

**Chemistry - Mrs. Bauck, PHUHS**  
 Unit 1: Introduction to Chemistry - Chapter 1  
 State Standards (\*\*\*) = Chem 1H only)

**Topic 1: The Nature of Science (Ch. 1, part 1)**

- SC.912.N.1.1 Define a problem based on a specific body of knowledge (for example: biology, chemistry, physics, and earth/space science), and conduct experiments according to the steps of the scientific method. (paraphrased)
- SC.912.N.1.2 Describe and explain what characterizes science and its methods.
- SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
- SC.912.N.1.5 Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
- SC.912.N.2.2 Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
- SC.912.N.2.3 \*\*\* Identify examples of pseudoscience (such as astrology, phrenology) in society.
- SC.912.N.2.4 Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
- SC.912.N.2.5 Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
- SC.912.N.3.1 \*\*\* Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena thus, a scientific theory represents the most powerful explanation scientists have to offer.
- SC.912.N.3.2 Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
- SC.912.N.3.3 Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
- SC.912.N.4.1 Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.

**Topic 2: Data Collection and Analysis (Ch. 1, part 2)**

- SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
- SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations.
- MAFS.912.N-Q.1.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
- MAFS.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
- MAFS.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

4.0	Extensions/Applications	Students will be able to: (CHAPTER 1, part 1) <ul style="list-style-type: none"> <li><input type="checkbox"/> Evaluate the validity of an experiment.</li> <li><input type="checkbox"/> Research and summarize past scientific theories that have been disproved and their implications to modern science.</li> <li><input type="checkbox"/> Research and summarize current cutting-edge scientific theories.</li> <li><input type="checkbox"/> Conduct systematic observations, plan investigations, use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), generate explanations that explicate or describe natural phenomena (inferences), use appropriate evidence and reasoning to justify these explanations to others, evaluate the merits of the explanations produced by others.</li> </ul>
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3.0	Learning Goal (Derived from State Standard)	<p>Students will be able to: (CHAPTER 1, part 1)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Differentiate between scientific theories and scientific laws.</li> <li><input type="checkbox"/> Identify ways in which a scientific claim is evaluated.</li> <li><input type="checkbox"/> Identify scientific questions that can be disproved by experimental testing.</li> <li><input type="checkbox"/> Differentiate between a hypothesis, theory, and scientific law.</li> <li><input type="checkbox"/> Recognize that theories evolve over time based on new information and technology.</li> <li><input type="checkbox"/> Pose answers, explanations, or descriptions of events.</li> <li><input type="checkbox"/> Communicate results of scientific investigations.</li> </ul> <p>(CHAPTER 1, part 2)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Correctly determine the number of significant figures in measurements and calculations (addition, subtraction, multiplication, division).</li> <li><input type="checkbox"/> Explain the difference between precision and accuracy.</li> </ul>
2.0	Required Skills or Background Knowledge to accomplish Learning Goal	<p>Students will be able to: (CHAPTER 1, part 1)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Examine books and other sources of information to see what is already known.</li> <li><input type="checkbox"/> Explain why models are used in science.</li> </ul> <p>(CHAPTER 1, part 2)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Show math work using units and labels.</li> <li><input type="checkbox"/> Show math work using dimensional analysis (DA).</li> <li><input type="checkbox"/> Round calculated answers to the correct number of significant figures.</li> <li><input type="checkbox"/> Differentiate between what is science and what is religion, opinion or belief.</li> </ul>
1.0	With help from the teacher, student has partial success with the goal	<p>With help from a teacher, students will be able to:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Achieve partial success with 2.0 and/or 3.0.</li> </ul>
0.0	Even with help, the student has no success with the goal	<ul style="list-style-type: none"> <li><input type="checkbox"/> Even with help, student is unable to understand or complete any of the skills in scales 1.0 through 4.0.</li> </ul>