Marietta City Schools

2025–2026 District Unit Planner

Accelerated Physical Science

Unit title	*Properties of Matter*	**MYP year**	*3*	**Unit duration (hrs)**	*13 Hours*

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

GA DoE Standards

Standards

SPS5. Obtain, evaluate, and communicate information to compare and contrast the phases of matter as they relate to atomic and molecular function.
a. Ask questions to compare and contrast models depicting the particle arrangement and motion in solids, liquids, gasses, and plasmas.
b. Plan and carry out investigations to identify the relationships among temperature, pressure, volume, and density of gasses in closed systems. (Clarification statement: Using specific gas laws to perform calculations is beyond the scope of this standard; emphasis should focus on the conceptual understanding of the behavior of gasses rather than calculations.)

SPS7. Obtain, evaluate, and communicate information to explain transformations and flow of energy within a system.
d. Analyze and interpret data to explain the flow of energy during phase changes using heating/cooling curves.

MCS Gifted Standards:

- **MCS.Gifted.S1A.** Formulate thought-provoking questions to guide in depth research.
- **MCS.Gifted.S1B.** Devise and manage a research plan.
- **MCS.Gifted.S4A.** Develop skills and techniques associated with effective verbal and non-verbal communication, adjusting for a given audience or task.

Prior Student Knowledge: (REFLECTION – PRIOR TO TEACHING THE UNIT)
S4E3. Obtain, evaluate and communicate information to demonstrate the water cycle.
a. Plan and carry out investigations to observe the flow of energy in water as it changes states from solid (ice) to liquid (water) to gas (water vapor) and changes from gas to liquid to solid.

In fifth grade, students investigate the following:
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 physical changes in the state of water are due to temperature changes, which cause 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). These students have not been exposed to the 8 th Science GSE that lay the foundation for the high school Physical Science standards.

Concepts/Skills to be Mastered by Students

- Matter
- Structure of atoms and elements
- Thermal Energy
- Gas Laws
- Energy Transformations
- Heating/Cooling Curves

Key Vocabulary: (KNOWLEDGE & SKILLS)
Pure substance, element, compound, homogeneous mixture, heterogeneous mixture, charge, physical properties, chemical properties, physical change, chemical change, density, pressure, volume, temperature, kinetic energy, solid, liquid, gas, plasma, melting point, boiling point, freezing/melting, condensation/evaporation, sublimation, deposition, heating/cooling curves

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

Unit Phenomena (LEARNING PROCESS)
How can we use our understanding of particle arrangement and Gas Laws to explain why certain objects can explode due to different temperatures or altitudes?

Possible Preconceptions/Misconceptions: (REFLECTION – PRIOR TO TEACHING THE UNIT)
Students may struggle to discern between pure substances: elements, molecules, and compounds. Students often come with a basic understanding of solids, liquids, and gases. Students may have difficulty interpreting the plateaus of heating/cooling curves. Students may struggle to visualize and model the relationship between pressure and volume.

Key concept	Related concept(s)	Global context
Systems and system models (MYP/CCC) Systems are sets of interacting or interdependent components. Systems provide structure and order in human, natural and built environments. Systems can be static or dynamic, simple or complex.	Transformation	**Scientific and Technical Innovation** 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.
Statement of inquiry		
Scientific and technical advancements have led to the development of models to make sense of changes in systems.		
Inquiry questions		
Factual:		

What are systems?
What are the differences between solids, liquids, gasses, and plasma?
What is a heating/cooling curve?
What is density?
What relationships exist between temperature, volume, and pressure?

Conceptual:

Why would we use models to represent interactions within systems?
How is matter classified? How do physical properties describe matter?
Why is density a physical property of matter?
How do physical changes (of state) and chemical changes of matter compare?
How do the states of matter compare in energy and particle motion?
How do I interpret graphs of P vs. T, V vs. T, and P vs. V?

Debatable:
Which models out of a given selection would be the best to represent transformations within a given system?
Given a scenario, what are some factors that could cause the implosion or explosion of a substance?

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 i. describe scientific knowledge ii. apply scientific knowledge to solve problems set in familiar and unfamiliar situations iii. analyze information to make scientifically supported judgments Criterion B:	SOI: Scientific and technical advancements have led to the development of models to make sense of changes in systems. Students are required to demonstrate their understanding of SPS5 and SPS7.d., which includes the motion and particle arrangement of solids, liquids, and gasses; the behavior of gasses when certain variables are altered; and the interpretation of heating/cooling curves as a substance changes state, through the completion of a multiple-choice, standards-aligned unit assessment that mimics the GA Milestones. The assessment requires students to analyze and interpret models and graphs in order to identify key scientific concepts as well as the relationships between specific variables.	**Formative Assessment(s):** CFA: States of Matter **Summative Assessment(s):** Properties of Matter Unit Assessment Paper I and Paper II

i. describe a problem or question to be tested by a scientific investigation Criterion C: Processing and Evaluating i. present collected and transformed data ii. interpret data and describe results using scientific reasoning Criterion D: Reflecting on the Impacts of Science iii. apply scientific language effectively		

Approaches to learning (ATL)
Category: Self-Management **Cluster:** Organization **Skill Indicator:** Bring necessary equipment and supplies to class.

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
SPS5. Obtain, evaluate, and communicate information to compare and contrast the phases of matter as they relate to atomic and molecular function. a. Ask questions to compare and contrast models depicting the particle arrangement and motion in solids, liquids, gasses, and plasmas.	● Reviewing States of Matter using PhET Sim and CERs	● Discovery Education High School Chemistry Science Techbook ● NGSS Case Studies for Differentiated Learners ● Next Generation Science Standards: "All Standards, All Students" ● Extensions – Enrichment Tasks/Projects

<table>
<tr><td>SPS5. Obtain, evaluate, and communicate information to compare and contrast the phases of matter as they relate to atomic and molecular function.
b. Plan and carry out investigations to identify the relationships among temperature, pressure, volume, and density of gasses in closed systems.</td><td>● Lab: Investigating Density (Science: A,C,D)
● Lab: Investigating Gas Laws Using Syringes (Science: A,C,D)
● Elaboration: Gas Laws Scenarios</td><td rowspan="3">All information included by PLC in the differentiation box is the responsibility and ownership of the local school to review and approve per Board Policy IKB.

Task-Specific Differentiation

● Modeling
● Graphic Organizers
● Extended Learning
● Mode/Method of Presentation
● Type of Product</td></tr>
<tr><td>SPS7. Obtain, evaluate, and communicate information to explain transformations and flow of energy within a system.
d. Analyze and interpret data to explain the flow of energy during phase changes using heating/cooling curves.</td><td>● Analyzing and Interpreting Heating/Cooling Curves</td></tr>
<tr><td colspan="2">Content Resources</td></tr>
<tr><td colspan="3">Discovery Education High School Chemistry Science Techbook

Holt Science Spectrum Physical Science Textbook

PhET Sims: States of Matter; Gases Intro

GaDOE Instructional Segment: The Case of the Exploding Chip Bag

Boiling Ice Lab Data Set</td></tr>
</table>