

Academic Vocabulary

CONTENT BUILDER FOR THE PLC

SCIENCE
CHEMISTRY

PLEASE NOTE: The words contained in **Academic Vocabulary** are words/concepts/terms essential for concept development; this list is not intended to be comprehensive. The “new to grade level” vocabulary suggestions are a starting point, and educators are encouraged to refer to their district curriculum resources for additional words/concepts/terms.

The Periodic Table

C.5 Science concepts. The student understands the development of the Periodic Table and applies its predictive power.

important words for concept development					
subcluster	standards	new to grade level		previously introduced	
Periodic Properties	C.5(A), C.5(B)	alkali metal	group	atomic mass	nonmetal
		alkaline earth metal	halogen	atomic number	period
		atomic weight	intensive property	chemical group	periodic table
		chemical family	noble gas	chemical property	physical property
		core electron	periodic law	metal	reactivity
		diatomic element	transition metal	metalloid	
		extensive property	valence electron		
		family	valence shell		
		full shell			
Periodic Trends	C.5(C)	anion = negative ion	ionic radius	reactivity	
		atomic mass	ionization energy		
		atomic radius	neutral atom		
		cation = positive ion	nuclear charge		
		electron repulsion	periodic trend		
		electronegativity	shielding		
		ion = charged atom			

Atomic Theory

C.6 Science concepts. The student understands the development of atomic theory and applies it to real-world phenomena.

important words for concept development				
subcluster	standards	new to grade level		previously introduced
Atomic Theory	C.6(A)	Bohr model	position	electron
		cathode ray	proton	nucleus
		energy level	quantum model	orbit
		gold-foil experiment	scientific law	particle
		modern atomic theory	scientific principle	wavelength
		momentum	scientific theory	
		neutron	subatomic particle	
Atomic Structure	C.6(B), C.6(D), C.6(E)	orbital		
		abundance	isotopic notation	atom
		anion	Lewis dot diagram	electron
		atomic mass unit (amu)	mass number	element
		Aufbau principle	neutral atom	nucleus
		average atomic mass	neutron	
		Bohr model	opposite spin	
		cation	orbital diagram	
		charged ion	paired electrons	
		core electron	parallel spin	
		electrical charge	Pauli exclusion principle	
		electron cloud	proton	
		electron configuration	quantum number	
		electron orbital	representative element	
		full shell	spin	
		Hund's rule	unpaired electrons	
		isotope	valence electron	
		isotopic composition		

(continued)

Atomic Theory (continued)

C.6 Science concepts. The student understands the development of atomic theory and applies it to real-world phenomena.

important words for concept development			
subcluster	standards	new to grade level	previously introduced
Atomic Properties	C.6(C)	hertz ionizing radiation joule non-ionizing radiation photon Planck's constant speed of light visible spectrum	electromagnetic spectrum energy frequency wavelength

Chemical Bonds

C.7 Science concepts. The student knows how atoms form ionic, covalent, and metallic bonds.

important words for concept development				
subcluster	standards	new to grade level		previously introduced
Intramolecular Bonds	C.7(A), C.7(C)	anion bent cation diatomic duet rule electronegativity Lewis diagram Lewis dots Lewis structure linear lone pair	molecular geometry octet rule representative (main group) metal Roman numeral shared pair tetrahedral transition metal trigonal planar trigonal pyramidal VSEPR (Valence Shell Electron Pair Repulsion)	nonmetal subscript
Intramolecular Forces	C.7(D)	dipole dipole-dipole force electrostatic induced dipole intermolecular force intramolecular bond	non-polar molecule permanent dipole moment polar molecule polarizability temporary dipole moment	
Chemical Nomenclature	C.7(B)	anion cation covalent bond = molecular bond criss-cross method crystalline solid diatomic ionic bond ionic charge	IUPAC nomenclature rules monatomic ion oxidation number polyatomic ion prefix representative (main group) metal Roman numeral transition metal	metal nonmetal subscript

The Mole

C.8 Science concepts. The student understands how matter is accounted for in chemical substances.

important words for concept development				
subcluster	standards	new to grade level		previously introduced
Mole Concept	C.8(A), C.8(B), C.8(C), C.8(D)	Avogadro's number	molar quantity	atom
		chemical particle	mole	atomic mass
		conversion factor	molecular formula	atomic weight
		dimensional analysis	molecule	subscript
		empirical formula	percent	
		formula unit	percent composition	
		gram	ratio	
		ion	reduced formula	
		molar mass		

Chemical Equations

C.9 Science concepts. The student understands how matter is accounted for in chemical reactions.

important words for concept development				
subcluster	standards	new to grade level		previously introduced
Stoichiometry	C.9(C), C.9(D)	actual yield	limiting reactant/reagent	product
		Boyle's law	molar mass	reactant
		coefficient	molar volume	
		conversion factor	mole ratio	
		dimensional analysis	percent yield	
		excess reactant/reagent	stoichiometry	
		final product	theoretical yield	
		initial compound		
Mass Conservation and Reactions	C.9(A), C.9(B)	acid-base reaction		aqueous
		balanced equation		coefficient
		oxidation number		combustion
		oxidation-reduction reaction		decomposition
		precipitation reaction		double replacement
		reduce		gas
		salt		heat
		single replacement		law of conservation of mass
		synthesis		
		whole number ratios		
				liquid
				oxidize
				precipitate
				product
				reactant
				solid
				yield

Principles of Gases

C.10 Science concepts. The student understands the principles of the kinetic molecular theory and ideal gas behavior.

important words for concept development				
subcluster	standards	new to grade level		
Principles of Gases	C.10(A), C.10(B), C.10(C)	absolute temperature	kinetic molecular theory	kinetic energy
		absolute zero	mole	potential energy
		Avogadro's law	partial pressure	
		Boyle's law	pressure	
		Charles' law	pressure unit	
		compressible	real gas	
		constituent gases	repulsion	
		Dalton's law of partial pressure	STP (standard temperature and pressure)	
		elastic collision		
		Gay-Lussac's law	total pressure	
		ideal gas	units of pressure (kPa, mmHg, Torr, atm)	
		ideal gas law		
		Kelvin temperature		

Solutions

C.11 Science concepts. The student understands and can apply the factors that influence the behavior of solutions.

important words for concept development					
subcluster	standards	new to grade level		previously introduced	
Solutions	C.11(A), C.11(B)	boiling point dissociation electrolyte electronegativity freezing point hydrogen bond insoluble melting point	nonelectrolyte polar molecule polarity saturated solution saturation point solubility curve graph supersaturated solution unsaturated solution	adhesion capillary action cohesion conductivity heterogeneous homogeneous mixture	precipitate solubility soluble solute solution solvent surface tension
Solubility	C.11(C), C.11(D)	nonpolar polar		agitation aqueous solution dissolution insoluble particle precipitate	solubility soluble solute solvent surface area temperature
Molar Concentration	C.11(E), C.11(F)	concentrated solution diluted solution dilution molar concentration molarity (M) mole		solute solution solvent	

Acids and Bases

C.12 Science concepts. The student understands and applies various rules regarding acids and bases.

important words for concept development					
subcluster	standards	new to grade level		previously introduced	
Chemical Nomenclature	C.12(A)	acid anion base binary cation	ion IUPAC nomenclature rules polyatomic ion ternary		
Chemical Properties	C.12(B), C.12(C), C.12(E)	Arrhenius acid Arrhenius base base 10 basic Bronsted-Lowry acid Bronsted-Lowry base dissociation reaction hydrogen (H ⁺) hydrogen ion hydronium (H ₃ O ⁺) hydroxide (OH ⁻)	ionize litmus paper logarithm negative log pH proton proton acceptor (H ⁺) proton donor (H ⁺) strong acid strong base weak acid weak base	acidic acidity alkaline alkalinity double replacement	neutral neutralization reaction pH scale product reactant
Chemical Changes	C.12(D)	caustic corrosive neutralization pH pH indicator salt		acidic alkaline basic	

Thermochemistry

C.13 Science concepts. The student understands the energy changes that occur in chemical reactions.

important words for concept development					
subcluster	standards	new to grade level		previously introduced	
Thermodynamics	C.13(A)	absolute zero boundary closed system entropy first law of thermodynamics heat flow internal energy isolated system	open system second law of thermodynamics surroundings thermal expansion third law of thermodynamics zeroth law of thermodynamics	conduction convection heat transfer law of conservation of energy radiation	
Heat Calculations	C.13(B), C.13(C), C.13(D)	activated complex activation energy calorie calorimetry catalyst endothermic enthalpy exothermic	heat heat enthalpy joule product energy reactant energy specific heat surroundings temperature change	conduction convection heat transfer law of conservation of energy	mass radiation system

Nuclear Chemistry

C.14 Science concepts. The student understands the basic processes of nuclear chemistry.

subcluster	standards	important words for concept development	
		new to grade level	previously introduced
Nuclear Reactions	C.14(A), C.14(B), C.14(C)	alpha particle	neutron
		beta particle	nuclear decay
		chain reaction	nuclear instability
		diagnostic imaging	nuclear stability
		electromagnetic radiation	radiation therapy
		fission	radioactive decay
		fusion	solar cell
		gamma photon	