



Marietta City Schools

District Unit Planner

Everything on the unit planner must be included on the unit curriculum approval statement.

Science Grade 8

Unit title	Atomic Structure & Periodic Table	MYP year	3	Unit duration (hrs)	20 Hours
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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.)

Prior Student Knowledge: (REFLECTION – PRIOR TO TEACHING THE UNIT)

Students preview atomic structure during Unit 1: Energy Forms and Transformations, to begin building connections between matter and energy. Students model the structure of an atom, using Bohr models, to show the location, number, and charges of protons, neutrons, and electrons.

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

Year-Long Anchoring Phenomena: (LEARNING PROCESS)

Human Need for Energy

Unit Phenomena (LEARNING PROCESS)

What elements do I have for breakfast?

How can I understand an element's properties by using the periodic table?

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
<p align="center">Relationships (MYP)</p> <p>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.</p>	<p align="center">Patterns (MYP/CCC)</p>	<p align="center">Scientific and technical innovation</p> <p>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.</p>
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?

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?

Debatable

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

MYP Objectives	Assessment Tasks	
<i>What specific MYP objectives will be addressed during this unit?</i>	<i>Relationship between summative assessment task(s) and statement of inquiry:</i>	<i>List of common formative and summative assessments.</i>
Criterion A: Knowing and Understanding I. describe scientific knowledge Criterion B: Inquiring and Designing I. describe a problem or question to be tested by a scientific investigation	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. Students will also use chemical equations as models to uphold the Law of Conservation of Matter in chemical reactions. In their assessment, students are challenged to review experimental design procedures to determine how those procedures could be altered in order to ensure the representation of the Law of Conservation of Matter.	<u>Formative Assessment(s):</u> Atomic Structure CFA <u>Summative Assessment(s):</u> AS & PT Paper I Unit Assessment (Science A) AS & PT Paper II Unit Assessment (Science A,D)

<p>Criterion C: Processing and Evaluating</p> <p>I. present collected and transformed data</p> <p>li.interpret data and describe results using scientific reasoning</p> <p>Criterion D: Reflecting on the Impacts of Science</p> <p>lii. apply scientific language effectively</p>		
Approaches to learning (ATL)		
<p>Category: Thinking</p> <p>Cluster: Critical-Thinking Skills</p> <p>Skill Indicator: Identify trends and forecast possibilities</p>		

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
<p>S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter.</p> <ul style="list-style-type: none">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.	<p>Bohr Model Construction</p> <p>Periodic Table Project</p>	<ul style="list-style-type: none">Discovery Education Science TechbookNGSS Case Studies for Differentiated LearnersNext Generation Science Standards: "All Standards, All Students"Extensions - Enrichment Tasks/Project <p>All information included by the PLC in the differentiation box is the responsibility and ownership of the local school to review and approve per Board Policy IKB.</p>
<p>S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter.</p> <ul style="list-style-type: none">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.)	<p>Law of Conservation of Matter Practice: Identifying Balanced and Unbalanced Equations</p> <p>Lab: Chemical Reactions and the LOCOM (Science B,C)</p>	<p>Task-Specific Differentiation</p> <ul style="list-style-type: none">ScaffoldingLeveled TasksExperimental Design ChoicesMode/Method of Representation/Presentation (text, videos, laboratory investigations)

Content Resources

DE Science Techbook: Unit 1: Matter: Concept 1.5: Chemical Reactions and Equations

Mosa Mack: Atoms & Molecules

PhET:

-Build an Atom

-Balancing Chemical Equations

GaDOE Instructional Segment: You Are What You Eat

GaDOE Instructional Segment: Periodic Table

Argument-Driven Inquiry in Physical Science: Conservation of Mass: How Does the Total Mass of a Substance Formed as a Result of a Chemical Change Compare with the Total Mass of the Original Substances?