

Chapter 3 Objectives

Understand the correct meaning and usage for each of the following terms: matter, energy, pure, mixture, homogeneous mixture, heterogeneous mixture, element, compound, solid, liquid, gas, intensive properties, extensive properties, physical properties of matter, chemical properties of matter, potential energy, kinetic energy, heat, temperature, exothermic, endothermic, and specific heat capacity

State and discuss the law of conservation of matter, the law of conservation of energy, and the law of conservation of matter and energy. Be able to deduce which law applies to a given situation.

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

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.

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.

Explain the difference between heat and temperature.

Convert temperature units, particularly Celsius and Kelvin.

Identify chemical changes as being exothermic or endothermic.

Use the specific heat capacity and temperature information to calculate the amount of heat generated or absorbed.

Chapter 3 Outline

Matter

Classification of Matter

Pure versus Mixture

homogeneous versus heterogeneous mixtures

Element versus Compound

States of Matter

Properties of Matter

Chemical versus Physical Properties

Intensive versus extensive

Energy

Potential versus kinetic energy

Heat versus temperature

Temperature scales: Kelvin, Celsius, and Fahrenheit

Exothermic versus endothermic reactions

Specific heat capacity

Laws of conservation of matter, energy, and matter & energy

Homework: Work problems 35, 39 (briefly explain your answers), 45, 63 (explain your answers), 95, at the end of chapter 3.

Class participation: develop an original visual analogy to compare and contrast one of the following pairs of terms:

Pure versus mixture

Homogeneous versus heterogeneous mixtures

Element versus compound

Potential versus kinetic energy

Exothermic versus endothermic reactions

Note: analogies are not the same as examples.

Extra credit will be awarded to students who create original artwork and/or have extended analogies that work on many levels.