

Unit 2: Molecular and Ionic Compound Structure and Properties

Content Area: **Science**
Course(s): **AP Chemistry**
Time Period: **Semester 1**
Length: **6 weeks**
Status: **Published**

Modifications

<https://docs.google.com/document/d/1ODqaPP69YkcFiyG72fit8XsUIe3K1VSG7nxuc4CpCec/edit>

Standards

SCI.9-12.5.2.12	All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.
SCI.9-12.5.2.12.A	All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia.
SCI.9-12.5.2.12.A.1	Use atomic models to predict the behaviors of atoms in interactions.
SCI.9-12.5.2.12.A.2	Account for the differences in the physical properties of solids, liquids, and gases.
SCI.9-12.5.2.12.A.3	Predict the placement of unknown elements on the Periodic Table based on their physical and chemical properties.
SCI.9-12.5.2.12.A.4	Explain how the properties of isotopes, including half-lives, decay modes, and nuclear resonances, lead to useful applications of isotopes.
SCI.9-12.5.2.12.A.5	Describe the process by which solutes dissolve in solvents.
SCI.9-12.5.2.12.A.6	Relate the pH scale to the concentrations of various acids and bases.
SCI.9-12.5.2.12.A.a	Electrons, protons, and neutrons are parts of the atom and have measurable properties, including mass and, in the case of protons and electrons, charge. The nuclei of atoms are composed of protons and neutrons. A kind of force that is only evident at nuclear distances holds the particles of the nucleus together against the electrical repulsion between the protons.
SCI.9-12.5.2.12.A.b	Differences in the physical properties of solids, liquids, and gases are explained by the ways in which the atoms, ions, or molecules of the substances are arranged, and by the strength of the forces of attraction between the atoms, ions, or molecules.
SCI.9-12.5.2.12.A.c	In the Periodic Table, elements are arranged according to the number of protons (the atomic number). This organization illustrates commonality and patterns of physical and chemical properties among the elements.
SCI.9-12.5.2.12.A.d	In a neutral atom, the positively charged nucleus is surrounded by the same number of negatively charged electrons. Atoms of an element whose nuclei have different numbers of neutrons are called isotopes.
SCI.9-12.5.2.12.A.e	Solids, liquids, and gases may dissolve to form solutions. When combining a solute and solvent to prepare a solution, exceeding a particular concentration of solute will lead to precipitation of the solute from the solution. Dynamic equilibrium occurs in saturated solutions. Concentration of solutions can be calculated in terms of molarity, molality, and

	percent by mass.
SCI.9-12.5.2.12.A.f	Acids and bases are important in numerous chemical processes that occur around us, from industrial to biological processes, from the laboratory to the environment.
SCI.9-12.5.2.12.B	Substances can undergo physical or chemical changes to form new substances. Each change involves energy.
SCI.9-12.5.2.12.B.1	Model how the outermost electrons determine the reactivity of elements and the nature of the chemical bonds they tend to form.
SCI.9-12.5.2.12.B.2	Describe oxidation and reduction reactions, and give examples of oxidation and reduction reactions that have an impact on the environment, such as corrosion and the burning of fuel.
SCI.9-12.5.2.12.B.3	Balance chemical equations by applying the law of conservation of mass.
SCI.9-12.5.2.12.B.a	An atom's electron configuration, particularly of the outermost electrons, determines how the atom interacts with other atoms. Chemical bonds are the interactions between atoms that hold them together in molecules or between oppositely charged ions.
SCI.9-12.5.2.12.B.b	A large number of important reactions involve the transfer of either electrons or hydrogen ions between reacting ions, molecules, or atoms. In other chemical reactions, atoms interact with one another by sharing electrons to create a bond.
SCI.9-12.5.2.12.B.c	The conservation of atoms in chemical reactions leads to the ability to calculate the mass of products and reactants using the mole concept.

Big Idea 2

Big Idea 2: Chemical and physical properties of materials can be explained by the structure and the arrangement of atoms, ions, or molecules and the forces between them.

Resources

Powerpoint -

Periodic Relationships Among the Elements

Chemical Bonding II - Molecular Geometry and Hybridization of Atomic Orbitals

Intermolecular Forces and Liquids and Solids

Physical Properties of Solutions

Assessments

https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcl/edit?usp=sharing

