

Fundamental concepts of chemistry

1. Read the text and fill in the gaps with the following expressions in appropriate forms. Use each expression only once.

chemical formula, chemical equation, proton, neutron, element, electron, atomic nucleus, molecule, cation, anion, chemical compound, chemical reaction, chemical bonds, ion, molecule, atomic number

An **atom** is a collection of **matter consisting of** a positively **charged core** (the _____) which **contains** _____ and _____ and which **maintains** a number of electrons to **balance** the positive charge in the nucleus. The atom is also the smallest **portion** into which an _____ can be divided and still **retain** its properties, made up of a **dense**, positively charged nucleus surrounded by a system of _____.

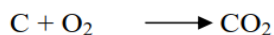
The most basic chemical **substances** are the chemical **elements**. They are building blocks of all other substances. An element is a class of atoms which have the same number of protons in the nucleus. This number is known as the _____ of the element. For example, all atoms with 6 protons in their nuclei are atoms of the chemical element **carbon**, and all atoms with 92 protons in their nuclei are atoms of the element **uranium**. Each chemical element is made up of only one kind of atom. The atoms of one element **differ** from those of all other elements. Chemists use letters of the alphabet as symbols for the elements. In total, 117 elements have been observed as of 2007, of which 94 occur naturally on Earth. Others have been produced **artificially**.

An _____ is an atom or a **molecule** that has lost or **gained** one or more electrons. Positively charged _____ (e.g. **sodium** cation Na^+) and negatively charged _____ (e.g. **chloride** Cl^-) can form **neutral salts** (e.g. **sodium chloride** NaCl).

Electrical forces at the atomic level create _____ that join two or more atoms together, forming _____. Some molecules consist of atoms of a single element. **Oxygen** molecules, for example, are made up of two oxygen atoms. Chemists represent the oxygen molecule O_2 . The 2 indicates the number of atoms in the molecule.

When atoms of two or more different elements **bond together**, they form a _____. Water is a compound made up of two **hydrogen** atoms and one oxygen atom. The _____ for a water molecule is H_2O .

Compounds are formed or broken down by means of _____. All chemical reactions **involve** the **formation** or **destruction** of chemical bonds. Chemists use _____ to express what **occurs** in chemical reactions. Chemical equations consist of chemical formulas and symbols that show the substances **involved in** chemical change. For example, the equation



expresses the chemical change that occurs when one **carbon** atom **reacts**, or bonds, with an oxygen molecule. The reaction produces one molecule of **carbon dioxide**, which has the formula CO_2 .

2. Read the article again. The names of which chemical elements and compounds can you find there?

3. What is the meaning of the following expressions:

chemical bonds bond together dense density

Exercises:

Exercise 1 Choose the correct form of the verb, singular or plural.

1. Physics was / were my best subject in school.
2. Can I borrow your scissors? Mine isn't / aren't sharp enough.
3. Do you think the people is / are happy with the government?
4. Gymnastics is / are my favourite sport.
5. The trousers you bought for me doesn't / don't fit me.

Exercise 2 Change the following sentences from plural to singular.

1. What criteria did the scientists use?
2. The formulae represent the molecular structures of the substances.
3. The investigated phenomena are not frequent.
4. The analyses of the results did not prove his hypotheses.
5. Electrolysis is used for purifying certain metals.

Exercise 3 Write the plural form of the words in *italics*.

1. Even the best psychiatrists sometimes make mistakes in their *diagnosis* and treatment.
2. Nuclear energy is produced using the heat generated by splitting the *nucleus* of atoms of certain elements.
3. Atoms emit or absorb *quantum* of equal energy.
4. Chemical *equilibrium* may be classified into two groups, namely homogenous and heterogenous *equilibrium*.
5. After analyzing the *datum*, they were able to draw conclusions.