

IB CHEMISTRY YEAR 1 - Unit 1

IB Chemistry PLC		Subject Group and Course	Group 4 - Chemistry		
Course Part and Topic	1.1 - Introduction to the Particulate Nature of Matter and Chemical Change 1.2 - The Mole Concept 2.1 - The Nuclear Atom 3.1 - The Periodic Table	SL or HL / Year 1 or 2	SL Year 1	Dates	August to October 2022
Unit Description and Texts		DP Assessment(s) for Unit			
<ul style="list-style-type: none"> Murphy et al. <i>Oxford IB Diploma Programme: Chemistry Course Companion</i>, 2014 edition. Brown and Ford. <i>Pearson Baccalaureate Standard Level Chemistry</i>, 2nd edition. 		<ul style="list-style-type: none"> Unit 01 Summative Assessment - <i>Paper 1, 2, and 3 questions from old IB Papers</i> 			

INQUIRY: establishing the purpose of the unit

<p>Transfer Goals</p> <p>List here one to three big, overarching, long-term goals for this unit. Transfer goals are the major goals that ask students to “transfer” or apply their knowledge, skills, and concepts at the end of the unit under new/different circumstances, and on their own without scaffolding from the teacher.</p>
<p><u>Phenomenon</u>: When magnesium metal (Mg) is burned in air (O₂), a white solid product is produced; the formula for this product can be experimentally confirmed to be MgO (1:1 ratio of Mg:O).</p> <p><u>Statement of Inquiry</u>: Chemical change involves interactions between particles of fixed mass.</p> <ol style="list-style-type: none"> Students can balance any chemical equation, including state symbols and correct formulas. Students can use the mole concept to convert between the number of particles, amount of substance, and mass. Students can determine an empirical formula and molecular formula given percentage composition by mass and molar mass. Students can interpret the mass spectrum for an element and determine the relative atomic mass.

ACTION: teaching and learning through inquiry

Content / Skills / Concepts - Essential Understandings	Learning Process
<p>Students will UNDERSTAND the following CONTENT:</p> <ul style="list-style-type: none"> • Atoms of different elements combine in fixed ratios to form compounds, which have different properties from their component elements • Mixtures contain more than one element and/or compound that are not chemically bonded together and so retain their individual properties • Mixtures are either homogeneous or heterogeneous • The mole is a fixed number of particles and refers to the amount, n, of substance • Masses of atoms are compared on a scale relative to ^{12}C and are expressed as relative atomic mass (A_r) and relative formula/molecular mass (M_r) • Molar mass (M) has the units g mol^{-1} • The empirical formula and molecular formula of a compound give the simplest ratio and the actual number of atoms present in a molecule respectively • Atoms contain a positively charged dense nucleus composed of protons and neutrons (nucleons) • Negatively charged electrons occupy the space outside the nucleus • The mass spectrometer is used to determine the relative atomic mass of an element from its isotopic composition • The periodic table is arranged into four blocks associated with the four sublevels—s, p, d, and f • The periodic table consists of groups (columns) and periods (rows) • The period number (n) is the outer energy level that is occupied by electrons • The number of the principal energy level and the number of the valence electrons in an atom can be deduced from its position on the periodic table • The periodic table shows the positions of metals, nonmetals and metalloids <p>Students will DEVELOP the following SKILLS:</p> <ul style="list-style-type: none"> • Deduce a chemical equation when reactants and products are specified, including state symbols (s), (l), (g), (aq) • Balance any chemical equation • Identify and describe all changes of state (melting, freezing, vaporization, condensation, sublimation, deposition) in terms of particle motion and temperature • Explain observable changes in physical properties and temperature during changes of state • Determine an empirical formula from percentage composition by mass • Determine percentage composition by mass when given an empirical formula • Determine a molecular formula from an empirical formula and molar mass • Lab: Determine the empirical formula of a hydrate experimentally (mass before and after dehydration) 	<p><i>Check the boxes for any pedagogical approaches used during the unit. Aim for a variety of approaches to help facilitate learning.</i></p> <p>Learning experiences and strategies/planning for self-supporting learning:</p> <p><input checked="" type="checkbox"/> Lecture</p> <p><input type="checkbox"/> Socratic seminar</p> <p><input checked="" type="checkbox"/> Small group/pair work</p> <p><input checked="" type="checkbox"/> PowerPoint lecture/notes</p> <p><input checked="" type="checkbox"/> Individual presentations</p> <p><input checked="" type="checkbox"/> Group presentations</p> <p><input checked="" type="checkbox"/> Student lecture/leading</p> <p><input type="checkbox"/> Interdisciplinary learning</p> <p>Details:</p> <p><i>Students will learn through a combination of presentations, small group work, practice problems, and lab work.</i></p> <p><input checked="" type="checkbox"/> Other(s): <i>practice problems, lab work</i></p> <p>Formative assessment(s):</p> <p><i>Short closer quizzes for each lesson</i> <i>Daily formative checks</i></p>

<ul style="list-style-type: none"> • Deduce the number of protons, neutrons, and electrons in an atom or ion from nuclear notation • Calculate relative atomic mass and natural abundance from data that includes mass spectra • Deduce the electron configuration of an atom from its position on the periodic table (and vice versa) 	<p>Summative assessments:</p> <p><i>Topic test consisting of Paper 1, Paper 2, and Paper 3 questions</i></p> <p><i>Lab Report: Empirical Formula of a Hydrate</i></p> <hr/> <p>Differentiation:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Affirm identity - build self-esteem <input checked="" type="checkbox"/> Value prior knowledge <input checked="" type="checkbox"/> Scaffold learning <input checked="" type="checkbox"/> Extend learning <p>Details:</p> <ul style="list-style-type: none"> • <i>SWD/504 – Accommodations Provided</i> • <i>ELL – Reading & Vocabulary Support</i> • <i>Intervention Support</i> • <i>Extensions – Enrichment Tasks and Project</i>
<p>Approaches to Learning (ATL)</p> <p><i>Check the boxes for any explicit approaches to learning connections made during the unit. For more information on ATL, please see the guide.</i></p>	
<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Thinking <input checked="" type="checkbox"/> Social <input checked="" type="checkbox"/> Communication <input checked="" type="checkbox"/> Self-management 	

<p><input checked="" type="checkbox"/> Research</p> <p>Details:</p> <p><i>Students will be continuously challenged to develop higher-order thinking skills as they take prior knowledge, combine it with new content, and synthesize a lab report.</i></p> <p><i>Students will build social groups through group work and intentional reflection activities.</i></p> <p><i>Students will communicate their findings to their peers in the form of small-group presentations.</i></p> <p><i>Students will continue to work on self-management and organization skills.</i></p> <p><i>Students will complete background research for their lab report.</i></p>
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Language and Learning	TOK Connections	CAS Connections
<p><i>Check the boxes for any explicit language and learning connections made during the unit. For more information on the IB's approach to language and learning, please see the guide.</i></p>	<p><i>Check the boxes for any explicit TOK connections made during the unit</i></p>	<p><i>Check the boxes for any explicit CAS connections. If you check any of the boxes, provide a brief note in the "details" section explaining how students engaged in CAS for this unit.</i></p>
<p><input checked="" type="checkbox"/> Activating background knowledge</p> <p><input checked="" type="checkbox"/> Scaffolding for new learning</p> <p><input checked="" type="checkbox"/> Acquisition of new learning through practice</p> <p><input checked="" type="checkbox"/> Demonstrating proficiency</p> <p>Details:</p> <p><i>Content and vocabulary introduced in previous science courses will be used in this unit.</i></p>	<p><input type="checkbox"/> Personal and shared knowledge</p> <p><input checked="" type="checkbox"/> Ways of knowing</p> <p><input type="checkbox"/> Areas of knowledge</p> <p><input type="checkbox"/> The knowledge framework</p> <p>Details:</p> <p><i>What is the relationship between the AOKs of mathematics and natural science?</i></p>	<p><input checked="" type="checkbox"/> Creativity</p> <p><input type="checkbox"/> Activity</p> <p><input type="checkbox"/> Service</p> <p>Details:</p> <p><i>Students will be encouraged to consider the creativity involved in scientific experimentation. Students can explore alternative ways (visual, for example) to express and explain this creativity to others.</i></p>

<p><i>Students will use many of the concepts from this unit in future units throughout the two-year course.</i></p> <p><i>Students will acquire new vocabulary.</i></p> <p><i>Students will continually demonstrate proficiency with chemistry vocabulary in class discussions and group work.</i></p>	<p><i>Additional discussion related to atomic theory and Periodic Table development to explore the methods and tools used to produce knowledge in the Natural Sciences.</i></p>	
<p>Resources</p> <p><i>List and attach (if applicable) any resources used in this unit</i></p>		
<ul style="list-style-type: none"> ● Textbooks (Oxford and Pearson - see page 1) ● Laboratory resources ● Online notes and videos (Schoology) 		

REFLECTION: considering the planning, process, and impact of the inquiry

<p>What worked well</p> <p><i>List the portions of the unit (content, assessment, planning) that were successful</i></p>	<p>What didn't work well</p> <p><i>List the portions of the unit (content, assessment, planning) that were not as successful as hoped</i></p>	<p>Notes / Changes / Suggestions</p> <p><i>List any notes, suggestions, or considerations for the future teaching of this unit</i></p>
<ul style="list-style-type: none"> ● 	<ul style="list-style-type: none"> ● 	<ul style="list-style-type: none"> ●

Curriculum Unit Approval Statement
Every team member is expected to read and review the unit planner and contents contained in the unit planner.

This unit meets the rigorous review and approval process of Marietta City Schools. All components of the unit have been reviewed and approved including learning experiences, materials, resources, texts, and assessments. This unit's components:

- Are aligned to Georgia Standards of Excellence and MYP/DP subject area guide (if applicable)
- Are aligned to the pacing of the approved Subject Group Overview
- Provide resources that are appropriate for students' grade level, subject/course level, etc.
- Provide learning experiences that prepare students for course assessments

PLCs review each learning experience using three criteria and collaborate to provide explicit and specific information.

<p>Criteria I: Standards Alignment:</p> <p><i>Learning experiences should provide alignment to the standards and the MYP subject area guide (if applicable).</i></p>	<p>Criteria II: Materials, Resources, and Text Complexity and Controversial Topics and Issues:</p> <p><i>Materials, resources, and texts are grade level and content appropriate.</i></p>	<p>Criteria III: Assessment Alignment:</p> <p><i>Since assessment drives instruction, learning experiences must align to and prepare students for regular common formative and summative assessments used to determine whether students are mastering standards-based content and ATL skills.</i></p>
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Common Formative and Summative Assessments		
Assessment Title	<p>Criteria I: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding the <u>alignment of learning experiences, materials, and resources to:</u></p> <ol style="list-style-type: none"> State Standards MYP/DP (if applicable) components Aligned to learning experiences <p>Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution.</p>	<p>Criteria II: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding</p> <ol style="list-style-type: none"> Complexity of resources including text and vocabulary Controversial topics and issues in learning experiences, materials or resources <p>Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution. Include the specific quote(s) and reference page numbers or location (ex: time in video).</p>
Formative Assessment(s):	N/A	N/A
Summative(s) Assessment:	N/A	N/A
Plan to address issues or concerns noted:		

Learning Experiences			
Add additional rows below as needed.			
Learning Experience Title	Criteria I: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding the <u>alignment of learning experiences, materials, and resources</u> to: <ol style="list-style-type: none"> 1. State Standards 2. MYP/DP (if applicable) components Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution.	Criteria II: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding <ol style="list-style-type: none"> 1. Complexity of resources including text and vocabulary 2. Controversial topics and issues in learning experiences, materials or resources Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution. Include the specific quote(s) and reference page numbers or location (ex: time in video).	Criteria III: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding <ol style="list-style-type: none"> 1. Common Assessment alignment to instruction and/or standards Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution.
LE 1:	N/A	N/A	N/A
LE 2:	N/A	N/A	N/A
LE 3:	N/A	N/A	N/A
Plan to address issues or concerns noted:			

Resources listed on unit planner			
Add additional rows below as needed.			
Resources	Criteria I: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding the <u>alignment of learning experiences, materials, and resources</u> to: <ol style="list-style-type: none"> State Standards MYP/DP (if applicable) components Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution.	Criteria II: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding <ol style="list-style-type: none"> Complexity of resources including text and vocabulary Controversial topics and issues in learning experiences, materials or resources Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution. Include the specific quote(s) and reference page numbers or location (ex: time in video).	Criteria III: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding <ol style="list-style-type: none"> Common Assessment alignment to instruction and/or standards Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution.
Resource:	N/A	N/A	N/A
Plan to address issues or concerns noted:			

By typing my name below I am acknowledging that I have fully read, reviewed, listed concerns with resolutions, and approved of all contents included in the unit planner including learning experiences, materials, resources, texts, and assessments referenced on it. All other content and materials not included on the unit planner are the local school's responsibility (BOE IKB).

Curriculum Team Signatures:

Cody Morelock, PhD

Audrey Wakeley