

OpenStax	Learning Outcomes	
7.1, 7.2		Distinguish among ionic, covalent, and metallic bonding.
7.2	Use electronegativity to describe properties of covalent bonds.	
7.2		Explain electronegativity of an element.
7.2		Describe the trends for electronegativity of elements.
7.2		Relate electronegativity to bond polarity.
7.2		Categorize bonds as ionic, polar, or nonpolar.
7.3	Draw Lewis structures of compounds.	
7.3		Draw Lewis symbols of atoms.
7.3		Draw the Lewis structure of a binary ionic compound.
7.3		Describe how electrons form single, double, or triple bonds.
7.3		Draw Lewis structures of molecules and polyatomic ions.
7.3		Name the three types of exceptions to the octet rule.
7.3		Draw Lewis structures of compounds that violate the octet rule.
7.4		Define resonance.
7.4		Identify when resonance is possible in a molecule or ion.
7.4		Define resonance hybrid.
7.4		Calculate formal charge of atoms in a molecule or ion.
7.4		Explain the significance of formal charge values.
7.4		Apply a formal charge explanation to determine the best Lewis structure for a compound.
7.5	Characterize the strength of covalent bonds.	
7.5		Define bond energy.
7.5		Discuss bond strength as a function of bond length.
7.5		Describe how the bond length changes from single to double to triple bond between atoms.
7.5		Calculate the unknown given bond energy values and/or the enthalpy of a reaction.
7.5	Characterize the strength of ionic bonds.	
7.5		Define lattice energy.
7.5		Describe the lattice energy trends related to ion size and charge.
7.5		Describe the steps of the Born-Haber cycle.
7.5		Write the equation for the energies associated with the Born-Haber cycle.
7.5		Calculate lattice energy using the Born-Haber cycle.
7.6	Describe the three-dimensional shape of a molecule.	
7.6		Describe valence shell electron pair repulsion (VSEPR) theory.
7.6		Recognize the electron group geometry of molecules.
7.6		Determine the electron group geometry based on the Lewis structure.
7.6		Determine the effect of lone pairs on the geometry of a molecule.
7.6		Name the possible electron group and molecular geometries.
7.6		Identify the electron group geometry and molecular geometry based on the number of bonding and non-bonding groups in the Lewis structure of a molecule or ion.
7.6		Determine the geometries for molecules with more than one central atom.
7.6	Determine the polarity of a molecule.	
7.6		Define dipole moment.
7.6		Recognize that polarity affects solubility of molecular compounds (like dissolves like).