

**Connecticut High School Science
Contents Standards Mapping**

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Chemistry	Boardworks High School Chemistry Presentations
Grade 9 - Strand II: Chemical Structures and Properties	
D 10. Describe the general structure of the atom, and explain how the properties of the first 20 elements in the Periodic Table are related to their atomic structures.	Atomic Structure Electron Structure and the Periodic Table The Periodic Table
D 11. Describe how atoms combine to form new substances by transferring electrons (ionic bonding) or sharing electrons (covalent bonding).	Comparing Bonding Covalent Bonding Ionic Bonding Why do Atoms Form Bonds?
D 12. Explain the chemical composition of acids and bases, and explain the change of pH in neutralization reactions.	Neutralization pH and Indicators Properties of Acids and Alkalis
<i>D 13. Explain how the structure of the carbon atom affects the type of bonds it forms in organic and inorganic molecules.</i>	-
D 14. Describe combustion reactions of hydrocarbons and their resulting by-products.	Combustion Hydrocarbons
D 15. Explain the general formation and structure of carbon-based polymers, including synthetic polymers, such as polyethylene, and biopolymers, such as carbohydrate.	Polymers Polysaccharides
D 16. Explain how simple chemical monomers can be combined to create linear, branched and/or cross-linked polymers.	Polymers Polysaccharides
D 17. Explain how the chemical structure of polymers affects their physical properties.	Polymers
<i>D 18. Explain the short- and long-term impacts of landfills and incineration of waste materials on the quality of the environment.</i>	-
CHEMISTRY	
Atomic and Molecular Structure	
The nucleus of the atom is much smaller than the atom, yet contains most of its mass.	Atomic Structure Introducing Atoms
The quantum model of the atom is based on experiments and analyses by many scientists, including Dalton, Thomson, Bohr, Rutherford, Millikan and Einstein.	Introducing Atoms
The position of an element in the periodic table is related to its atomic number.	Electron Structure and the Periodic Table The Periodic Table

The periodic table can be used to identify metals, semimetals, non-metals and halogens.	Electron Structure and the Periodic Table Patterns of Behavior The Periodic Table
The periodic table can be used to identify trends in ionization energy, electronegativity, the relative sizes of ions and atoms, and the number of electrons available for bonding.	Electronegativity Electron Structure and the Periodic Table Ionization Energy The Periodic Table
The electronic configuration of elements and their reactivity can be identified based on their position in the periodic table.	Electron Configuration Electron Structure and the Periodic Table The Periodic Table
Chemical Bonds	
Atoms combine to form molecules by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds.	Comparing Bonding Covalent Bonding Ionic Bonding Metallic Bonding Why do Atoms Form Bonds?
Chemical bonds between atoms in molecules such as H ₂ , CH ₄ , NH ₃ , H ₂ CCH ₂ , N ₂ , Cl ₂ , and many large biological molecules are covalent.	Covalent Bonding Giant Covalent Structures
Salt crystals, such as NaCl, are repeating patterns of positive and negative ions held together by electrostatic attraction.	Ionic Compounds
The atoms and molecules in liquids move in a random pattern relative to one another because the intermolecular forces are too weak to hold the atoms or molecules in a solid form.	Particles in Action
<i>Lewis dot structures can provide models of atoms and molecules.</i>	–
<i>The shape of simple molecules and their polarity can be predicted from Lewis dot structures.</i>	–
Electronegativity and ionization energy are related to bond formation.	Electronegativity Ionization Energy
Solids and liquids held together by Van der Waals forces or hydrogen bonds are affected by volatility and boiling/melting point temperatures.	Intermolecular Forces
Conservation of Matter and Stoichiometry	
Chemical reactions can be described by writing balanced equations.	Reacting Masses
The quantity one mole is set by defining one mole of carbon; 12 atoms to have a mass of exactly 12 grams.	What are Moles?
One mole equals 6.02 x 10 ²³ particles (atoms or molecules).	What are Moles?
The molar mass of a molecule can be determined from its chemical formula and a table of atomic masses.	Molar Mass What are Moles?

The mass of a molecular substance can be converted to moles, number of particles, or volume of gas at standard temperature and pressure.	Gases and Moles
Hess's law is used to calculate enthalpy change in a reaction.	Enthalpy Change
Reaction Rates	
The rate of reaction is the decrease in concentration of reactants or the increase in concentration of products with time	Rates of Reaction
Reaction rates depend on factors such as concentration, temperature and pressure.	Concentration, Pressure and Reaction Rates Temperature and Reaction Rates
Equilibrium is established when forward and reverse reaction rates are equal.	Dynamic Equilibrium
Catalysts play a role in increasing the reaction rate by changing the activation energy in a chemical reaction.	Bonds and Activation Energy Surface Area, Catalysts and Reaction Rates
Organic Chemistry and Biochemistry	
Large molecules (polymers), such as proteins, nucleic acids and starch, are formed by repetitive combinations of organic monomers.	Polysaccharides Proteins
The bonding characteristics of carbon result in the formation of a large variety of structures, ranging from simple hydrocarbons to complex biological molecules and synthetic polymers.	Hydrocarbons Polymers Polysaccharides Proteins
Amino acids are the building blocks of proteins.	Proteins