

Chemistry 101 – Syllabus Supplement – Lesson Objectives and Map to Learning Objectives and ICE

Text: Denniston, Caret & Topping, “General, Organic, and Biochemistry,” 5th Edition, McGraw Hill (2007)

Chapter Lesson Objectives (see text)	Meets Course Learning Objective(s)	Ideas, Connections, Extensions
Chapter 1		
1.1 Explain the scientific method and correctly use the terms “hypothesis,” “theory,” and “scientific law”	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
1.2 Classify matter, describe properties of matter, and classify types of physical and chemical change in matter	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
1.3 Learn units of measurement in the English and metric systems and be able to interconvert between them	#2 – Understand and apply the nomenclature and symbols of chemistry #3 – Apply mathematics to solve chemical problems	Ideas, Connections Connections, Extensions
1.4 Distinguish between data and results, be able to use scientific notation, and report data and results to the proper number of significant figures	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections
Chapter 2		
2.1 Identify the types of subatomic particles, describe their properties, and determine the number in each atom	#1 – Describe substances and their behavior using the definitions and terminology of chemistry #2 – Understand and apply the nomenclature and symbols of chemistry	Ideas Ideas, Connections
2.2 Distinguish among atoms, ions, and isotopes	#1 – Describe substances and their behavior using the definitions and terminology of chemistry #2 – Understand and apply the nomenclature and symbols of chemistry	Ideas Ideas, Connections
2.3 Understand and use the periodic table to obtain	#4 – Relate atomic structure to the	Connections

information about an element, recognizing families (groups), periods, metals, and nonmetals	organization of the periodic table and to chemical formulas	
2.4 Write electron configurations for atoms of common elements and use the octet rule to predict the charge on common ions	#4 – Relate atomic structure to the organization of the periodic table and to chemical formulas	Connections
Chapter 3		
3.1 Classify compounds according to the type of bonding they exhibit (ionic, covalent, polar covalent)	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
3.2 Be able to write the name of a compound when given the formula, and vice versa	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections
3.3 Draw Lewis structures for compounds and ions, and use Lewis structures and VSEPR theory to predict geometry	#4 – Relate atomic structure to the organization of the periodic table and to chemical formulas	Connections
	#5 – Relate molecular structure to the properties of substances	Connections
3.4 Relate properties of compounds to their bonding and geometry	#5 – Relate molecular structure to the properties of substances	Connections
Chapter 4		
4.1 Understand the mole as a measure of quantity and carry out calculations involving moles	#3 – Apply mathematics to solve chemical problems	Connections, Extensions
4.2 Calculate formula weights of compounds	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections
	#3 – Apply mathematics to solve chemical problems	Connections, Extensions
4.3 Balance and interpret chemical equations	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections
4.4 Use mass and formula weight data to calculate theoretical and percent yields	#3 – Apply mathematics to solve chemical problems	Connections, Extensions
Chapter 5		

5.1 Use kinetic molecular theory to describe the behavior of gases, liquids, and solids	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
5.2 Use gas laws to predict conditions and changes in gases	#2 – Understand and apply the nomenclature and symbols of chemistry #3 – Apply mathematics to solve chemical problems	Ideas, Connections Connections, Extensions
5.3 Describe processes involving changes in states of matter	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
5.4 Describe intermolecular forces and relate them to physical properties of matter	#1 – Describe substances and their behavior using the definitions and terminology of chemistry #5 – Relate molecular structure to the properties of substances	Ideas Connections
5.5 Identify classes of solids	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
Chapter 6		
6.1 Explain the terms “solution,” “solute,” and “solvent”	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
6.2 Calculate solution concentrations in percent, parts per million, and molarity	#1 – Describe substances and their behavior using the definitions and terminology of chemistry #3 – Apply mathematics to solve chemical problems	Ideas Connections, Extensions
6.3 Perform dilution calculations	#3 – Apply mathematics to solve chemical problems	Connections, Extensions
6.4 Understand concentration-dependent solution	#1 – Describe substances and their	Ideas

properties	behavior using the definitions and terminology of chemistry	
6.5 Describe the characteristics of water which make it unique	#5 – Relate molecular structure to the properties of substances	Connections
6.6 Understand the role of electrolytes in blood	#6 – Relate chemical principles to other disciplines, such as biology	Extensions
Chapter 7		
7.1 Use the terminology of thermochemistry to describe the heat flow between objects	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
7.2 Describe the concept of reaction rate and relate rate to molecular structure, concentration, temperature, etc.	#1 – Describe substances and their behavior using the definitions and terminology of chemistry #5 – Relate molecular structure to the properties of substances	Ideas Connections
7.3 Use reaction rate data to determine elementary processes in a reaction mechanism	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections
7.4 Recognize and describe equilibrium situations	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
7.5 Calculate equilibrium constants and predict changes in equilibrium systems using LeChatelier's principle	#3 – Apply mathematics to solve chemical problems	Connections, Extensions
Chapter 8		
8.1 Identify acids and bases and predict the products of acid-base reactions	#1 – Describe substances and their behavior using the definitions and terminology of chemistry #2 – Understand and apply the nomenclature and symbols of chemistry	Ideas Ideas, Connections
8.2 Calculate pH from concentration data and vice	#3 – Apply mathematics to solve	Connections, Extensions

versa	chemical problems	
8.3 Understand the importance of pH in biological systems	#6 – Relate chemical principles to other disciplines, such as biology	Extensions
8.4 Understand the meaning and importance of buffers	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
8.5 Explain oxidation and reduction	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections
Chapter 9		
9.1 Understand the various types of nuclear radiation and their properties	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
9.2 Write balanced equations for nuclear processes	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections
9.3 Explain uses for nuclear chemistry in diagnostics and therapeutics	#6 – Relate chemical principles to other disciplines, such as biology	Extensions
Chapters 10 and 11		
10.1 Compare and contrast organic and inorganic compounds	#1 – Describe substances and their behavior using the definitions and terminology of chemistry	Ideas
10.2 Identify and draw organic functional groups and families	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections
10.3 Use different methods for depicting structures	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections
10.4 Understand the relationship between structure and properties in saturated hydrocarbons	#5 – Relate molecular structure to the properties of substances	Connections
10.5 Use basic nomenclature rules to name simple organic compounds	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections
10.6 Understand the three-dimensional structure of basic organic compounds with respect to isomers and	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections

conformations		
10.7 Write equations for basic reactions involving hydrocarbons	#2 – Understand and apply the nomenclature and symbols of chemistry	Ideas, Connections