Marietta City Schools

2025–2025 District Unit Planner

Honors Science 8

Unit title	*Atomic Structure, Periodic Table, and LOCOM*	**MYP year**	*3*	**Unit duration (hrs)**	*20 Hours*

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

GSE Standards

Standards

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.
- S8P1. f. Construct an explanation based on evidence to describe conservation of matter in a chemical reaction including the resulting differences between products and reactants. (Clarification statement: Evidence could include models such as balanced chemical equations.)

Gifted Standards

- **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. Previous unit data indicates that S8P1.e has standard attainment of 2.7, and S8P1.f. has standard attainment of 2.6. Students struggle with identifying the correct number of neutrons when developing atomic models and correctly identifying conservation of matter. Students need to differentiate between reactants and products based on the rearrangement of atoms and their corresponding numbers. Students need to be able to identify the correct operations when presented subscripts vs. coefficients.

Concepts/Skills to be Mastered by Students

- Matter (structure, composition, properties)
- Elements and Compounds
- Conservation of Matter

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, law of conservation of matter, created, destroyed, transformed, reactants, products, chemical equation, mass, open vs. closed Systems, 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.
- Students may have difficulty counting atoms of reactants/products as evidence of LOCOM.

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
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?
What are reactants? What are products?
What are the differences between an open and closed system during chemical reactions?

Conceptual
How can I model atomic structure?
How can the Periodic Table be used to predict the structure, composition, and characteristics of atoms?
How can a chemical equation be used to show the Law of Conservation of Matter?
Which chemical reactions would involve an open or closed system?

Debatable
What method or investigation can I use/develop to demonstrate the Law of Conservation of Matter?

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 Criterion D: Reflecting on the Impacts of Science Design: Criterion A: Inquiring and Analyzing Criterion B: Developing Ideas Criterion C: Creating the Solution	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. 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.	**Formative Assessment(s):** CFA #1 (Atomic Structure and Periodic Table) CFA#2 (LOCOM and Balance Simple Equations) **Summative Assessment(s):** Atomic Structure & Periodic Table Assessment Paper I and Paper II

Criterion D: Evaluating		
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.	● Hands on Build an Atom Lab ● Aviation Period Table	● 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. f. Construct an explanation based on evidence to describe conservation of matter in a chemical reaction including the resulting differences between products and reactants. (Clarification statement: Evidence could include models such as balanced chemical equations.)	● Demos: Baking Soda + Vinegar, Burning Steel Wool, Isopropyl Alcohol + Flame (Video Only) (Open vs. Closed Systems) ● How Combustion Engines work in Flight Article ● Lab: Chemical Reactions and the LOCOM	
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
- How Combustion Works in Flight Article
- Capstone Idea Submission