Marietta City Schools

District Unit Planner

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

Honors Science 8

Unit title	*Classification & Properties of Matter*	**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.

- 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.)
- 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.)

Gifted Standards

MCS. Gifted. S1C. Gather, organize, analyze, evaluate and synthesize data from multiple sources for research applications.
MCS. Gifted.S2B. Develop and apply the cognitive components of creative thinking; fluency, flexibility, originality, and elaboration.
MCS. Gifted. S2D. Apply components of creative thinking in finding, solving and evaluating solutions to authentic real-world problems and dilemmas.
MCS. Gifted. S5E. Use a variety of ulti-media and innovative technologies as tools to effectively communicate the individual or collaborative group work.

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

a. Plan and carry out investigations of physical changes by manipulating, separating, and mixing dry and liquid materials.
b. 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 causes small particles that cannot be seen to move differently.
c. 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)
- Mixtures and Solutions
- Elements and Compounds
- Chemical and Physical Properties and Changes

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

Year-Long Anchoring Phenomena: (LEARNING PROCESS)
How does matter and energy interact within the universe?

Unit Phenomena (LEARNING PROCESS)
How can chemical or physical properties of pure substances and mixtures help identify sustainable fuel options for aircraft?

CER: Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative and summative assessment.

Capstone Connective Theme:
Sustainable Fuel Sources for Aviation

UN Sustainable Development Goals:
7-Affordable and Clean Energy
9- Industry, Innovation and Infrastructure
12-Responsible Consumption and Production
13-Climate Action

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 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.

Key concept	Related concept(s)	Global context
Change (MYP/CCC) Change is a conversion, transformation, or movement from one form, state, or value to another. Inquiry into the concept of change	Models (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

involves understanding and evaluating causes, processes, and consequences.		and technological advances on society and on the environment.

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

Inquiry questions

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

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?

Debatable
Given a scenario, am I observing a physical or chemical change?
How can I uncover the identity of a mystery substance?
How can I use physical and chemical properties to design a water filtration system?

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	SOI: Scientific and technical innovations allow us to visualize, model, and explain properties of and changes in systems of matter. 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.	**Formative Assessment(s):** Pure Substances and Mixtures CFA **Summative Assessment(s):** Classification and Properties of Matter Paper I
Approaches to learning (ATL)		
Category: Communication **Cluster:** Communication Skills **Skill Indicator:** Make inferences and draw conclusions.		

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.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.)	• Identifying Pure Substances vs. Mixtures Activity • Water Filtration Design Challenge • Demo: Separating Mixtures	• 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.	• CER: Observing Physical/Chemical Properties/Changes with Stations • Water Filtration Design Challenge • Lab: Density of Unknown Objects - Will it Sink or Will It Float?	
S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter.	• Water Filtration Design Challenge • Discovery Education: Sustainable Aviation: Fermentation Lab	

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 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
Structure and Properties of Matter

Discovery Education Grade 8 Science Techbook
Unit 1 Matter
-Concept 1.1: Combining and Separating
-Concept 1.2 Characteristic Properties of Matter

Discovery Education Chemistry Science Techbook

Discovery Education: Boeing Partnership

Capstone Connections

Discovery Education: Sustainable Aviation: Fermentation Lab

Capstone Experience: Delta Flight Museum

Final Capstone Idea Submission

Capstone Research