

## Chapters 1 & 2 – Introduction to Chemistry and the Study of Matter (V1.3)

**HS-PS1-3.** Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

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

**HS-ETS1-2.** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

### Chapter 1 – Introduction to Chemistry

Objectives:

*The student will:*

1. Explain why knowledge of chemistry is central to many human endeavors.
2. Be able to compare and contrast inductive and deductive reasoning, give several examples of each, and identify their use in the process of scientific problem solving.
3. Identify the purpose of science and distinguish between scientific analysis and philosophy.
4. List the steps of the scientific method and demonstrate its application in scientific analysis.
5. Explain and describe scientific models, how those models are created, and make predictions based on the scientific models.
6. Explain the basic safety rules for working in a chemistry laboratory.
7. Differentiate between scientific observations, inferences and conclusions.

#### Vocabulary (plus any other of the key terms on page 18):

Inductive reasoning

Measurement

Quantitative Property

Deductive reasoning

Quantitative Property

Observation

Inference

Indirect Evidence

Model

### Chapter 2 –Matter (and Introduction to Energy)

Objectives:

*The student will:*

1. Define matter, mass, volume.
2. Name, define and describe the three basic forms of energy.

3. Explain the law of conservation of energy
4. Distinguish between heat and temperature.
5. Compare and contrast the Fahrenheit, Celsius and Kelvin temperature scales.
6. Explain what is meant by absolute zero.
7. Describe the solid, liquid and gaseous states of matter and give an example of each.
8. Define extensive, intensive, chemical and physical properties of matter and classify various properties of matter using these terms.
9. Describe the differences between physical and chemical change and classify changes of matter using these designations.
10. Categorize substances as elements, compounds, pure substances, heterogeneous mixtures, and/or homogeneous mixtures.
11. Describe at least two methods of separating heterogeneous mixtures.
12. List and describe four techniques used to separate homogenous mixtures.
13. Define and use the key terms on page 44 of the text book.

**Vocabulary:**

Physical Change	Chemical Change	Physical Property
Chemical Property	Element	Compound
Homogeneous Mixture	Heterogeneous Mixture	Alloy
States of Matter	Solid	Liquid
Gas	Pure Substance	Distillation
Filtration	Filtrate	Solution
Matter	Mass	Molecule
Volume	Solvent	Saturated Solution
Solute	Supersaturated Solution	Magnetic