

# FRANKLIN-SIMPSON HIGH SCHOOL

Course Name: Chemistry

Unit Name: Language of Chemistry: Part I

Days: 11

## Quality Core Objectives:

Unit 3 Language of Chemistry: Part I	
I.A.1. Scientific Inquiry	c. Collect, organize, and analyze data accurately and use techniques and equipment appropriately
	d. Interpret results and draw conclusions, revising hypotheses as necessary and/or formulating additional questions or explanations
	e. Write and speak effectively to present and explain scientific results, using appropriate terminology and graphics
	f. Safely use laboratory equipment and techniques when conducting scientific investigations
	g. Routinely make predictions and estimations
I.A.2. Mathematics and Measurement in Science	a. Distinguish between precision and accuracy with respect to experimental data
	b. Use appropriate SI units for length, mass, time, temperature, quantity of matter, area, volume, and density; describe the relationships among SI unit prefixes (e.g., centi-, milli-, kilo-); recognize commonly used non-SI units
	c. Use the correct number of significant figures in reporting measurements and the results of calculations
	d. Use appropriate statistical methods to represent the results of investigations
	g. Use graphical, mathematical, and/or statistical models to express patterns and relationships inferred from sets of scientific data
I.A.3. Science in Practice	a. Explain and apply criteria that scientists use to evaluate the validity of scientific claims and theories
	b. Explain why experimental replication and peer review are essential to eliminate as much error and bias as possible in scientific claims
	c. Explain the criteria that explanations must meet to be considered scientific (e.g., be consistent with experimental/observational evidence about nature, be open to critique and modification, use ethical reporting methods and procedures)
	e. Use a variety of appropriate sources (e.g., Internet, scientific journals) to retrieve relevant information; cite references properly
II.A.2. Elements, Atomic Mass, and Nomenclature	a. Use the IUPAC symbols of the most commonly referenced elements
	b. Compare the characteristics of elements, compounds, and mixtures
	c. Compare characteristics of isotopes of the same element

III.A.1. Empirical Formulas, Molecular Formulas, and Percentage Composition	a. Distinguish between chemical symbols, empirical formulas, molecular formulas, and structural formulas
	b. Interpret the information conveyed by chemical formulas for numbers of atoms of each element represented
	c. Use the names, formulas, and charges of commonly referenced polyatomic ions
	d. Provide the interconversion of molecular formulas, structural formulas, and names, including common binary and ternary acids
	e. Calculate the percent composition of a substance, given its formula or masses of each component element in a sample
	g. Determine percent composition experimentally and derive empirical formulas from the data (e.g., for hydrates)
	IV.B.2. Periodic Table and Periodicity
c. Use the periodic table to determine the atomic number; atomic mass; mass number; and number of protons, electrons, and neutrons in isotopes of elements	
d. Calculate the weighted average atomic mass of an element from isotopic abundance, given the atomic mass of each contributor	

**Purpose of the Unit:** The purpose of this unit is to familiarize students with some of the basics of the language scientists use that is specific to chemistry. Students will learn the names and symbols of the commonly used elements, polyatomic ions, and acids. Students will also learn about the different types of formulas used to represent compounds and structures of those compounds. Students will learn how to use information on the periodic table to determine the number of protons, neutrons and electrons in different isotopes of elements as well as find the average atomic mass. Finally students will determine the empirical formulas of hydrates experimentally.

**Prerequisites:** Students should be able to:

- Use the symbols and names for elements 1-20
- Calculate protons, neutrons, electrons, atomic mass, and atomic number for an element
- Calculate percentages
- Compare characteristics of isotopes
- Distinguish between elements, compounds and mixtures

## Daily Lesson Guide

Day	Lesson Content and Objectives	Focus Questions	Critical Thinking (High Yield / Literacy /LTF/etc.)	Engagement	Assessment and/or Accommodations
1	<ul style="list-style-type: none"> <li>* Element names and symbols</li> <li>* Polyatomic ion names, symbols, and charges</li> </ul> II.A.2.a III.A.1.c	<ul style="list-style-type: none"> <li>* What names do chemists give to different symbols and combination of symbols?</li> </ul>	<ul style="list-style-type: none"> <li>* Summarizing and note taking</li> <li>* Working with others</li> <li>* Novelty and variety</li> </ul>	<ul style="list-style-type: none"> <li>* Pre test</li> <li>* ACT bell ringer</li> <li>* Self creation of study aides</li> <li>* Quizzes in future over names (formative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate pre test and formative assessment</li> </ul> Accommodations: prompting/ cueing, paraphrasing, reader, scribe, reduced assignment, extended time (as needed)
2	<ul style="list-style-type: none"> <li>* Names of acids</li> <li>* Characteristics of isotopes</li> <li>* Inside the atom</li> </ul> II.A.2.c III.A.1.d IV.B.2.c, d	<ul style="list-style-type: none"> <li>* How are acids named?</li> <li>* How are different atoms alike/ different?</li> </ul>	<ul style="list-style-type: none"> <li>* Summarizing and note taking</li> <li>* Analysis/ application</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Graphic organizer on naming acids</li> <li>* Modeled notes</li> <li>* Practice together (formative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate formative assessment and graphic organizer</li> </ul> Accommodations: prompting/ cueing, paraphrasing, reader, scribe, reduced assignment, extended time (as needed)
3	<ul style="list-style-type: none"> <li>* Average atomic mass</li> </ul> IV.B.2.d	<ul style="list-style-type: none"> <li>* Why are masses on the periodic table decimals and not whole numbers?</li> </ul>	<ul style="list-style-type: none"> <li>* Summarizing and note taking</li> <li>* I Do – We Do – You Do</li> <li>* Ananalysis</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Modeled notes</li> <li>* Practice problems together (formative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate formative assessment</li> </ul> Accommodations: prompting/ cueing, paraphrasing, reader, scribe, reduced assignment, extended time (as needed)
4	<ul style="list-style-type: none"> <li>* Interpreting different types of formulas</li> <li>* Conversions between different types of formulas</li> </ul> III.A.1.a, b, d	<ul style="list-style-type: none"> <li>* What do the different types of formulas represent?</li> <li>* How are they alike/ different?</li> </ul>	<ul style="list-style-type: none"> <li>* Sumarizing and note taking</li> <li>* I Do – We Do – You Do</li> <li>* Similarities and differences</li> <li>* Application/ Analysis</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Modeled notes with graphic organizer</li> <li>* Practice problems together (formative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate formative assessment</li> </ul> Accommodations: prompting/ cueing, paraphrasing, reader, scribe, reduced assignment, extended time (as needed)

5	<ul style="list-style-type: none"> <li>* Percent composition of compounds and hydrates</li> <li>III.A.1.e, g</li> </ul>	<ul style="list-style-type: none"> <li>* How can you use the formula of a compound to determine the percent composition?</li> </ul>	<ul style="list-style-type: none"> <li>* Summarizing and note taking</li> <li>* I Do – You Do – We Do</li> <li>* Application</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Modeled notes</li> <li>* Practice problems together (formative)</li> <li>* MSDS sheet on Epsom salt</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate formative assessment and for understanding of MSDS sheet</li> <li>Accommodations: prompting/ cueing, paraphrasing, reader, scribe, reduced assignment, extended time (as needed)</li> </ul>
6-7	<ul style="list-style-type: none"> <li>* Extra practice with naming elements, compounds, acids, and polyatomic ions</li> <li>II.A.2.a</li> <li>III.A.1.c, d</li> </ul>	<ul style="list-style-type: none"> <li>* What can I do to get better at naming elements, compounds, and ions?</li> </ul>	<ul style="list-style-type: none"> <li>* Novelty and variety</li> <li>* Working with others</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Use flash cards, partners, clickers, etc to practice naming and writing</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate progress with periodic quizzes (these will continue throughout the year)</li> <li>Accommodations: prompting/ cueing, paraphrasing, reader, scribe, reduced assignment, extended time (as needed)</li> </ul>
8-9	<ul style="list-style-type: none"> <li>* Laboratory: Formula of a hydrate</li> <li>I.A.1.c, d, e, f, g</li> <li>I.A.2.a, b, c, d, g</li> <li>I.A.3.a, b, c, d, e</li> <li>II.A.2.a, b, c</li> <li>III.A.1.a, b, c, d, e, g</li> <li>IV.B.2.c, d</li> </ul>	<ul style="list-style-type: none"> <li>* How can I use what I know to experimentally determine the formula of an unknown hydrate?</li> </ul>	<ul style="list-style-type: none"> <li>* Synthesis</li> <li>* Application/ Analysis</li> <li>* Identifying similarities and differences</li> <li>* Learning with others</li> <li>* Authenticity</li> <li>* Novelty and Variety</li> <li>* Generating and testing hypotheses</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Conduct lab according to procedures provided (summative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate lab report</li> <li>Accommodations: Partner students based on skill level, prompting/ cueing, extended time (as needed)</li> </ul>
10	<ul style="list-style-type: none"> <li>* Review</li> <li>I.A.1.c, d, e, f, g</li> <li>I.A.2.a, b, c, d, g</li> <li>I.A.3.a, b, c, e</li> <li>II.A.2.a, b, c</li> <li>III.A.1.a, b, c, d, e, g</li> <li>IV.B.2.c, d</li> </ul>	<ul style="list-style-type: none"> <li>* What can I do to be better prepared for the exam?</li> </ul>	<ul style="list-style-type: none"> <li>* Use clickers to test students' knowledge and clarify and misconceptions before the exam with immediate feedback.</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Use clickers to review with exam like questions (summative)</li> </ul>	<ul style="list-style-type: none"> <li>* Students participate in review</li> <li>Accommodations: prompting/ cueing, extended time, paraphrasing, reader, use of formula sheet (as needed)</li> </ul>

11	<p><b>* Exam</b>  I.A.1.c, d, e, f, g  I.A.2.a, b, c, d, g  I.A.3.a, b, c, e  II.A.2.a, b, c  III.A.1.a, b, c, d, e, g  IV.B.2.c, d</p>	<p><b>* Can I demonstrate my knowledge on the exam?</b></p>	<p><b>* Evaluation</b>  <b>* Analysis</b>  <b>* Application</b>  <b>* Synthesis</b></p>	<p><b>* ACT bell ringer</b>  <b>* Students take exam (summative)</b></p>	<p><b>* Evaluate exam</b>  <b>Accommodations: prompting and cueing, extended time, paraphrasing, reader, limited choices, use of formula sheet (as needed)</b></p>
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