

Table of Contents

<u>Unit</u>	<u>Page</u>
1. <u>Introduction</u> (Lesson 1)	1
Points of Inquiry	1
What you will need for the course	2
The Calculator	2
Using the Textbook	3
2. <u>The Tools We Need</u> (Lessons 2 – 4)	5
Points of Inquiry	5
Scientific Notation	6
Measurements	7
The Metric System	8
Problem Solving	9
Significant Figures	10
Rounding Off	11
Density and Specific Gravity	12
Temperature and Heat	14
Exercises	16
Quick Quiz	17
3. <u>A First Look at Matter</u> (Lesson 5)	19
Points of Inquiry	19
Matter and the States of Matter	20
Properties and Changes	21
Elements and Compounds	22
Substances and Mixtures	22
Exercises	25
Quick Quiz	27

4.	<u>The Stuff of Matter</u>	29
	(Lessons 6 – 8)	
	Points of Inquiry	29
	Elements	30
	Beginnings of Atomic Theory	31
	Atomic Structure – 3 Great Minds	31
	Atoms and Isotopes	33
	The Periodic Table	35
	Ions and How They Form	38
	Ionic Compounds	39
	Exercises	41
	Quick Quiz	45
5.	<u>Nomenclature</u>	47
	(Lessons 9-10)	
	Points of Inquiry	47
	Introduction	48
	Binary – 2 Non-metals	49
	Binary – Metal & Non-metal	50
	Binary – Acids	53
	Ternary – Acids	54
	Ternary – Metal & Radical	56
	Miscellaneous	57
	Common Names	57
	Exercises	58
	Quick Quiz	61
6.	<u>Introduction to Reactions</u>	63
	(Lesson 11)	
	Points of Inquiry	63
	Introduction	64
	Characteristics of Reactions	64
	Information from Equations	65
	Balancing Chemical Equations	66
	Exercises	68.
	Quick Quiz	71

7.	<u>Reactions in Solution</u>	73
	(Lessons 12 - 14)	
	Points of Inquiry	73
	The Chemistry of Dissolving	74
	Net and Total Ionic Equations	78
	Acids and Bases	79
	Metathetical Reactions	79
	Single Replacement Reactions	80
	Exercises	82
	Quick Quiz	85
8.	<u>Other Types of Reactions</u>	87
	(Lesson 15)	
	Points of Inquiry	87
	Simple Combination Reactions	88
	Combustion	89
	Decomposition	89
	Oxidation-Reduction Reactions	90
	Exercises	92
	Reaction Review/Exercises	93
	Quick Quiz	95
9.	<u>The Mole and Chemical Formulas</u>	97
	(Lessons 16 – 18)	
	Points of Inquiry	97
	Relative Weights	98
	The Mole	100
	Percent Composition	104
	Empirical Formulas	105
	Molecular Formulas	107
	Exercises	108
	Quick Quiz	111

10.	Calculations from Chemical Equations	113
	(Lessons 19-20)	
	Points of Inquiry	113
	Introduction	114
	Calculations from Equations	115
	Limiting Reagents	118
	Percent Yields	119
	Exercises	121
	Quick Quiz	123
11.	Energy in Reactions	125
	(Lessons 21-22)	
	Points of Inquiry	125
	Definitions	126
	Classifying Energy	127
	Exothermic and Endothermic Processes	127
	Hess's Law	128
	Specific Heat Capacity	128
	Biofuels	131
	Exercises	132
	Quick Quiz	133
12.	Atomic Theory	135
	(Lessons 23-28)	
	Points of Inquiry	135
	The Electromagnetic Spectrum	136
	A History Lesson	138
	The Bohr Model	138
	The Wave Mechanical Model	139
	Electron Configurations	140
	The Periodic Table (again)	146
	Ionization energy	148
	Size of Atoms	149
	Electron Affinity	150
	Electronegativity	151
	Isoelectronic Series	152
	Electron Configuration of Ions	153
	Exercises	154
	Quick Quiz	157

13.	Bonding	159
	(Lessons 29 – 31)	
	Points of Inquiry	159
	Ionic Bonds	160
	Properties of Ionic Compounds	162
	Covalent Bonds	162
	Molecular Geometry	163
	Lewis Dot Structures	165
	Polar Molecules	168
	Exercises	170
	Quick Quiz	173
14.	Gases and the Gas Laws	175
	(Lessons 32 – 35)	
	Points of Inquiry	175
	Kinetic Molecular Theory	176
	Boyle’s Law	177
	Charles Law	179
	General Gas Law	181
	Dalton’s Law	183
	The Ideal Gas Law	185
	Calculations from Equations	186
	Exercises	188
	Quick Quiz	191
15.	Solids and Liquids	193
	(Lessons 36 – 37)	
	Points of Inquiry	193
	The Properties of Water	194
	Changes of State	195
	Forces of Attraction	197
	Bonding in Solids	200
	Bonding in Metals	201
	Exercises	202
	Quick Quiz	205

16.	Chemistry in Solution	207
	(Lessons 38 – 40)	
	Points of Inquiry	207
	Terms	208
	The Process of Dissolving	208
	Percent Solutions	210
	Molarity of Solutions	211
	Dilution of Solutions	212
	Calculations from Equations	214
	Exercises	218
	Quick Quiz	221
17.	pH and Buffers	223
	(Lessons 41-42)	
	Points of Inquiry	223
	Strong and Weak Acids	224
	Equilibrium	225
	pH and pOH	225
	Buffers	230
	Application to the Human Body	232
	Exercises	233
	Quick Quiz	235
18.	Radioactivity	237
	(Lesson 43)	
	Points of Inquiry	237
	Another Look at the Nucleus	238
	Important Terms	239
	Radioactive Decay	239
	Radioactive Bombardment	243
	Carbon Dating	243
	Nuclear Energy	244
	Effects of Radiation	245
	Exercises	246
	Quick Quiz	247

Appendix	249
Solubility Rules	251
Activity Series of the Elements	253
Table of Common Oxidation Numbers	255
Answers to Select Exercises	257
Answers to Quick Quizzes	268