

**Kenai Peninsula Borough School District**  
**Science: Chemistry**

**Unit 1: INTRODUCTION TO CHEMISTRY AND DATA ANALYSIS**

**Pacing:**

**NGSS Standards:**

**HS-PS1-7** Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

**MATHEMATICS STANDARDS:**

**MP.2** Reason abstractly and quantitatively. (HS-PS1-7)

**HSN-Q.A.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. (HS-PS1-7)

**HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling. (HS-PS1-7)

**HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-PS1-7)

**ELA STANDARDS:** - I will write in these

**Essential Questions:**

1. Define matter.
2. Compare and contrast mass and weight.
3. Why does chemistry involve the study of the changes in the world at a submicroscopic level?
4. Explain why a scientist must be cautious when a new chemical that has many potential uses is synthesized.
5. What is the scientific method? What are its steps?
6. You are asked to study the effect of temperature on the volume of a balloon. Identify the independent and dependent variable.
7. Compare and contrast pure and applied research.
8. What is technology? Give examples of technology that you use every day.
9. Explain the reason behind each of the following: wear goggles and an apron in the lab even if you are only an observer, report all accident to the teacher, do not return unused chemicals to the stock bottles.
10. List the SI (Metric) units for length, time, mass and temperature.
11. Describe the relationship between mass, volume and density of a material.
12. What is the difference between a base unit and a derived unit?
13. How many milliseconds are in a second?
14. Why does oil float on water?
15. Which of these measurements was made with the most precise measuring devise: 8.1956 m, 8.20 m or 8.19 m? Explain your answer.

16. Explain why graphing can be an important tool for analyzing data.

**Big Ideas:**

1. Chemistry is the study of matter and the changes it undergoes.
2. Matter is anything that has mass and take up space.
3. Mass is a measure of the amount of matter
4. Weight is a measure of not only of an amount of matter but also the effect of Earth's gravitational pull on that matter.
5. There are five traditional branches of chemistry: inorganic, physical analytical and biochemistry.
6. Macroscopic observations of matter reflect the actions of atoms on a submicroscopic scale.
7. Typical steps of the scientific method include observations, hypothesis, data analysis and conclusion.
8. Qualitative data describe an observation: quantitative data use numbers.
9. Any independent variable is a variable you change in an experiment and a dependent variable changes in response to a change in the independent variable.
10. A theory is a hypothesis that has been supported by many experiments.
11. A scientific law describes relationship in matter.
12. Scientific methods can be used in research.
13. Laboratory safety is the responsibility of anyone who conducts and experiment.
14. Many of the conveniences we enjoy today are technological applications of chemistry.
15. SI (metric) measurement units allow scientists to report data that can be reproduced by other scientists.
16. Adding prefixes to SI units extends the range of possible measurements.
17. SI units for length, time, mass and temperature.
18. Volume and density have derived units.
19. Scientific notation makes it easier to handle extremely large or small measurements.
20. Dimensional analysis often uses conversion factors.
21. An accurate measurement is close to the accepted value and precise measurement show little variation over a series of trails.
22. Graphs are visual representations of data.

**Vocabulary:** Chemistry, Conclusion, Control, Variable, Experiment, Hypothesis, Mass, Matter, Model, Research, Data, Law, Scientific method, Technology, Weight, Accuracy, Base unit. Conversion factor, Density, Unit, Dimensional analysis, Graph, Metric units (SI), Error, Precision, Scientific notation, Temperature scales, Macroscopic, Microscopic