

## Science and Technology for NPTS - Chemistry Module Glossary

**Unit** A defined quantity based on a standard. For example, in the value 100 meters, *meter* is the unit.

**Mass** The amount of matter in an object. Mass can also be defined as the property of matter that leads to gravitational attractions between objects and therefore gives rise to weight.

**Element** A substance that cannot be chemically converted into simpler substances; a substance in which all of the atoms have the same number of protons and therefore the same chemical characteristics.

**Metals** The elements that (1) have a metallic luster, (2) conduct heat and electric currents well, and (3) are malleable.

**Nonmetals** The elements that do not have the characteristics of metals. Some of the nonmetals are gases at room temperature and pressure, some are solids, and one is a liquid. Various colors and textures occur among the nonmetals.

**Metalloids or semimetals** The elements that have some but not all of the characteristics of metals.

**Atom** The smallest part of an element that retains the chemical characteristics of the element.

**Proton** A positively charged particle found in the nucleus of an atom.

**Electron** A negatively charged particle found outside the nucleus of an atom.

**Neutron** An uncharged particle found in the nucleus of an atom.

**Nucleus** The extremely small, positively charged core of the atom.

**Ion** Any charged particle, whether positively or negatively charged.

**Cation** An ion formed from an atom that has lost one or more electrons and thus has become positively charged.

**Anion** An ion formed from an atom that has gained one or more electrons and thus has become negatively charged.

**Isotopes** Atoms that have the same number of protons but different numbers of neutrons. They have the same atomic number but different mass numbers.

**Atomic number** The number of protons in an atom's nucleus. It establishes the element's identity.

**Mass number** The sum of the number of protons and neutrons in an atom's nucleus.

**Covalent bond** A link between atoms that results from their sharing two electrons.

**Molecule** An uncharged collection of atoms held together with covalent bonds.

**Compound** A substance that contains two or more elements, the atoms of these elements always combining in the same whole-number ratio.

**Chemical formula** A concise written description of the components of a chemical compound. It identifies the elements in the compound by their symbols and indicates the relative number of atoms of each element with subscripts.

**Pure substance** A sample of matter that has constant composition. There are two types of pure substances, elements and compounds.

**Mixture** A sample of matter that contains two or more pure substances and has variable composition.

**Chemical bond** An attraction between atoms or ions in chemical compounds. Covalent bonds and ionic bonds are examples.

**Polar covalent bond** A covalent bond in which electrons are shared unequally, leading to a partial negative charge on the atom that attracts the electrons more and to a partial positive charge on the other atom.

**Nonpolar covalent bond** A covalent bond in which the difference in electron-attracting ability of two atoms in a bond is negligible (or zero), so the atoms in the bond have no significant charges.

**Ionic bond** The attraction between a cation and an anion.

**Molecular compound** A compound composed of molecules. In such compounds, all of the bonds between atoms are covalent bonds.

**Ionic compound** A compound that consists of ions held together by ionic bonds.

**Polyatomic ion** A charged collection of atoms held together by covalent bonds.

**Lone pair** Two electrons that are not involved in the covalent bonds between atoms but are important for explaining the arrangement of atoms in molecules. They are represented by pairs of dots in Lewis structures.

**Lewis structure** A representation of a molecule that consists of the elemental symbol for each atom in the molecule, lines to show covalent bonds, and pairs of dots to indicate lone pairs.

**Chemical Weapons Convention (CWC)** An arms control agreement that bans the production, stockpiling, transferring, and use of chemical weapons. Approved by the U.N. General Assembly in November, 1992.

**Organization for the Prohibition of Chemical Weapons (OPCW)** Implementing body of the CWC...given the mandate to achieve the object and purpose of the Convention, to ensure the implementation of its provisions, including those for international verification of compliance with it, and to provide a forum for consultation and cooperation among States Parties.

**Toxic chemical** According to the CWC, any chemical which through its chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals.

**Precursor** According to the CWC, any chemical reactant that takes part at any stage in the production by whatever method of a toxic chemical.

**Schedule 1 chemicals** According to the CWC, chemicals that have few or no uses other than as chemical weapons or to make chemical weapons.

**Schedule 2 chemicals** According to the CWC, chemicals that could be used as weapons or to make weapons, but also have legitimate small-scale uses.

**Schedule 3 chemicals** According to the CWC, chemicals that can be used as chemical weapons or to make chemical weapons but that also have large-scale uses other than chemical weapons.

**Choking agents** Compounds that disrupt the victim's ability to breathe. Chlorine and phosgene are examples.

**Blister agents** Compounds that cause severe skin, eye, and mucus membrane pain and irritation. They cause severe chemical burns and painful water blisters. Sulfur mustard is an example.

**Blood agents** Toxic compounds that are quickly absorbed into the blood. Hydrogen cyanide is an example.

**Enzyme** A naturally occurring catalyst.

**Substrate** A molecule that an enzyme causes to react.

**Active site** A specific section of the protein structure of an enzyme in which the substrate fits and reacts.

**Nerve agents** Phosphorus-containing organic compounds that disrupt the process by which nerves transfer messages to organs. The disruption is caused by deactivating the enzyme acetylcholinesterase, leading to a buildup of the neurotransmitter acetylcholine. Tabun, Sarin, Soman, and VX are examples.

**Neurotransmitters** Chemicals that transmit signals from nerve cells (neurons) to a target cell across a synapse.

**1925 Geneva Protocol** Protocol on the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare

**Hydrolysis** The reaction in which water,  $H_2O$ , divides into  $H$ , which combines with one part of a molecule, and  $OH$ , which combines with another part of the molecule, splitting the molecule into two parts.

**Hydrocarbons** Compounds that contain only carbon and hydrogen.

**Organic chemistry** The branch of chemistry that involves the study of carbon-based compounds.

**Double bond** A link between atoms that results from the sharing of four electrons. It can be viewed as two 2-electron covalent bonds.

**Triple bond** A link between atoms that results from the sharing of six electrons. It can be viewed as three 2-electron covalent bonds.

**Isomers** Compounds that have the same molecular formula but different molecular structures.

**Toxin** A poisonous substance produced within living cells or organisms.