

GIPS Pre AP Chemistry Design Map

Units (in sequence)	Estimated Time Frame (days)	K-12 Program Strands With Corresponding Course/Grade Level Standards	K-12 Program Enduring Understandings (for content only)	K-12 Program Essential Questions (for content only)	Unit Assessments (note if optional)	C/GL Key Vocabulary Concepts
Unit 1 Matter	10 Days	<p>Physical Science 2.1 Chemical & Physical Properties of Matter</p> <p>Describe and explain the composition of matter and classify types of matter, and the changes that can occur to matter</p>	<p>All matter is made up of relatively few kinds of basic materials combined in various ways.</p> <p>The way matter can be separated determines what type of matter it is.</p> <p>The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.</p> <p>See strand one for full text.</p>	<p>How do scientists distinguish between objects? What do they learn from the comparisons?</p> <p>How do the properties of a substance determine its use?</p> <p>How does the structure of the atom affect the physical and chemical properties of the atom?</p>	<p>Structured Response</p> <p>Constructed Response and Performance</p>	<ul style="list-style-type: none"> -conservation of matter -physical states of matter -atomic structure -mixture -physical/chemical properties and changes of matter -compound -element -molecule -measurement -density -significant figures -dimensional analysis -energy -electromagnetic radiation -wave-mechanical model -Periodic table -Ion -Bonding -Valence-shell electron pair repulsion theory -Lewis structure -balanced chemical equation -atomic/molecular mass -Mole -Avogadro's number -system -ideal gas laws -pressure -kinetic molecular theory -concentration -acid/base -pH/indicators -titration -neutralization
Unit 2 Measurement	10-15 Days	<p>Scientific Inquiry Integrated Science</p> <p>Use technology, observations and mathematics to improve investigations and communications.</p>	<p>Scientists analyze data to determine what evidence is valid and how that informs what they do/think.</p> <p>Descriptions of change are necessary to reasonably predict what will happen.</p> <p>Scientific inquiry progresses through a continuous process of questioning, data collection, analysis, and interpretation. [There is no fixed set of steps that scientists follow, no one path that lead to scientific knowledge.]</p> <p>See strand one for full text.</p>	<p>What information do I have? What information do I need? How do I get that information?</p> <p>How do I collect and record data to remember what is important?</p> <p>When do I have enough data to support my thinking?</p> <p>Do the results make sense?</p>	<p>Structured Response</p> <p>Constructed Response</p> <p>Performance Lab</p>	<ul style="list-style-type: none"> -balanced chemical equation -atomic/molecular mass -Mole -Avogadro's number -system -ideal gas laws -pressure -kinetic molecular theory -concentration -acid/base -pH/indicators -titration -neutralization

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Unit 3 Atomic Structure	10 Days	<p>Physical Science 2.1 Chemical & Physical Properties of Matter</p> <p>Analyze and use atomic structure to predict reactivity, bonding, formulas, and trends in the periodic table</p>	<p>All matter is made up of relatively few kinds of basic materials combined in various ways.</p> <p>The way matter can be separated determines what type of matter it is.</p> <p>The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.</p> <p>See strand one for full text.</p>	<p>How do scientists distinguish between objects? What do they learn from the comparisons?</p> <p>How do the properties of a substance determine its use?</p> <p>How does the structure of the atom affect the physical and chemical properties of the atom?</p>	Structured Response Constructed Response	
Unit 4 Quantum Theory	10-15 Days	<p>Physical Science 2.1 Chemical & Physical Properties of Matter</p> <p>Analyze and use atomic structure to predict reactivity, bonding, formulas, and trends in the periodic table</p> <p>Physical Science 2.3 Matter & Energy</p> <p>Describe and explain the wave and particle nature of the electron and its impact on spectroscopy as well as how an atom's electron configuration impacts the atom's properties</p>	<p>All matter is made up of relatively few kinds of basic materials combined in various ways..</p> <p>The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.</p> <p>The total amount of matter and energy remains constant, even though their form and location undergo continual change.</p> <p>Although the various forms of energy seem very different in a way that makes it possible to keep track of how much of one form is converted into another.</p> <p>Vibrations (waves) carry energy away from its source.</p> <p>Different wavelengths interact with matter in different ways.</p> <p>See strand one for full text.</p>	<p>How do scientists distinguish between objects? What do they learn from the comparisons?</p> <p>How does the structure of the atom affect the physical and chemical properties of the atom?</p> <p>How does energy change?</p> <p>Where does energy com from? Where does it go?</p> <p>How does energy, matter, and/or momentum, remain constant in a closed system?</p> <p>How does energy flow and how is it transmitted?</p>	Structured Response Constructed Response	

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Unit 5 Periodic Properties	7 Days	<p><u>Physical Science</u> 2.1 Chemical & Physical Properties of Matter</p> <p>Analyze and use atomic structure to predict reactivity, bonding, formulas, and trends in the periodic table</p> <p>Describe and explain the wave and particle nature of the electron and its impact on spectroscopy as well as how an atom's electron configuration impacts the atom's properties</p>	<p>All matter is made up of relatively few kinds of basic materials combined in various ways.</p> <p>When two or more substances interact to form new substances, the properties of the new combinations may be very different from those of the old.</p> <p>The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.</p> <p>See strand one for full text.</p>	<p>How do scientists distinguish between objects? What do they learn from the comparisons?</p> <p>How do the properties of a substance determine its use?</p> <p>How does the structure of the atom affect the physical and chemical properties of the atom?</p>	Structured Response Constructed Response	
Unit 6 Bonding	10-15 Days	<p><u>Physical Science</u> 2.1 Chemical & Physical Properties of Matter</p> <p><u>Physical Science</u> 2.2 Motions & Forces</p> <p><u>Physical Science</u> 2.3 Matter & Energy</p> <p>Analyze and use atomic structure to predict reactivity, bonding, formulas, and trends in the periodic table</p> <p>Describe and explain the wave and particle nature of the electron and its impact on spectroscopy as well as how an atom's electron configuration impacts the atom's properties</p>	<p>All matter is made up of relatively few kinds of basic materials combined in various ways.</p> <p>The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.</p> <p>The interaction between energy and matter creates forces (pushes and pulls) the produce predicable patterns of change.</p> <p>The total amount of matter and energy remains constant, even though their form and location undergo continual change.</p> <p>Although the various forms of energy seem very different, each can be measured in a way that makes it possible to keep track of how much of one form is converted into another.</p> <p>See strand one for full text.</p>	<p>How do scientists distinguish between objects? What do they learn from the comparisons?</p> <p>How do the properties of a substance determine its use?</p> <p>How does the structure of the atom affect the physical and chemical properties of the atom?</p> <p>How are forces produced? What role do forces play here?</p> <p>How does energy cause change?</p> <p>Where does energy come from? Where does it go?</p> <p>How does energy/matter remain constant even as it changes form?</p>	Structured Response Constructed Response Performance Lab	

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Unit 7 Nomenclature	10-15 Days	<p>Physical Science 2.1 Chemical & Physical Properties of Matter</p> <p>Describe and explain the composition of matter and classify types of matter, and the changes that can occur to matter</p> <p>Classify types of compounds and be able to apply nomenclature rules</p> <p>Analyze and use atomic structure to predict reactivity, bonding, formulas, and trends in the periodic table</p>	<p>All matter is made up of relatively few kinds of basic materials combined in various ways.</p> <p>The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.</p> <p style="text-align: center;">See strand one for full text.</p>	<p>How do scientists distinguish between objects? What do they learn from the comparisons?</p>	<p>Structured Response</p> <p>Constructed Response</p>	
Unit 8 Chemical Reactions #1	?? periods	<p>Physical Science 2.1 Chemical & Physical Properties of Matter</p> <p>Physical Science 2.2 Motions & Forces</p> <p>Physical Science 2.3 Matter & Energy</p> <p>Describe and explain the composition of matter and classify types of matter, and the changes that can occur to matter</p> <p>Analyze and use atomic structure to predict reactivity, bonding, formulas, and trends in the periodic table</p> <p>Identify, analyze and predict types of chemical reactions</p> <p>Describe and explain the wave and particle nature of the electron and its impact on spectroscopy as well as how an atom's electron configuration impacts the atom's properties</p> <p>Analyze factors that affect solubility of solids and calculate solution composition quantities</p>	<p>All matter is made up of relatively few kinds of basic materials combined in various ways.</p> <p>When two or more substances interact to form new substances, the properties of the new combinations may be very different from those of the old.</p> <p>The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.</p> <p>The interaction between energy and matter creates forces (pushes and pulls) the produce predicable patterns of change.</p> <p>The total amount of matter and energy remains constant, even though their form and location undergo continual change.</p> <p style="text-align: center;">See strand one for full text.</p>	<p>What causes a reaction? How do we predict reactions before they happen?</p> <p>How do the properties of a substance determine its use?</p> <p>How does the structure of the atom affect the physical and chemical properties of the atom?</p> <p>How are forces produced? What role do forces play here?</p> <p>How does energy cause change?</p> <p>Where does energy come from? Where does it go?</p> <p>How does energy/matter remain constant even as it changes form?</p> <p>How does energy flow and how is it transmitted?</p>	<p>Structured Response</p> <p>Constructed Response</p> <p>Performance Lab</p>	

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Unit 9 Stoichiometry	10-15 Days	<p>Physical Science 2.3 Matter & Energy</p> <p>Identify, analyze and predict types of chemical reactions</p> <p>Analyze mass quantities in chemical reactions to determine limiting reactants and to do stoichiometric calculations</p>	<p>The total amount of matter and energy remains constant, even though their form and location undergo continual change.</p> <p>Although the various forms of energy seem very different, each can be measured in a way that makes it possible to keep track of how much of one form is converted into another.</p> <p style="text-align: center;">See strand one for full text.</p>	<p>How does energy cause change?</p> <p>Where does energy come from? Where does it go?</p> <p>How does energy/matter remain constant even as it changes form?</p> <p>How does energy flow and how is it transmitted?</p>	Structured Response Constructed Response	
Unit 10 Chemical Reactions #2	10-15 Days	<p>Physical Science 2.1 Chemical & Physical Properties of Matter</p> <p>Physical Science 2.3 Matter & Energy</p> <p>Describe and explain the composition of matter and classify types of matter, and the changes that can occur to matter</p> <p>Classify types of compounds and be able to apply nomenclature rules</p> <p>Analyze and use atomic structure to predict reactivity, bonding, formulas, and trends in the periodic table</p> <p>Identify, analyze and predict types of chemical reactions</p> <p>Identify the general properties of energy and recognize that energy is a driving force for natural processes</p>	<p>When two or more substances interact to form new substances, the properties of the new combinations may be very different from those of the old.</p> <p>The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.</p> <p>The total amount of matter and energy remains constant, even though their form and location undergo continual change.</p> <p>Although the various forms of energy seem very different, each can be measured in a way that makes it possible to keep track of how much of one form is converted into another.</p> <p style="text-align: center;">See strand one for full text.</p>	<p>What causes a reaction? How do we predict reactions before they happen?</p> <p>How do the properties of a substance determine its use?</p> <p>How does energy cause change?</p> <p>Where does energy come from? Where does it go?</p> <p>How does energy/matter remain constant even as it changes form?</p> <p>What happens when a machine is used to do work? Does using this machine make my work easier?</p>	Structured Response Constructed Response Performance Lab	

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Unit 11 Gases	15 Days	<p><u>Physical Science</u> 2.1 Chemical & Physical Properties of Matter</p> <p><u>Physical Science</u> 2.3 Matter & Energy</p> <p>Describe and explain the composition of matter and classify types of matter, and the changes that can occur to matter</p> <p>Analyze and use atomic structure to predict reactivity, bonding, formulas, and trends in the periodic table</p> <p>Identify, analyze and predict types of chemical reactions</p> <p>Explain gas laws and analyze the relationship between gas laws and the kinetic molecular theory</p>	<p>All matter is made up of relatively few kinds of basic materials combined in various ways.</p> <p>When two or more substances interact to form new substances, the properties of the new combinations may be very different from those of the old.</p> <p>The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.</p> <p>The total amount of matter and energy remains constant, even though their form and location undergo continual change.</p> <p style="text-align: center;">See strand one for full text.</p>	<p>How do scientists distinguish between objects? What do they learn from the comparisons?</p> <p>How do the properties of a substance determine its use?</p> <p>How does the structure of the atom affect the physical and chemical properties of the atom?</p> <p>How does energy/matter remain constant even as it changes form?</p>	<p style="text-align: center;">Structured Response Constructed Response</p> <p style="text-align: center;">Performance Lab</p> <p style="text-align: center;">Oral Presentation and Demonstration</p>	
Unit 12 Solutions	10-12 Days	<p>Describe and explain the composition of matter and classify types of matter, and the changes that can occur to matter</p> <p>Classify types of compounds and be able to apply nomenclature rules</p> <p>Analyze and use atomic structure to predict reactivity, bonding, formulas, and trends in the periodic table</p> <p>Identify, analyze and predict types of chemical reactions</p> <p>Analyze factors that affect solubility of solids and calculate solution composition quantities</p>	<p>All matter is made up of relatively few kinds of basic materials combined in various ways.</p> <p>When two or more substances interact to form new substances, the properties of the new combinations may be very different from those of the old.</p> <p>The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.</p> <p>The total amount of matter and energy remains constant, even though their form and location undergo continual change.</p> <p style="text-align: center;">See strand one for full text.</p>	<p>How do scientists distinguish between objects? What do they learn from the comparisons?</p> <p>How do the properties of a substance determine its use?</p> <p>How does the structure of the atom affect the physical and chemical properties of the atom?</p> <p>How does energy/matter remain constant even as it changes form?</p>	<p style="text-align: center;">Structured Response Constructed Response</p> <p style="text-align: center;">Performance Lab</p>	

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Unit 13 Bases	10-12 Days	<p>Describe and explain the composition of matter and classify types of matter, and the changes that can occur to matter</p> <p>Classify types of compounds and be able to apply nomenclature rules</p> <p>Analyze and use atomic structure to predict reactivity, bonding, formulas, and trends in the periodic table</p> <p>Identify, analyze and predict types of chemical reactions</p> <p>Analyze factors that affect solubility of solids and calculate solution composition quantities</p> <p>Investigate and describe the pH scale and the differences between acids and bases</p>	<p>All matter is made up of relatively few kinds of basic materials combined in various ways.</p> <p>When two or more substances interact to form new substances, the properties of the new combinations may be very different from those of the old.</p> <p>The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.</p> <p>The total amount of matter and energy remains constant, even though their form and location undergo continual change.</p> <p style="text-align: center;">See strand one for full text.</p>	<p>How do scientists distinguish between objects? What do they learn from the comparisons?</p> <p>How do the properties of a substance determine its use?</p> <p>How does the structure of the atom affect the physical and chemical properties of the atom?</p> <p>How does energy/matter remain constant even as it changes form?</p>	<p>Structured Response</p> <p>Constructed Response</p> <p>Performance Lab</p>	
Chemistry Projects	Year-long	<p>Scientific Inquiry Integrated Science Components</p> <p>Develop an understanding of the major unifying concepts</p> <p>Investigate and understand that scientists, past and present, have different abilities, technologies, qualities, theories, and scientific habits of mind (e.g., ethics)</p> <p>Understand the role of science in making informed decisions</p>	<p>Scientists analyze data to determine what evidence is valid and how that informs what they do/think.</p> <p>Peer review is an expectation in the establishment of the veracity of data.</p> <p>Quality scientific writing presents data in relation to the original hypothesis and effectively explains what happened and possible next steps (both predictions for future investigations, impact of trends).</p> <p>The way research is presented should be done mindful of both the science involved and the scientific knowledge base of the audience.</p> <p style="text-align: center;">See strand one for full text.</p>	<p>What information do I have? What information do I need? How do I get that information?</p> <p>How do I collect and record data to remember what is important?</p> <p>Who is my audience? How does that affect the way I communicate data and ideas?</p> <p>How do scientists handle different points of view on the same issue?</p>	<p>Ongoing Performances</p> <p>-Scientist Project</p> <p>-Element Search Around Us</p> <p>-Scavenger Hunt</p>	