



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	Classification & Properties of Matter	MYP year	3	Unit duration (hrs)	25 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.

- Develop and use a model to compare and contrast pure substances (elements and compounds) and mixtures. (Clarification statement: Include heterogeneous and homogeneous mixtures. Types of bonds and compounds will be addressed in high school physical science.)
- 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. (Clarification statement: Evidence could include ability to separate mixtures, development of a gas, formation of a precipitate, change in energy, color, and/or form.)
- 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 have already explored atoms and elements through Unit 3. Students will now relate atoms that combine to 2 or more as molecules and compounds. Students as well can see the chemical formula of certain molecules and can identify them based on their Chemical Symbol to relate it to the Periodic Table.

In fifth grade, students should have mastered:

S5P1. Obtain, evaluate, and communicate information to explain the differences between a physical change and a chemical change.

- Plan and carry out investigations of physical changes by manipulating, separating, and mixing dry and liquid materials.
- Construct an argument based on observations to support a claim that the physical changes in the state of water are due to temperature changes, which cause small particles that cannot be seen to move differently.
- Plan and carry out an investigation to determine if a chemical change occurred based on observable evidence (color, gas, temperature change, odor, new substance produced).

Concepts/Skills to be Mastered by Students

- Matter (structure, composition, properties)

MCS MYP Science 8 Unit 3 Planner. Last Revised: October, 2023

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

- Mixtures and solutions
- Elements and compounds
- Chemical and Physical Properties and Changes
- Conservation of Matter

Key Vocabulary: (KNOWLEDGE & SKILLS)

pure substances, matter, element, compound, molecule, atom, mixtures, homogeneous, heterogeneous, particle, state, physical property, mass, volume, density, melting point, boiling point, freezing point, chemical properties, reactivity, combustibility, physical change, chemical change, chemical reaction, precipitate, 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)

The science of cooking and eating

What is the mysterious brown substance that has been detected in the tap water of Westfield?

Possible Preconceptions/Misconceptions: (REFLECTION – PRIOR TO TEACHING THE UNIT)

- Students may have difficulty determining visually and using models, how to represent elements, compounds, homogeneous, and heterogeneous mixtures. Students may also have difficulty distinguishing between these models.
- Students may have difficulty calculating density.
- Students often mistake phase changes for a chemical, rather than physical change.
- Students often confuse melting point and boiling point as chemical properties, rather than physical properties.
- Students may have difficulty counting atoms of reactants/products as evidence of LOCOM.

Key concept	Related concept(s)	Global context
<p>Change</p> <p>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.</p>	<p>Models (MYP)</p>	<p>Scientific and technical innovation</p> <p>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.</p>
Statement of inquiry		

Scientists and technical innovations allow us to visualize, model, and explain properties of and changes in systems of matter.

Inquiry questions

Factual

- What is matter?
- What is the difference between pure substances and mixtures?
- What is a physical property and what are some examples of physical properties?
- What are the differences between physical and chemical properties?
- How do I calculate density?
- What are the differences between physical and chemical changes?
- What are reactants? What are products?

Conceptual

- How can models be used to distinguish between pure substances and mixtures?
- 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 a chemical equation be used to show the Law of Conservation of Matter?

Debatable

- How can I uncover the identity of mystery substances?
- How can I use physical and chemical properties to design a water filtration system?
- What method or investigation can I use/develop to demonstrate the Law of Conservation of Matter?

MYP Objectives	Assessment Tasks	
<i>What specific MYP <u>objectives</u> 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>

<p>Science A: Knowing and Understanding</p> <p>I. describe scientific knowledge</p> <p>li. apply scientific knowledge and understanding to solve problems</p> <p>lii. analyze information to make scientifically supported judgments</p> <p>Science B: Inquiring and designing</p> <p>I. describe a problem or question to be answered by a scientific investigation</p> <p>Science 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>Science D: Reflecting on the Impact of Science</p> <p>lii. apply scientific knowledge effectively</p> <p>Design A: Inquiring and Analyzing</p> <p>I. explain and justify the need for a solution to a problem</p> <p>Design B:</p>	<p>SOL: Scientists and technical innovations allow us to visualize, model, and explain properties of and changes in systems of matter.</p> <p>Throughout the unit, students are tasked with observing, identifying, and distinguishing between both chemical and physical properties and changes. They are also required to use models to illustrate the differences between pure substances and mixtures on a macro and micro scale. The MYP unit assessments use models, laboratory investigations, and scenarios to evaluate students' ability to correctly visualize, model, and explain characteristics and properties of matter. Students are also tasked with asking appropriate questions to determine whether something is a pure substance or mixture and whether a change that has occurred is physical or chemical in nature. 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.</p>	<p><u>Formative Assessment(s):</u></p> <p>Pure Substances & Mixtures CFA</p> <p><u>Summative Assessment(s):</u></p> <p>Classification and Properties of Matter UA Paper I and Paper II</p>
---	---	--

<p>lv. develop accurate planning drawings/diagrams and outline requirements for the creation of the chosen solution</p> <p>Design C:</p> <p>lii. follow the plan to create the solution, which functions as intended</p> <p>Design D:</p> <p>li. explain the success of the solution against the design specification</p> <p>lii. describe how the solution could be improved</p>		
Approaches to learning (ATL)		
<p>Category: Communication</p> <p>Cluster: Communication Skills</p> <p>Skill Indicator: Make inferences and draw conclusions.</p>		

<u>Learning Experiences</u> Add additional rows below as needed.		
Objective or Content	Learning Experiences	Personalized Learning and Differentiation
S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter. a. Develop and use a model to compare and contrast pure substances (elements and compounds) and mixtures. (Clarification statement: Include heterogeneous and homogeneous mixtures. Types of bonds and compounds will be addressed in high school physical science.)	<ul style="list-style-type: none"> Identifying Pure Substances and Mixtures Activity Design a Filtration System for Clean Water (Design A-D) 	
		<ul style="list-style-type: none"> Discovery Education Science Techbook NGSS Case Studies for Differentiated Learners Next 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>Task-Specific Differentiation</p> <ul style="list-style-type: none"> Scaffolding Leveled Tasks Design Choices Using a Variety of Materials Mode/Method of Representation/Presentation (text, videos, laboratory investigations, design challenges) Final Product
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.	<ul style="list-style-type: none"> Lab: Observing and Using Physical and Chemical Properties to Identify Mystery Substances (Science B-C) Lab: Density of Unknown Objects/ Will it Sink or Float? 	
S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter. d. Construct an argument based on	<ul style="list-style-type: none"> Lab Stations: Observing and Identifying Physical vs. Chemical Changes (Science B-C) Design a Filtration System for Clean Water (Design A-D) 	

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.)		
S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter. 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.)	<ul style="list-style-type: none">• Law of Conservation of Matter Practice: Identifying Balanced and Unbalanced Equations• Lab: Chemical Reactions and the LOCOM (Science B,C)	
Content Resources		
Georgia Grade 8 Science: Structure and Properties of Matter Instructional Segment: Dinner is Ready		
<u>Discovery Education Grade 8 Science Techbook</u> Unit 1: Matter Concept 1.1: Combining and Separating Concept 1.2: Characteristics and Properties of Matter		
<u>Mosa Mack</u> Matter and its Interactions		
Argument Driven Inquiry in Physical Science Lab 2: Chemical and Physical Changes: What Set of Rules Should We Use to Distinguish Between Chemical and Physical Changes in Matter 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?		