

## Chapter 1 Outline

Homework: 14, 17, 34, 36, 46, 48 a& b, 62, 74, and 98.

Introduction

Matter

Classification of Matter

Pure versus Mixture

Pure substances

Homogeneous mixtures

Heterogeneous mixtures

Colloidal suspensions

Element versus Compound

Element

Compound

States of Matter

Solid

Liquid

Gas

Properties of Matter

Intensive versus Extensive Properties

Chemical versus Physical Properties

Energy

Definitions

Units

Types of energy

Kinetic versus Potential

Exothermic versus endothermic reactions

Thermal energy (heat)

Specific heat capacity

Heat capacity

Electromagnetic energy

Frequency

Wavelength

Electrical Energy

Nuclear Energy

Measurement

Scale: microscopic vs macroscopic

Error in measurement

Random and systematic error

Precision and accuracy

Significant Figures

The connection between significant figures and error

Guidelines for determining if a digit is significant

Rounding the result of calculations

Addition rule

Multiplication rule

Mixed operations

Scientific notation and significant figures

Units of measurement  
SI Units  
Derived Units  
Other important units  
Density calculations  
Heat and heat capacity  
Dimensional Analysis

## Chapter 1 Objectives

Understand the correct meaning and usage for each of the following terms: pure, mixture, homogeneous mixture, heterogeneous mixture, element, compound, solid, liquid, gas, intensive properties, extensive properties, physical properties of matter, chemical properties of matter, energy, heat, exothermic, endothermic, specific heat capacity, frequency, wavelength, random error, systematic error, precision, accuracy, and density.

Compare and contrast pairs of these terms: pure, mixture, element, and compound.

Classify properties of matter as being intensive or extensive.

Classify properties of matter as being physical or chemical.

Classify processes as being physical or chemical changes.

Identify samples of matter as being elements or compounds.

Identify samples of matter as being pure substances or mixtures, and heterogeneous mixtures or homogeneous mixtures.

Describe and discuss the process of using physical properties to separate the components of a mixture (hint: this was a laboratory experiment).

Clearly explain what is meant by intensive/extensive properties of matter and chemical/physical properties of matter. Illustrate your explanation with examples of properties that are intensive and physical, intensive and chemical, and etc.

Compare and contrast the terms random and systematic error. Compare and contrast the terms precision and accuracy. Describe laboratory situations that could lead to each type of error.

Determine the number of significant figures, and round results of calculations to the correct number of significant figures.

Perform unit conversions using dimensional analysis.

Perform calculations involving density, specific gravity, temperature, heat, and specific heat capacity rounding your answers to the correct number of significant figures.