

## Chapter 6 Lesson 1: Substances and Mixtures

### Vocabulary

-Matter	-Element	-Mixture
-Atom	-Molecule	-Heterogeneous mixture
-Substance	-Compound	Homogeneous mixture

### What is matter?

- **Matter** is anything that has mass and takes up space.
- Anything that does not have mass or volume is not matter.

### What is matter made of?

- An **atom** is a small particle that is the building block of matter.

### Classifying Matter

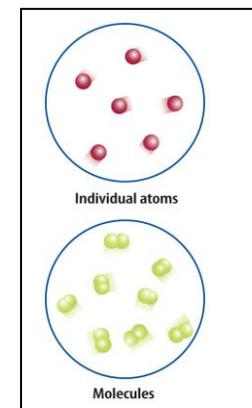
- Scientists place matter into one of two groups – substances and mixtures.

### What is a Substance?

- A **substance** is matter with a composition that is always the same.
- A certain substance always contains the same kinds of atoms in the same combination.
- An element is a substance made of only one kind of atom.
- For example, the element of gold is made of only gold atoms, and all gold atoms are alike.
- Sodium Chloride (salt) is also a substance.

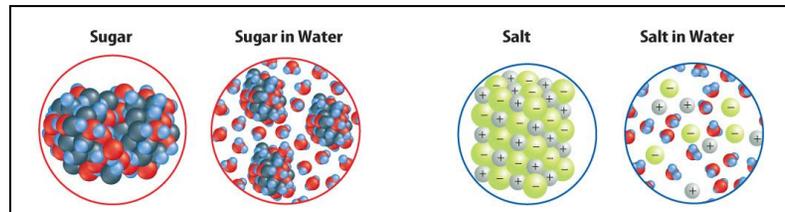


- Element symbols have either one or two letters. Temporary symbols have three letters.



- A **molecule** is two or more atoms that are held together by chemical bonds and act as a unit.
- In some elements, the atoms are grouped into molecules.

- A **compound** is a substance made of two or more elements that are chemically joined in a specific combination.
- Because each compound is made of atoms in a specific combination, a compound is a substance.
- Many compounds exist as molecules, but some, such as table salt, do not.
- Sugar particles are molecules because they always travel together as a unit. Salt particles do not travel together as a unit.



- A chemical formula includes the symbols of each element in the compound and small numbers, called subscripts, which show the ratio of the elements in the compound.
- Sometimes the same elements combine to form different compounds.

What is a mixture?

- A **mixture** is matter that can vary in composition.
- A mixture is made of two or more substances that are blended but are not chemically bonded.

Types of Mixtures

- A **heterogeneous mixture** is a mixture in which substances are not evenly mixed.
- A **homogeneous mixture** is a mixture in which two or more substances are evenly mixed, but not bonded together.
- A solution is another name for a homogeneous mixture and is made of two parts – a solvent and one or more solutes.
- The solvent is the substance that is present in the largest amount, and the solute dissolves, or breaks apart, and mix evenly in the solvent.

Compounds vs. Mixtures

- Compounds and solutions are alike in that they both look like pure substances.
- The atoms that make up a given compound are bonded together, which means the composition of a given compound is always the same.
- The substances that make up a mixture are not bonded together.
- Adding more of one substance to a mixture does not change the identity of the mixtures.

Differences Between Solutions and Compounds		
	Solutions	Compound
<b>Composition</b>	Made up of substances (elements and compounds) evenly mixed together; the composition can vary in a given mixture.	Made up of atoms bonded together; the combination of atoms is always the same in a given compound.
<b>Changing the composition</b>	The solution is still the same with similar properties. However, the relative amounts of substances might be different.	Changing the composition of a compound has changes into a new compound with new properties.
<b>Properties of parts</b>	The substances keep their own properties when they are mixed.	The properties of the compound are different from the properties of the atoms that make it up.

- The substances that make up a mixture are not chemically combined.

- The substances that make up a mixture can easily be separated by physical processes.
- The elements that make up a compound can be separated only by chemical processes.

Visualizing Classification of Matter

- Matter can be classified as either a substance or a mixture.
- Matter is classified according to the types of atoms and the arrangement of atoms in matter.
- GREAT CHART IN BOOK TO STUDY – PAGE 231.

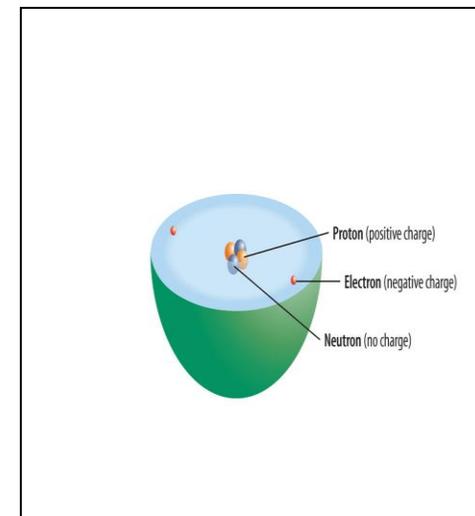
### Chapter 6 Lesson 2: The Structure of Atoms

Vocabulary

- Nucleus	- electron	- isotope
- Proton	-electron cloud	- ion
- Neutron	- atomic number	

The Parts of an Atom

- Atoms are made of several types of tiny particles.
- The number of each of these particles in an atom is what makes atoms different from each other.
- Almost all the mass of an atom is in its nucleus.
- An atom has a center region with a positive charge.
- The **nucleus** is the region at the center of an atom that contains most of the mass of the atom.
- Two kinds of particles make up the nucleus – protons and neutrons.
- A **proton** is a positively charged particle in nucleus of an atom.
- A **neutron** is an uncharged particle in the nucleus of an atom.



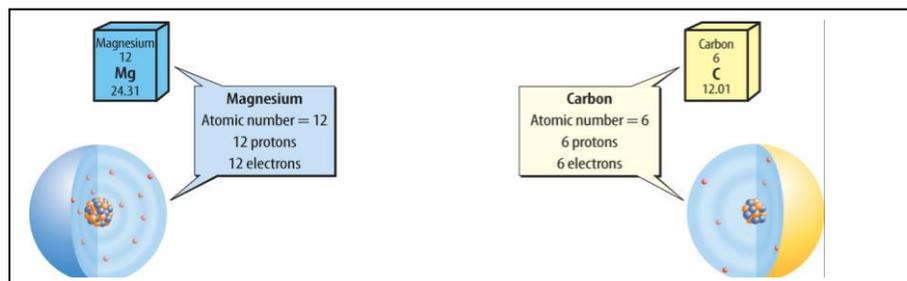
- An **electron** is a negatively charged particle that occupies the space in an atom outside the nucleus.
- An **electron cloud** is the region surrounding an atom's nucleus where one or more electrons are most likely to be found.
- Electrons occupy certain areas around the nucleus according to their energy.
- Electrons close to the nucleus are strongly attracted to it and have less energy.
- Electrons farther from the nucleus are less attracted to it and have more energy.

### The Size of Atoms

- Every solid, liquid, and gas is made of millions and millions of atoms.
- If you could multiply the width of atom by 100 million, it would be the size of an orange.

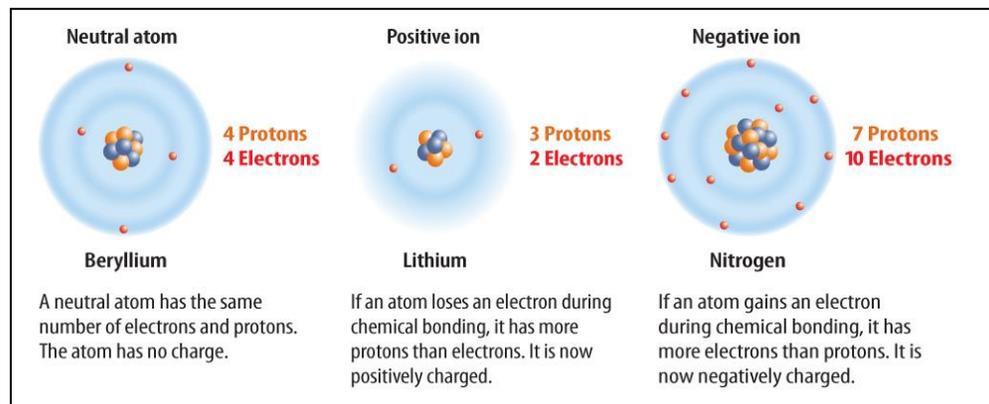
### Differences in Atoms

- The **atomic number** is the number of protons in the nucleus of an atom of an element.



- Every element in the periodic table has a different atomic number.
- You can identify an element if you know either its atomic number or the number of protons its atoms have.
- An **isotope** is one of two or more atoms having the same number of protons, but a different number of neutrons.
- Because electrons are negatively charged, a neutral atom that has lost an electron has a positive charge.
- A neutral atom that has gained an electron has a negative charge.

- An ion is an atom that has a charge because it has gained or lost electrons.



### Atoms and Matter

- When elements combine to form compounds, the number of electrons in the atoms can change.
- The ways in which the atoms combine result in the many different kinds of matter.

