Marietta City Schools 2025–2026 District Unit Planner					
Honors Science 8					
Unit title	*Atomic Structure and Periodic Table*	**MYP year**	*3*	**Unit duration (hrs)**	*18.5 Hours*

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

	GSE Standards
	<u>Standards</u> **S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter.** ● c. 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. ● d. 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. (Clarification statement: Evidence could include ability to separate mixtures, development of a gas, formation of a precipitate, change in energy, color, and/or form.) ● e. 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. **<u>Gifted Standards</u>** ● **MCS.Gifted.S2A.** Recognize and evaluate how the process of creative thinking improves ideas, products, and solutions to problems. ● **MCS.Gifted.S4D.** Respectfully collaborate and effectively communicate exchanges of constructive/critical feedback. **Prior Student Knowledge: (REFLECTION – PRIOR TO TEACHING THE UNIT)** Students have not had previous exposure to these science concepts. Students struggle with identifying the correct number of neutrons when developing atomic models and correctly identifying conservation of matter. **<u>Concepts/Skills to be Mastered by Students</u>** ● Matter (structure, composition, properties) ● Elements and Compounds ● Physical and Chemical Properties and Changes **Key Vocabulary: (KNOWLEDGE & SKILLS)** pure substance, matter, element, compound, molecule, atom, protons, neutrons, electrons, particle, Periodic Table of elements, pattern, structure, composition, atomic number, atomic mass, mass number, period, group/family, electron shell/orbital/energy level, metal, metalloid, non-metal, reactive, inert, non reactive, Octet Rule

	Year-Long Anchoring Phenomena: (LEARNING PROCESS) How does matter and energy interact within the universe? **Unit Phenomena (LEARNING PROCESS)** How can the Periodic Table be used to determine characteristics of elements that are useful in flight? **CER:** Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative and summative assessment. **Capstone Connective Theme:** Elements in Flight **UN Sustainable Development Goals:** Industry, Innovation, and Infrastructure & Responsible Consumption and Production **Possible Preconceptions/Misconceptions: (REFLECTION – PRIOR TO TEACHING THE UNIT)** ● Students may have difficulty recalling the number of electrons that will fill electron shells/orbitals/energy levels. ● Students may confuse Periodic Table groups/families and periods. ●		
	Key concept	**Related concept(s)**	**Global context**
	Relationships 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.	Patterns (MYP/CCC)	**Scientific and technical innovation** How the world works: an inquiry into the natural world and its laws; the interaction between the natural world (physical and biological) and human societies; how humans use their understanding of scientific principles; the impact of scientific and technological advances on society and on the environment.
	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.		
	Inquiry questions		
	Factual ● What is a physical property and what are some examples of physical properties?		

- What are the differences between physical and chemical properties?
- What is density?
- What are the differences between physical and chemical changes?
- How are atoms structured?
- What are protons, neutrons, and electrons? Where do they belong in atoms and what are their charges?
- What is the difference between an atom's atomic number and atomic mass?
- What are the similarities and differences between metals, non-metals, and metalloids?

Conceptual

- What determines the physical and chemical properties of a substance?
- How can you determine whether a change in a substance is physical or chemical?
- How can I model atomic structure?
- How can the Periodic Table be used to predict the structure, composition, and characteristics of atoms?

Debatable

- How can I uncover the identity of mystery substances based on its physical and chemical properties?
- How can I use physical and chemical changes to predict a substance's reactivity?
- Is the Periodic Table the most efficient way to group known elements?
- Is the Bohr Model the most accurate model to present the atomic structure of an element?

MYP Objectives	**Assessment Tasks**	
*What specific MYP **objectives** will be addressed during this unit?*	***Relationship** between summative assessment task(s) and statement of inquiry:*	*List of common formative and summative assessments.*
Science: Criterion A: Knowing and Understanding Criterion B: Inquiring and Designing Criterion C: Processing and Evaluating	SOI: 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. The MYP summative assessment tasks require students to use the Periodic Table in order to model, recognize, and identify atoms and their subatomic particles. In doing so, students are tasked with understanding and using the Periodic Table to make predictions regarding the structure, properties, and uses of the elements in our natural world.	**Formative Assessment(s):** Physical and Chemical Properties and Changes CFA Atomic Structure and Periodic Table CFA **Summative Assessment(s):**

	Criterion D: Reflecting on the Impacts of Science Design: Criterion A: Inquiring and Analyzing Criterion B: Developing Ideas Criterion C: Creating the Solution Criterion D: Evaluating	Honors Science 8 students take this investigation a step further, by developing a Periodic Table of Aviation based on elements commonly used in flight and the properties that make them suitable and/or necessary for aviation.	Atomic Structure & Periodic Table Assessment Paper I (Science: A,D)
	Approaches to learning (ATL)		
	Category: Thinking **Cluster:** Critical Thinking Skills **Skill Indicator:** Identify trends and forecast possibilities.		

Learning Experiences Add additional rows below as needed.		
Objective or Content		**Personalized Learning and Differentiation**
S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter. ● S8P1.e. 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.	● Build an Atom PhET SIM ● Atomic Models Elaboration ● Periodic Table Worksheet (Scavenger Hunt) ● Aviation Elements on the Periodic Tablet (Science A,C,D)	● Capstone Connections ● Discovery Education High School Science Techbook ● NGSS Case Studies for Differentiated Learners ● Next Generation Science Standards: "All Standards, All Students" ● Extensions – Enrichment Tasks/Projects Task-Specific Differentiation ● Scaffolding ● Extended Learning ● Sentence Starters ● Leveled Tasks ● Mode/Method of Presentation ● Type of Product
S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter. ● S8P1.c. 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.	● Lab: Observing & Using Physical & Chemical Properties and Changes (Science: A,C, D) ● Demo: Density of Unknown Objects/ Will it Sink or Float?	
S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter. ● S8P1.d. 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. (Clarification statement: Evidence	● Lab: Observing & Using Physical & Chemical Properties and Changes (Science: A,C, D)	

could include ability to separate mixtures, development of a gas, formation of a precipitate, change in energy, color, and/or form.)		

Content Resources

Georgia Grade 8 Science GaDOE Instructional Segment

Discovery Education Grade 8 Science Techbook
Concept 1.5: Chemical Reactions and Equations

Discovery Education Chemistry Science Techbook

Discovery Education: Boeing Partnership

PhET: Build an Atom

Teach Engineering: May the Force be With You; Thrust Article

Capstone Connections

- Aviation Periodic Table
- Capstone Kickoff
- Introduction to Design Cycle
- Introduction to Honors Science 8 Capstone
- Capstone Brainstorming