Table of Contents

Preface v

Acknowledgments vi

High School POGIL Initiative. . . . . .vii–viii

Introduction to Chemistry

Safety First 1

Fundamentals of Experimental Design 7

Organizing Data. 13

Significant Digits and Measurement 23

Significant Zeros. 31

Classification of Matter 39

Atomic and Electron Structure

Isotopes 47

Ions 53

Average Atomic Mass 59

Coulombic Attraction 67

Electron Energy and Light 75

Electron Configurations 83

The Periodic Table

Cracking the Periodic Table Code. 93

Periodic Trends. 107

Ionic and Molecular Compounds

Naming Ionic Compounds. 115

Polyatomic Ions 123

Naming Molecular Compounds. 133

Naming Acids. 141

Molecular Geometry 145

Chemical Reactions and Stoichiometry

Types of Chemical Reactions 153
Relative Mass and the Mole 161
Mole Ratios 169
Limiting and Excess Reactants 175

Properties of Gases

Gas Variables 185

Solubility and Solutions

Saturated and Unsaturated Solutions 195
Solubility 203
Molarity 209

Thermochemistry

Calorimetry 217
Bond Energy 225

Equilibrium

Equilibrium 235

Acids and Bases

Acids and Bases 245
Strong versus Weak Acids 251
Calculating pH. 259

Oxidation and Reduction

Oxidation and Reduction 267
The Activity Series 275
Batteries 283