



SCIENCE 1102 ELEMENTS, COMPOUNDS AND MIXTURES

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ELEMENTS, COMPOUNDS AND MIXTURES

Chemistry is an ancient science. Early in Genesis (Genesis 4:22) record is made of man's use of chemistry. In man's quest for ways to "subdue the earth and have dominion over it," chemistry has played a major role. Our synthetic world of today with its many different forms of plastic is a result of the knowledge man has gained about chemistry.

On the other hand, our polluted streams, poisoned atmosphere, and trash-laden landfills are

also a result of our knowledge of chemistry. Knowledge is neither good nor bad, but man's use of it can be either good or bad. Because of man's innate sinful nature, self is first, encouraging the misuse and poor stewardship of God's creation.

In this LIFEPAC[®] you will study the history of chemistry, the classification of matter, and man's knowledge of the world about him.

OBJECTIVES

Read these objectives. The objectives tell you what you will be able to do when you have successfully completed this LIFEPAC.

When you have finished this LIFEPAC, you should be able to:

- 1. Trace the history of chemistry to about 1750.
- 2. Describe alchemy and what it has contributed to us.
- 3. Describe elements.
- 4. Distinguish between and describe chemical, physical, and phase changes.
- 5. Describe compounds and distinguish them from elements.
- 6. Classify compounds as organic or inorganic.
- 7. Describe and give examples of various types of mixtures.

Survey the LIFEPAC. Ask yourself some questions about this study. Write your questions here.

I. ELEMENTS

All matter can be classified in the following classification scheme:



FIGURE 1: CLASSIFICATION OF MATTER

We will use this classification scheme for our study of chemistry.

In man's effort to find order in the universe, he has learned to classify. Man has always been curious about the world around him. The word science comes to us from the Latin verb *scio* which means *to know*. The Latin noun *scientia* means knowledge. In both cases the meaning is broader than mere recognition. In this section you will study the history of alchemy, the contributions of alchemy, and the properties of the simplest parts of matter, elements.

SECTION OBJECTIVES

Review these objectives. When you have completed this section, you should be able to:

- 1. Trace the history of chemistry to about 1750.
- 2. Describe alchemy and what it has contributed to us.
- 3. Describe elements.
 - 3.1 Give the symbols of several common elements.
 - 3.2 Classify elements by properties.
 - 3.3 Define atoms.

VOCABULARY

Study these words to enhance your learning success in this section.

alchemy	compound	metal
alloy	element	nonmetal
atom		

ALCHEMY

Who was the first chemist? No one really knows, but Genesis 4:22 clearly describes Tubalcain as an art teacher who worked with brass and iron. This information indicates that chemistry had been established as a science by then. However, that chemistry was probably limited to simple metallurgy and the use of metals.

History. As civilization grew, the center of all scientific knowledge became Alexandria, Egypt. About 300 B.C. the science of **alchemy** became

important. The Egyptians were interested in making life easier. As a result, a deliberate effort was made to combine the Egyptian arts of metallurgy, dyeing, and glassmaking with a search for a "better" life. As a result, the alchemist tried to:

- 1. Discover a universal cure for disease,
- 2. Discover a means to prolong life, and
- 3. Transmute the base elements like lead into gold.



Prepare a report.

The history of the spread of alchemy to Europe from 300 B.C. through the Dark Ages and up to about 1750 is interesting because it was greatly influenced by the religious beliefs of the nations in control. Aristotle, Descartes, and Roger Bacon are examples of people who influenced the growth of chemistry through this period. Find out what "puffers" and "adepts" were. Prepare a report on the growth and spread of alchemy from 300 B.C. to about A.D. 1750. Include names, dates, and specific influences the church had on this spread. Submit the report for evaluation.



Legacy. Early alchemists contributed much to modern knowledge of matter. They were able to isolate and study the properties of common elements such as copper, sulfur, iron, lead, gold, silver, arsenic, and mercury. They also studied compounds such as mercury oxide and alloys of metals and developed laboratory techniques that were used by later scientists.

The transition from alchemy to the science of chemistry occurred when the basis of the study became truly experimental in practice. Scientists in the sixteenth century began to put each theory to the test and found the laboratory the heart of the learning process.

	Complete these statements.	
1.2	The two main classes of homogeneous matter are a	and
	b	
1.3	Pure substances can be classed as a or b.	
1.4	The three purposes of alchemy were:	
	a	
	b	, and
	С	·
1.5	The city that first was known for alchemy was	

SYMBOLS

Very early, even in the days of alchemy, chemists discovered the need for symbols to express what they were doing. Using symbols provided a simple way to communicate without always writing out the full words or names. **Derivation.** Early symbols were derived from the surroundings, things that were simple and easily understood.



FIGURE 2: EARLY SYMBOLS WERE DERIVED FROM SURROUNDINGS.

Representation. Today's symbol representation is derived primarily from an abbreviation of the name of the element, either the English or Latin spelling. A list of common elements and symbols is found in Figure 3.

Name	Symbol	Name	Symbol	Name	Symbol
Hydrogen	Н	Silver	Ag	Aluminum	Al
Carbon	С	Lead	Pb	Zinc	Zn
Nitrogen	Ν	Nickel	Ni	Gold	Au
Calcium	Ca	Oxygen	0	Magnesium	Mg
Copper	Cu	Neon	Ne	Uranium	U
Iron	Fe	Helium	Не	Tin	Sn
Mercury	Hg	Iodine	Ι	Arsenic	As

FIGURE 3: NAMES AND SYMBOLS OF COMMON ELEMENTS