected, refracted, absorbed, diffracted, or transmitted through various materials. ● Analyze and interpret data to predict patterns in the relationship between density of media and wave behavior (i.e., speed). ● Develop and use a model (e.g., simulations, graphs, illustrations) to predict and describe the relationships between wave properties (e.g., frequency, amplitude, and wavelength) and energy. ● Develop and use models to demonstrate the effects that lenses have on light (i.e. formation of an image) and their possible technological applications.	Students will: ● Construct an argument using evidence to support the claim that fields (i.e., magnetic fields, gravitational fields, and electric fields) exist between objects exerting forces on each other even when the objects are not in contact. ● Plan and carry out investigations to demonstrate the distribution of charge in conductors and insulators. ● Plan and carry out investigations to identify the factors (e.g., distance between objects, magnetic force produced by an electromagnet with varying number of wire turns, varying number or size of dry cells, and varying size of iron core) that affect the strength of electric and magnetic forces.	Students will: ● Analyze and interpret data to identify patterns in the relationships between speed and distance, and velocity and acceleration. ● Construct an explanation using Newton's Laws of Motion to describe the effects of balanced and unbalanced forces on the motion of an object. ● Construct an argument from evidence to support the claim that the amount of force needed to accelerate an object is proportional to its mass (inertia)

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	Approaches To Learning Instructional Strategies	. **Critical Thinking:** Identify trends and forecast possibilities **Reflection:** Consider content: -What did I learn about today? -What don't I understand? -What questions do I have now?	**Communication:** Make inferences and draw conclusions. **Communication:** Negotiate ideas and knowledge with peers and teachers	**Self-Management: Organization:** Bring necessary equipment and supplies to class. **Self-Management: Affective:** Practice focus and concentration.	**Communication:** Read critically and for comprehension. **Communication:** Take effective notes in class.	**Critical Thinking:** Use models and simulations to explore complex systems and issues. **Collaboration:** Work effectively with others.	**Critical Thinking:** Make logical, reasonable judgments and create arguments to support them. **Social: Collaboration:** Delegate and take responsibility as appropriate.	**Research:** Collect and analyze data to identify solutions and/or make informed decisions. **Critical Thinking:** Consider consequences to events.
	Statement of Inquiry	Scientific and technical advancements enable scientists to understand relationships and patterns that exist related to the structure and function of elements in our natural world. **Phenomena:** What materials and elements would best be used for race cars?	Scientists and technical innovations allow us to visualize, model, and explain properties of and changes in systems of matter. **Phenomena**: How can we get clean drinking water in the middle of the woods? **CER:** Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment.	Scientific and technical advancements have led to the development of multiple systems that facilitate energy transformations. **Phenomena**: How can we design the best roller coaster that maximizes energy within the system?	Scientific and technical innovations enable us to use thermal energy changes for practical applications. **Phenomena:** How can we cook food without using modern technology? **CER:** Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment.	Advances in science and technology have developed humans' understanding of the uses, behaviors, and effects of electromagnetic and mechanical energy. **Phenomena:** How can we develop devices for people who have a hearing or seeing disability?	Scientific and technical innovations allow us to understand the relationships between objects in magnetic, gravitational, and electric fields. **Phenomena:** How can we develop wireless charging of our commonly used devices? **CER:** Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment.	Scientific and technical advancements have led to the development of a variety of models that can be used to demonstrate changes in motion of balanced and unbalanced forces on objects. **Phenomena:** How can we evaluate a stunt performance within a movie?
	Global Context	**Scientific and Technical Innovation** 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.	**Scientific and Technical Innovation** 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.	**Scientific and Technical Innovation** 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.	**Scientific and Technical Innovation** 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.	**Scientific and Technical Innovation** 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.	**Scientific and Technical Innovation** 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.	**Scientific and Technical Innovation** 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.

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	Key Concepts	**Relationships (MYP)** Relationships are the connections and associations between properties, objects, people and ideas - including the human community's connections with the world in which we live. Any change in a relationship brings consequences.	**Change (MYP/CCC)** Change is a conversion, transformation or movement from one form, state, or value to another. Inquiry into the concept of change involves understanding and evaluating causes, processes and consequences.	**Systems and system models (MYP/CCC)** Systems are sets of interacting or interdependent components. Systems provide structure and order in human, natural and built environments. Systems can be static or dynamic, simple or complex.	**Change (MYP/CCC)** Change is a conversion, transformation or movement from one form, state, or value to another. Inquiry into the concept of change involves understanding and evaluating causes, processes and consequences.	**Development (MYP)** Development is the act or process of growth, progress or evolution, sometimes through iterative improvements.	**Relationships (MYP)** Relationships are the connections and associations between properties, objects, people and ideas - including the human community's connections with the world in which we live. Any change in a relationship brings consequences.	**Systems and system models (MYP/CCC)** Systems are sets of interacting or interdependent components. Systems provide structure and order in human, natural and built environments. Systems can be static or dynamic, simple or complex.
	Related Concepts	Patterns (MYP/CCC)	Models (MYP)	Energy (MYP/CCC) Transformation (MYP)	Energy (MYP/CCC)	Effects (MYP)	Interaction (MYP)	Movement (MYP)
	Disciplinary Core Ideas	Connecting Core Ideas ● Matter (structure, composition, properties) ● Elements and compounds ● Chemical and Physical Properties and Changes	Connecting Core Ideas ● Mixtures and solutions ● Matter (structure, composition, properties) ● Elements and compounds ● Conservation of Matter	Connecting Core Ideas ● Energy ● Energy Transformations ● Kinetic & Potential	Connecting Core Ideas ● Matter (structure, composition, properties) ● Thermal Energy ● States of Matter	Connecting Core Ideas ● Wave Properties (frequency, amplitude, wavelength, and energy) ● Energy (electromagnetic spectrum) ● Light and Sound ● Wave Propagation (reflection, refraction, absorption, diffraction, transmission) ● Lenses	Connecting Core Ideas ● Forces (friction, gravitational, electrical, and magnetic) ● Force fields ● Conductors and insulators	Connecting Core Ideas ● Energy ● Kinetic and Potential ● Force and Motion ● Speed and Distance ● Speed and Acceleration ● Newton's Laws of Motion ● Balanced and Unbalanced Forces
	MYP Assessments/ Performance Tasks	**Common Assessments Title and Criterion:** Atomic Structure & Periodic Table Unit Assessment Paper I (Science: A,D) Lab: Physical and Chemical Properties Investigation (Science: A-D) Lab: Observing & Using Physical & Chemical Properties and Changes (Science: A,C,D) Elements on the Periodic Table (Science A,C,D)	**Common Assessments Title and Criterion:** Classification & Properties of Matter Unit Assessment Paper I and Paper II (Science: A,D) Lab: Identifying Pure Substances and Mixtures (Science: A,C,D) Designing a Filtration System for Clean Water (Design: A-D)	**Common Assessments Title and Criterion:** Energy Forms and Transformations Unit Assessment Paper I (Science: A,D) Lab: Investigating Pendulums (Science: B-D) Design a Rollercoaster System (Design: A-D)	**Common Assessments Title and Criterion:** Thermal Energy & Phase Changes Unit Assessment Paper I and Paper II (Science: A,D) Lab: Investigating Boiling Ice (Science: B,C) Designing an Insulating Device (Design: A-D)	**Common Assessments Title and Criterion:** Waves Unit Assessment Paper I (Science: A,D) Lab: Investigating Wave Behaviors (Science: A,C,D) EM Spectrum Device Research & Design Challenge (Design: A,B,D) Lab: Investigating Lenses (Science: A,C,D)	**Common Assessments Title and Criterion:** Non-Contact Forces Unit Assessment Paper I and Paper II (Science: A,D) Lab: Investigating Magnets & Magnetic Fields (Science: B,C) Lab: Investigating Electrostatics (Science: B,C) Designing an Electromagnet (Design: A-D)	**Common Assessments Title and Criterion:** Motion & Newton's Laws Unit Assessment Paper I (Science: A,D) Lab: Using Spring Scales to Measure Force (Science: B,C) Lab: Investigating Motion (Science: A-D)
	Differentiation For Tiered Learners	Discovery Education Science Techbook	Discovery Education Science Techbook	Discovery Education Science Techbook	Discovery Education Science Techbook	Discovery Education Science Techbook	Discovery Education Science Techbook NGSS Case Studies for Differentiated Learners	Discovery Education Science Techbook

Published: 8,2025 Resources, materials, assessments not linked to SGO or unit planner will be reviewed at the local school level.

		NGSS Case Studies for Differentiated Learners NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	NGSS Case Studies for Differentiated Learners NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	NGSS Case Studies for Differentiated Learners NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	NGSS Case Studies for Differentiated Learners NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	NGSS Case Studies for Differentiated Learners NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	NGSS Case Studies for Differentiated Learners NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects