

# Kolbe Academy Home School

## HIGH SCHOOL CHEMISTRY WITH LAB *Prentice Hall Chemistry*

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**Resale & Copying Policy:** This course plan and all accompanying materials are not intended for resale or copying. Copying represents copyright infringement, which is illegal. Regarding reselling the materials, Kolbe Academy relies upon the continued purchase of our course plans for financial stability. As a Catholic Apostolate, we ask you to refrain from reselling Kolbe's course plans. While we cannot stop you from copying or reselling this course plan, we do strongly implore you not to do so.

**COURSE TITLE:** Chemistry

**COURSE TEXTS:**

- ❖ *Chemistry* by Wilbraham, Staley, Matta, and Waterman, © 2005, Prentice Hall, (T5250)
- ❖ Prentice Hall *Virtual Labs Chemistry* CD-ROM (T5250B)
- ❖ Kolbe Academy Chemistry Answer Key with ChemASAP student online access, (T5250A), Optional

**COURSE DESCRIPTION:**

This course is designed to give students an appreciation of creation and of the order and complexity of atoms and their interactions with each other. The course plans outline a track for a Kolbe Academy Core course (K) and a Kolbe Academy honors course (H) in Chemistry. The "Core Chemistry" track will emphasize the basic chemical interactions between atoms, compounds, and molecules while the "Honors Chemistry" track will delve more deeply into the theoretical, mathematical, and organic chemical processes.

This course provides an introduction to chemistry suitable for students in a college preparatory program. The honors track, although up to the parent's discretion, is aimed for students who have previously had a solid background in physical science. A student who still wishes to pursue this course as an honors course that did not follow the recommended course of study for physical science may find that the pace of the course very quick and should be sure to allot extra time for their studies. The honors track should be followed if students wish to have the opportunity to take the AP test in Chemistry. Since this book is NOT a college text, it is important to study for the AP with an AP specified study guide for Chemistry. Most of the topics needed to be successful on the Chemistry AP exam are covered in the honors course of study. To see the AP chemistry requirements, go to [www.collegeboard.com](http://www.collegeboard.com).

**SCOPE AND SEQUENCE:**

- |  |   |
|--|---|
| 1. Problem Solving in Chemistry          | 13. Water and aqueous systems                         |
| 2. Matter and Change                     | 14. Solutions   |
| 3. Scientific Measurement                | 15. Thermochemistry                                   |
| 4. Atomic Structure                      | 16. Reaction rates and equilibrium                    |
| 5. The Periodic Table                    | 17. Acids, bases and salts                            |
| 6. Ionic, metallic, and covalent bonding | 18. Oxidation – reduction reactions                   |
| 7. Chemical names and formulas           | 19. Electrochemistry                                  |
| 8. Balancing chemical equations          | 20. Hydrocarbon compounds                             |
| 9. Chemical reactions                    | 21. Alcohols, ethers, carbonyl compounds              |
| 10. Stoichiometry                        | 22. Carbohydrates, amino acids, lipids, nucleic acids |
| 11. States of Matter                     | 23. Nuclear chemistry                                 |
| 12. Gas behavior                         |   |

**DIPLOMA REQUIREMENTS:**

**Summa Cum Laude** diploma candidates are required to follow either the Kolbe Core course (K) or Kolbe Honors course (H) track outlined in the course plan, and are required to fulfill the laboratory component with this chemistry course (see page 5). **Magna Cum Laude** and **Standard** diploma candidates may choose to pursue the (H) or (K) designation, but are not required to do so, and instead have the option of altering the course plan as they choose. **Summa** students must complete 4 years of science during their high school course of study including Biology with Lab, Chemistry with Lab, Physics with Lab, and a pre-approved science elective. **Magna** students must complete 3 years of science during their high school course of study including Biology, Chemistry, and a physical science. **Standard** diploma students must complete 2 years of science including a biological and physical science. For a student pursuing the **Magna Cum Laude** diploma, the science requirement dictates that lab work is incorporated into two of the following three courses: Biology, Chemistry or Physics. There is no lab requirement for the **Standard** diploma. Please see below for specific course titles, quarterly reporting requirements and transcript designations for chemistry.

**REQUIRED SAMPLE WORK:**

Designation*			K	K	H
Course Title	Chemistry	Chemistry w/ Lab	Chemistry	Chemistry w/ Lab	Chemistry w/ Lab
<b>Quarter 1</b>	1. Any written sample work.	1. Any written sample work. 2. Any sample lab work	1. Exam I with "Core" sections answered fully	1. Exam I with "Core" sections answered fully 2. 1 lab report	1. Exam I with "Honors" sections fully answered 2. 1 lab report
<b>Quarter 2</b>	1. Any written sample work.	1. Any written sample work. 2. Any sample lab work	1. Exam II 2. Exam III Each with "Core" sections answered fully	1. Exam II 2. Exam III Each with "Core" sections answered fully 3. 1 lab report	1. Exam II 2. Exam III Each with "Honors" sections answered fully 3. 1 lab report
<b>Quarter 3</b>	1. Any written sample work.	1. Any written sample work. 2. Any sample lab work	1. Exam IV with "Core" sections fully answered	1. Exam IV with "Core" sections answered fully 2. 1 lab report	1. Exam IV with "Honors" sections answered fully 2. 1 lab report
<b>Quarter 4</b>	1. Any written sample work.	1. Any written sample work. 2. Any sample lab work	1. Exam V 2. Exam VI Each with "Core" sections fully answered	1. Exam V 2. Exam VI Each with "Core" sections fully answered 3. 1 lab report	1. Exam V 2. Exam VI Each with "Honors" sections answered fully 3. Lab report for Honors Project

\*Designation refers to designation type on transcript. K designates a Kolbe Academy Core course. H designates a Kolbe Academy Honors course.

If the student wishes to have the course distinguished on the transcript with a (K) as a Kolbe Academy Core course or with an (H) as a Kolbe Academy Honors course, please be sure to send the correct exams and components each quarter for verification as specified above. **If no designation on the transcript is desired,**

parents may alter the lesson plan and any written sample work is acceptable to receive credit for the course each quarter. If you have any questions regarding what is required for the (K) or (H) designations or diploma type status, please contact the academic advisory department at 707-255-6499 ext. 5 or by email at [advisors@kolbe.org](mailto:advisors@kolbe.org).

### COURSE PLAN "AT A GLANCE" OUTLINE:

#### **Core Chemistry (K)**

##### **Quarter 1**

Weeks 1-5: Chapters 1-4  
Week 6: Exam I  
Weeks 7-9: Chapters 5-7 (Week 9: Quiz 1)

##### **Quarter 2**

Week 1: Chapter 7 (cont)  
Week 2: Exam II  
Weeks 3-8: Chapters 8-10 (Week 5: Quiz 2)  
Week 9: Exam III

##### **Quarter 3**

Weeks 1-5: Chapters 11-14  
Week 6: Exam IV  
Weeks 7-9: Chapters 15-17

##### **Quarter 4**

Weeks 1-3: Chapter 17 (cont), 18-20  
Week 4: Exam V  
Weeks 5-8: Chapters 21, 22, 25  
Week 9: Exam VI

#### **Honors Chemistry (H)**

##### **Quarter 1**

Weeks 1-4: Chapters 1-4  
Week 5: Exam I  
Weeks 6-9: Chapters 5-7 (Week 8: Quiz 1)

##### **Quarter 2**

Week 1: Exam II  
Weeks 2-8: Chapters 8-12 (Week 5: Quiz 2)  
Week 9: Exam III

##### **Quarter 3**

Weeks 1-5: Chapters 13-16  
Week 6: Exam IV  
Weeks 7-9: Chapters 17-19

##### **Quarter 4**

Weeks 1-2: Chapter 19 (cont), 20  
Week 3: Exam V  
Weeks 4-8: Chapters 21-25  
Week 9: Exam VI

**Please note that many chapters are not covered in their entirety. Be sure to refer to the course plan that follows for specific guidance.**

**COURSE PLAN METHODOLOGY:** In most chemistry courses, it is beneficial for students to memorize certain things in order to aid them in doing more difficult problems and grasping deeper ideas later in the course. Quizzes have been included for those concepts deemed necessary for memorization, and students should not take these lightly. Further, memorization of basic equations and formulas may be necessary for some students, but important chemical formulas will be used often enough in weekly assignments such that students should become naturally adept at the understanding and manipulation of these formulas.

There are 6 exams incorporated into the chemistry course. These exams reflect the content of the assignments in the weekly course plans. If students do the work assigned during the week, they should be adequately prepared for any question that arrives on the exams. The exams consist of many different types of questions including matching, multiple choice, and essays. In order to receive the Kolbe Honors course designation (H) on their transcript, students must complete all the sections on the exams that are labeled "Honors Chemistry". Students wishing to receive the Kolbe Core course designation (K) must complete all the sections that are labeled "Core Chemistry". Students may not skip or alter questions except when specified by the directions within the exam itself if they wish to receive either the (H) or (K) designation for this course. As parents are the primary educator, they may alter the course plan or exams as needed if the student does not desire the (H) or (K) designation on the transcript. **For struggling students**, it is suggested that parents cut out Exam VI and the accompanying material to allow ample time to concentrate on material covered in Exams I – V.

Lab work is suggested throughout the lesson plan through the use of the Virtual Lab CD and labs in the textbook that do not require extensive materials. Alternately, a parent may choose to utilize the labs that occur in the textbook for lab credit. **To qualify the course as a lab science, students should spend an average of one hour per week doing some type of lab work.** This may include field observation, chemical experiments, or using the virtual laboratory CD. Students may receive lab credit by other means than following the course plan suggestions such as a home school co-op, hands-on lab at home, college lab course etc. **A separate grade should NOT be given for the lab work, but should be incorporated into the overall grade given for the course.** Parents may determine the weight the lab component will have on the final grade, but typical values ranges from 15-25% of the total grade.

If this text is being used in preparation for the **AP Chemistry exam**, students should complete assignments under the Honors Chemistry heading. Since this book is NOT a college text, it is important to study for the AP with an AP specified study guide for Chemistry. Most of the topics needed to be successful on the Chemistry AP exam are covered in the honors course of study. To see the AP Chemistry requirements, go to [www.collegeboard.com](http://www.collegeboard.com). AP is a registered trademark of the College Board.

This chemistry text has a wealth of appendices for the student to utilize. The **Elements Handbook** begins on page R2 in appendix A. This is a useful reference for quick facts about the major groups of elements in the periodic table. **Reference Tables** are located on page R46 in appendix B. This appendix gives the students a quick reference point for different physical constants, conversion factors, and lists of symbols for common ions, elements. Finally, the **Math Handbook** (appendix C) begins on page R56 and is especially useful for reviewing mathematical concepts that are involved in solving different chemistry problems. Anytime certain math skills are used in the text to solve complex chemistry problems, there will be an indicator of where to find information on the mathematical processes involved in the Math Handbook. It will typically give you the page number to find relevant information. The interactive textbook includes even more additional resources for students. Here, there

are **guided reading** and **study worksheets** to help concentrate the student's thoughts on the most important concepts of the chapter. Please see the User's Manual included in the Kolbe Academy Chemistry Answer Key for specific guidance on utilizing the Interactive Textbook.

**The following key will help the parent and student understand how each week's assignments are laid out.**

**Reading:** Includes sections of the chapter for students to read in the Prentice Hall *Chemistry* textbook.

**Assessment:** Suggested questions from the Prentice Hall *Chemistry* text within each chapter. The suggested questions will help the student prepare well for each exam provided by Kolbe Academy. Most of the practice problems that occur within the reading are assigned so that students will be able to practice the concepts they are learning as they read. **The problems marked with an asterisk (\*) indicates that a step-by-step tutorial is available for those questions online.**

**ChemASAP:** ChemASAP is an online application of the Interactive Chemistry textbook. It includes animations, simulations, and tutorials for students to use. Students receive access to the online interactive textbook with ChemASAP upon the purchase of the Kolbe Academy Chemistry Answer Key. To receive the code for accessing the interactive student text, please send in the Instructor Code Release form located on the first page in the Chemistry answer key.

Anytime the student sees in the margin "Interactive textbook ... with ChemASAP," there is an interactive animation, simulation, tutorial, or assessment that is available through the interactive chemistry textbook. The student should go to the corresponding section of the interactive textbook and look for the square button that says "ChemASAP." Please see the User's Manual for additional help.

**Go Online:** Prentice Hall/Pearson offers a free web tools for the Chemistry program. For each chapter, it includes official website links to topics covered in the chapter. Most importantly, it provides an online self-grading quiz called the "Self-Assessment." To access the "Self-Assessment," go to [www.phschool.com](http://www.phschool.com) and enter the web code for the quiz. Web codes are listed in the course plan for your convenience.

**Lab Work:** Suggested labs described on either the Prentice Hall *Virtual ChemLab* or from the Small Scale or Quick Labs located throughout the textbook. The labs chosen need little or no equipment to be completed at home. Many of the labs help the student to understand the more complex ideas, so lab work is more significant for the Honors Chemistry student. If you have equipment available to complete the labs that are outlined in the book, this would add a very good component to the course, and is a superior way to fulfill the lab requirement. However, the *Virtual ChemLab* is an excellent way to add the laboratory component to the course in a safe and affordable way. After installing the *Virtual ChemLab* software on your computer, 30 pre-set labs are available for lab work or the student may perform any lab using the software. The pre-set labs can be retrieved by clicking on the workbook that lay on the table after opening the virtual chem. Lab program. The student can enter the Virtual Laboratories by clicking on the General Chemistry lab door (the Organic Chemistry lab is not built into this software).

**Key Terms:** This is a list of important vocabulary terms to look out for as the student reads the chapter.

**Important Concepts:** The most important concepts for the student to understand are described in this section, as well as caveats or additional information that may be useful for the student as he or she reads through the material.

## ◆◆◆ FIRST QUARTER ◆◆◆

KOLBE ACADEMY WELCOME WEEK				
This week will be strictly dedicated to learning about the set up of the course and textbook, the virtual lab software, and all supplemental online materials.				
MON	<p>If you haven't already done so, <b>send in your Online Access Code Release Form</b> located in the beginning of the <i>Kolbe Academy Answer Key for Chemistry</i>. You can email, fax, or mail this form in. Email to <a href="mailto:homeinfo@kolbe.org">homeinfo@kolbe.org</a> or fax to 707-255-1581. If your answer key did not come with a form, please email Kolbe for a copy right away.</p> <p><b>Read pages 1 – 4</b> of the Kolbe Academy <b>Syllabus</b> for chemistry. Open the textbook to the table of contents. Compare the <b>Course "At A Glance" Outline</b> on page 4 of this syllabus to the table of contents in the text to see the titles of the chapters you will be covering this year. Decide with your parents, which course outline you prefer to cover: the Core Chemistry or Honors Chemistry, or another modified form of the course.</p>			
TUES	<p>If you are using the virtual lab software, <b>install</b> it on your computer. Using the software in conjunction with the Virtual Lab Record Sheets booklet, go through Lab #1 in its entirety. Do not answer any questions, just go through the procedure.</p>			
WED	<p>Using the <i>Kolbe Academy Answer Key for Chemistry</i>, open to <b>Part II</b>: Using other Online Support materials. Go through the entirety of Part II so that you will know how to access the Self-Assessments using the web codes.</p>			
THUR	<p>If you have already received your <b>online access code</b> from Kolbe Academy, you will be able to complete today's assignment. Otherwise, wait to do today's assignment until a later time.</p> <p>Using the <i>Kolbe Academy Answer Key for Chemistry</i>, open to <b>Part I: Using the Pearson/Prentice Hall Successnet Online Access</b>. Begin with "Creating a student username and password." Please take time to go through Part I in its entirety so that you will understand what is available to you in the Interactive Textbook.</p>			
FRI	<p>Read pages 5-6 of the course plan, paying special attention to the key that explains how each week's assignments are laid out. Compare the key with a few weeks in the course-plan since not every component appears in each week.</p> <p>Look ahead to Week 1. Take stock of the material you will be covering. Make sure you understand what each assignment is and whether it pertains to the course of study you will be following. You are now ready to begin your chemistry adventure!</p>			
WEEK 1				
	Core (K) Chemistry		Honors (H) Chemistry	
Reading	Chapter 1	Sections 1.1 – 1.4	Chapter 1	Sections 1.1 – 1.4
			Chapter 2	Sections 2.1 – 2.4
Assessment	<b>Chapter 1:</b> 21, 22, 25, 26, 27*, 28, 29*, 33, 47, 52, 62, 70, 76, 78		<b>Chapter 1:</b> 21, 22, 25 – 27*, 33, 47, 52, 62, 70, 76, 78, 80 <b>Chapter 2:</b> 6, 9, 10*, 14, 16, 18, 19*, 30, 35, 41, 46, 50, 56, 64, 70, 79, 81	
ChemASAP	Assessment 1.1 – 1.4		Animation 1	
			Assessment 1.4, 2.1-2.4	
Go Online	Chap 1: Self-Assess (Web Code: cda-1010)		Chap 1: Self-Assess (Web Code: cda-1010)	

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<b>Lab Work</b>	Quick Lab	Page 23	Small-Scale Lab	Page 26
	Small-Scale Lab	Page 26	Quick Lab	Page 45
<b>Key Terms</b>	<b>Core Chemistry (K) Students</b>			
	<b>Chapter 1</b> analytical chemistry applied chemistry biochemistry biotechnology	organic chemistry physical chemistry macroscopic microscopic manipulated variable	responding variable observation matter scientific law theory	
	<b>Honors (H) students are responsible for all of the vocabulary listed in the Study Guides on page 33 and page 57 of the textbook.</b>			
<b>Important Concepts</b>	<p>Although there appears to be quite a bit of material covered for the honor's students, much of this week's assignments are a review of concepts covered either in Biology or Physical Science. Most students will find most of the concepts in Chapter 1 easy to grasp, and can feel free to skim chapter 1 for major concepts. The honor's student should concentrate more heavily on the concepts in Chapter 2 this week, especially regarding concepts about chemical reactions. If the student has not had an in-depth physical science background, it is very important to concentrate on understanding the three physical states of matter (solid, liquid, and gas), as well as the differences between physical and chemical changes, and the differences between homogenous and heterogeneous mixtures. For the quick lab on page 45, use a white coffee filter.</p> <p>Note that there is a new definition of 'phase' in chapter 2 that the student may not be familiar with. The definition most students are familiar with refers to the physical state of matter a substance is in whether solid, liquid, or gas. The second definition refers to any part of a mixture that has uniform composition and properties. For example, a homogeneous mixture consists of a single phase. Students should be familiar with both definitions.</p>			
<b>WEEK 2</b>				
	<b>Core Chemistry</b>		<b>Honors Chemistry</b>	
<b>Reading</b>	Chapter 2	Sections 2.1 – 2.4	Chapter 3	Sections 3.1, 3.2
<b>Assessment</b>	Chapter 2 - 6, 9, 10*, 14, 18, 19*, 24, 30, 35, 41, 46, 50, 56, 60 – 63, 70, 79		Chapter 3 - 1, 2*, 5, 6*, 7, 8*, 11, 15, 16, 17*, 24, 60, 80	
<b>ChemASAP</b>	Animation 1 Assessment 2.1, 2.2, 2.3, 2.4		Animation 2 Assessment 3.1 – 3.2	
<b>Go Online</b>	Chapter 2: Self-Assessment (cda-1020)		Chapter 2: Self-Assessment (cda-1020)	
<b>Lab Work</b>	Quick Lab	Page 45	Quick Lab	Page 72
<b>Key Terms</b>	<b>Core Chemistry Students</b>			
	<b>Chapter 2</b> extensive property intensive property	gas physical change chemical change	element compound chemical reaction	

Notes