

Chemistry Objectives

Matter, and Measurement The student will be able to:	LPS Standard	State Standard	Text Pages
1. know the definition of chemistry and be knowledgeable about specific disciplines of chemistry.			3-14
2. understand the nature of the scientific method and distinguish among hypothesis, theory, and law.		12.8.2	15-16
3. understand matter in terms of definition, states, changes in state, and chemical and physical properties.	12.2.4b	12.1.2a	29-31
4. understand the classification of matter as substances and mixtures.	12.2.4d	12.1.2a	32-38
5. understand physical and chemical changes and the conservation of mass.	12.2.4e 12.2.6b	12.1.2a	41-43
6. understand matter in terms of mass, volume, and density.		12.1.2	68-72
7. understand temperature in terms of Kelvin and Celsius.			74-75
8. use the SI system in taking and recording measurements in terms of significant figures, precision and accuracy.			51-67

Atomic Structure and Nuclear Change The student will be able to:	LPS Standard	State Standard	Text Pages
1. understand the progression of the atomic model from Dalton to Thomson to Rutherford.	12.2.5b	12.8.3	107-112
2. understand the atom in terms of subatomic particles, mass number, atomic number, isotopes, and atomic mass.	12.2.4a 12.2.5a 12.2.5c	12.3.1a	113-121
3. understand the arrangement of elements of the periodic table in terms of sequence, the placement of elements into groups and regions of the chart and writing chemical symbols.	12.2.5a 12.2.5d	12.3.2d	123-126
4. understand radioactivity and alpha, beta, and gamma radiation.		12.3.1b	841-844
5. define and understand half-life.		12.3.1	847-849
6. understand the differences between nuclear fission and nuclear fusion.		12.3.1	853-856

Electron Configuration and Periodicity The student will be able to:	LPS Standard	State Standard	Text Pages
1. understand or be able to explain atomic spectra of the hydrogen atom.		12.3.1	372-375 379-380
2. understand the Bohr model as an electron distribution into energy levels within the electron cloud.		12.3.1	361-362
3. understand how electrons are configured within the electron cloud of an atom according to the Aufbau Principle, Hund's Rule, and Pauli Exclusion principle.		12.3.1	364-370
4. write electron configurations.		12.3.1	367-370
5. understand how electron configuration places elements on the periodic table and can be used to classify elements.	12.2.5d	12.3.1 12.3.2b	391-396
6. understand the correlation between atomic properties (such as atomic size and ionization energy), electron configuration, and the placement of the elements on the periodic table.	12.2.5d	12.3.2b	398-406

Bonding The student will be able to:	LPS Standard	State Standard	Text Pages
1. understand how valence electron configurations can be expressed as electron dot structures for representative elements.	12.2.5e	12.3.1	413-418
2. understand ionic bonding as a transfer of electrons in the formation of ionic compounds.	12.2.5e	12.3.3c	419-421
3. understand the properties of ionic compounds as an outcome of ionic bonding.	12.2.5f	12.3.2	422-426
4. understand the nature of covalent bonds in the formation of single, double, and triple bonds.	12.2.5f	12.3.2a 12.3.3c	437-443
5. understand how to write electron dot structures for covalently bonded molecules.		12.1.2a 12.3.3c	437-451
6. explain formation of polar bonds and polar molecules as an outcome of covalent bonds.	12.2.5f	12.3.2d	460-462
7. Students will understand molecular properties of substances in terms of intermolecular attractions.	12.2.5f	12.3.2d	463-466
8. use ionic and covalently bonding concepts to correctly write the formulas of inorganic compounds.		12.3.2	146-156
9. name inorganic ionic and molecular compounds.		12.3.2	158-160
10. distinguish organic compounds as saturated and unsaturated compounds, and structural isomers.		12.3.2f	742-754

Mole Concept The student will be able to:	LPS Standard	State Standard	Text Pages
1. understand mole as a count of particles.		12.1.3a	171-176
2. determine molar mass from a chemical formula.			177-183
3. understand how to relate the mass of a substance to moles or to the number of particles and vice versa.		12.1.2d	185-186
4. understand how to relate the volume of a gas at STP to moles or to the number of particles and vice versa.		12.1.2d	184-186
5. determine the percent composition of elements that compose a particular compound.			190-191
6. understand how to find an empirical formula from percent composition data of a compound.		12.1.2d	192-194

Balancing Equations and Stoichiometry The student will be able to:	LPS Standard	State Standard	Text Pages
1. understand equation symbols and how to balance chemical equations.	12.2.6a		203-211
2. understand how to identify the type of chemical reaction from examination of the equation.		12.3.3a	211-223
3. understand how to use the activity series to predict the feasibility and products of a single replacement reaction.		12.1.1a	216-218
4. understand the coefficients can be interpreted as moles in a balanced chemical equation.		12.3.3a	237-241
5. perform unit conversions including using scientific notation.		12.3.3a,d	89-100
6. understand how to carry out stoichiometric calculations from balanced equations.		12.1.3d	242-251

7. understand how to determine limiting reactants to carry out stoichiometric calculations.			251-255
8. understand how to determine percent yield.		12.1.2d	256-259

Kinetic Theory, Thermochemistry and Behavior of Gases The student will be able to:	LPS Standard	State Standard	Text Pages
1. understand the basic tenets of the kinetic molecular theory as particle motion.	12.2.4b	12.3.3	267
2. understand how the kinetic molecular theory relates to gas pressure and Kelvin temperature.	12.2.4c	12.1.2a	268-272
3. understand particle models for solids and particles.	12.2.4b	12.1.2a	274-275, 280
4. understand energy transformations as exothermic and endothermic processes.		12.1.1a	293-294
5. understand calorimetry as a means to find the heat of reaction.		12.1.3d	300-306
6. understand the physical aspects that correlate to specific segments of a cooling or heating curve.		12.1.2a	303-306
7. understand phase changes.	12.2.4b	12.1.2	303-306
8. understand how the kinetic molecular theory is applied to gas behavior in a qualitative sense.	12.2.4c	12.1.3e	327-331
9. understand gas laws that make relationships quantitative among variables affecting gas behavior		12.1.3d	333-343 350-351

Water and Solutions The student will be able to:	LPS Standard	State Standard	Text Pages
1. understand the unique properties of water.		12.1.2a	475-481
2. understand the nature of solutions in terms of electrolytic properties, and “like dissolves like.”		12.3.2 12.1.2b	482-485
3. understand the differences among solutions, colloids, and suspensions.		12.3.2	490-492
4. understand the nature of solution formation as an interaction of solvent and solute.		12.2.3	501-503
5. understand factors affecting solubility		12.2.3	503-507
6. understand molarity in terms of calculation and preparation from reagents and calculation and preparation from a stock solution.			509-512

Kinetics and Equilibrium The student will be able to:	LPS Standard	State Standard	Text Pages
1. understand collision theory as a controlling factor in reaction rates.		12.3.3d	533-536
2. explain the factors that affect the rate of reaction.	12.2.6c	12.3.3d	536-538
3. understand the nature of reversible chemical reactions that can lead to chemical equilibrium.		12.1.5b	539-541
4. understand the factors that affect chemical equilibrium.		12.1.5b	541-548
5. understand driving forces of chemical reaction in terms of entropy and heat change.		12.1.5	549-555

Acids and Bases The student will be able to:	LPS Standard	State Standard	Text Pages
1. list properties and name acids and bases.		12.3.3	577-579
2. understand solutions as acidic, basic, or neutral in terms of the ion-product expression (K_w).		12.3.3	580-582
3. understand solutions as acidic, basic, or neutral in terms of pH.		12.3.3	582-584
4. understand indicators, measure pH, and calculate pH.		12.3.3	586-592
5. understand Arrhenius and Bronsted-Lowry theories of acids and bases.		12.1.2	594-599
6. distinguish between strong and weak acids and bases.		12.1.2	600-604
7. write balanced equations to represent acid-base neutralization reactions.		12.3.3a	613-615
8. understand the purpose of titration, and relate the titration curve to chemical events.		12.1.2	616-618

Oxidation-Reduction The student will be able to:	LPS Standard	State Standard	Text Pages
1. define oxidation - reduction in terms of changes in electrons and oxidation numbers.		12.3.2a	645-650
2. determine the oxidation number of an atom of any element from the chemical formula.		12.3.3	654-656
3. identify oxidation-reduction reactions.		12.3.2a	654-656
4. understand oxidation-reduction chemical equations.		12.3.3a	663-668

Textbook: *Addison-Wesley Chemistry*, Wilbraham, Staley, Matta, & Waterman, Prentice Hall, 2002

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