

KAP Chemistry Syllabus—2013-2014

KAP Chemistry is a **college-level** chemistry course. It is a *second-year course*—students should have successfully completed a chemistry course in their sophomore or junior years of high school. It emphasizes chemical understanding, both quantitatively and qualitatively, in a laboratory setting. Students should have three credits in Math, credit in Biology, and Chemistry with a “B” or better average.



Students will earn one and one-half credits of advanced laboratory science. The course is taught as a “1 ½ block” course—students will alternate between single period and double period. The double period on alternate days will allow us to complete the more rigorous laboratory activities required by the KAP curriculum. Classes will either be 48 minutes or 100 minutes in length, with an average of 370 minutes of class time each week. A minimum of twenty-five percent of instructional time is dedicated to the lab activities.

Students will be able to earn college credit through Kenyon College by participating in the KAP program. There is an additional fee for to register for the KAP program

The six **Big Ideas** of this course are:

Big Idea 1: The chemical elements are fundamental building materials of matter, and all matter can be understood in terms of arrangements of atoms. These atoms retain their identity in chemical reactions.

Big Idea 2: Chemical and physical properties of materials can be explained by the structure and the arrangement of atoms, ions, or molecules and the forces between them.

Big Idea 3: Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.

Big Idea 4: Rates of chemical reactions are determined by details of the molecular collisions.

Big Idea 5: The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter.

Big Idea 6: Any bond or intermolecular attraction that can be formed can be broken. These two processes are in a dynamic competition, sensitive to initial conditions and external perturbations.

In addition to the Big Ideas, KAP Chemistry incorporates seven **Science Practices**:

Science Practice 1: The student can use representations and models to communicate scientific phenomena and solve scientific problems.

Science Practice 2: The student can use mathematics appropriately.

Science Practice 3: The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course.

Science Practice 4: The student can plan and implement data collection strategies in relation to a particular scientific question. [Note: Data can be collected from many different sources, e.g., investigations, scientific observations, the findings of others, historic reconstruction, and/or archived data.]

Science Practice 5: The student can perform data analysis and evaluation of evidence.

Science Practice 6: The student can work with scientific explanations and theories.

Science Practice 7: The student is able to connect and relate knowledge across various scales, concepts, and representations in and across domains.

These concepts cover the following chapters in the required text:

1-9 (except 9.12), 10.1-10.5, 11.1-11.9, 12-19, 22.7, 22.8, 22.10, 22.11, 23.1-23.5, 23.11-23.14

Required Texts:

Hill, John. W, Petrucci, Ralph H, et. al., *General Chemistry*, 4th ed., Upper Saddle River, NJ: Pearson Education, Inc., 2005.

Other Supplies: Bound lab record book (provided as part of class fees), **approved safety goggles** (note—safety glasses are *not* an acceptable substitute for goggles), graphing calculator, notebook with separated sections for notes and homework, pens, pencils, highlighters

The Laboratory Program:



The laboratory component is, at minimum, 25% of the instructional time. Investigations will be integrated throughout the course. Students will also need to spend time out of class, both preparing for and completing laboratory investigations. Students will typically work with a partner, but some investigations require groups of three or four.

Students are required to have a bound lab notebook (provided) and a three-ring binder, which will be used as their lab portfolio.

The lab notebook will have a **table of contents**, which will include:

- Date the investigation was performed
- Title of investigation
- Page numbers of the investigation

Each laboratory investigation will have the following components:

- Title and date
- Scientific question
- Procedure
 - What you **actually** do in the lab, written **as you do it**
 - This **must** be initialed by your teacher before you leave the laboratory area
- Data
 - Written **directly into the lab notebook**
 - Written alongside the procedure, or, for repetitive data, in a table
- Data analysis
- Lab questions, copied into the notebook, with answers written clearly and concisely

In addition, *some* investigations will include

- Prelab group work
- Prelab E-campus quizzes
- Graphs or charts
- Analysis of class data
- Error analysis
- Presentation to the class
- Other components as needed

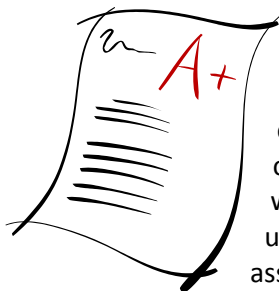
Some (but not necessarily all) of the investigations come from, or are modified from:

Randall, Jack. Advanced Chemistry with Vernier. Oregon: Vernier Software and Technology, 2004.
The College Board. AP Chemistry Guided Inquiry Experiments: Applying the Science Practices. 2013.
Flinn Scientific Advanced Inquiry Labs, 2013
NSF Summer Project in Chemistry -- Hope College
Volz, Donald L.; Smola, Ray; Investigating Chemistry through Inquiry

Holmquist, Dan D.; Randall, Jack; Volz, Donald L.; Chemistry with Vernier

Vonderbrink, Sally. Laboratory Experiments for AP Chemistry. Batavia: Flinn Scientific, 2001.

Bernstein, Jesse; Bracken, Jeffrey; Price, Paul. Advanced Placement Chemistry Laboratory Manual: An Inquiry and Forensic Approach Towards Chemical Experimentation, 2009



Academic honesty:

Students often work together in advanced science classes. This is valuable and I encourage working together. HOWEVER, copying another person's homework, lab report, or answers to any other sort of assessment is CHEATING. While you and your lab partner will share data, you need to do your OWN calculations and your OWN analysis. Using unapproved outside resources is also cheating. You will not receive credit for an assignment or assessment if you cheat.

Example: You do not know how to approach solving an old AP Test question that you have for homework. What should you do?

- | | |
|--|---|
| a) Search the internet for the answer | NO—that is CHEATING |
| b) Search the internet for another explanation of the topic | YES—good idea! |
| c) Copy the answer from your friend or older sister | NO—that is CHEATING |
| d) Tell your friend you could do a, b, and c but are stuck on d.
Ask your friend to point you in the right direction. | YES—good idea! |
| e) Steal the answer key from your teacher | NO—that is CHEATING |
| f) Ask your teacher for help a day or two before the due date | YES—good idea! |
| h) Ask your teacher for help a day or two after the due date | OK—Better late than never, but your teacher might get annoyed |
| i) Cry | OK for the short term, but you still need to figure out the answer! |
| j) Ignore it and hope it goes away. | NO—it won't go away, and neither will your teacher |

About KAP...



Students who will have junior or senior status will have the opportunity to apply for admission to the KAP (Kenyon Academic Partnership) program. The program allows students to get college credit while still in high school. Students will have an official transcript from Kenyon College. Students who wish to enroll in KAP courses must be strongly motivated and should have demonstrated success in the subject areas they wish to pursue. Since KAP courses are demanding, readiness and willingness to work hard are essential for success. When students register for their courses, they must complete a separate application for the KAP program. The application includes a teacher recommendations and a transcript. There is an additional fee for KAP and additional coursework may be required. Students participating in the KAP program will receive credit for the **four** following Kenyon courses:

Chemistry 121	Introductory Chemistry Lecture	(0.5 Kenyon units; 4 semester hours)
Chemistry 123	Introductory Chemistry Laboratory	(0.25 Kenyon units; 2 semester hours)
Chemistry 124	Biophysical and Medicinal Chemistry	(0.5 Kenyon units; 4 semester hours)
Chemistry 125	Biophysical and Medicinal Chemistry	(0.25 Kenyon units; 2 semester hours)

NOTES:

- a. Although there is a biological focus to the second semester Kenyon courses, the major chemical topics (equilibrium, atomic structure and bonding, kinetics) are the same as a traditional second-semester chemistry course. Students enrolled in KAP will have the same chemistry content as those enrolled only in AP Chemistry.
- b. Students may earn a maximum of 3.0 Kenyon units while in high school.
- c. I will submit **four separate grades** to Kenyon College. Students receive separate lecture and lab grades for each semester. These grades are **not** figured into the Davidson GPA and may be different than the grade on the student's Davidson report card.

Assessment...

The class is graded on a weighted scale. Tests and quizzes are 60% of the grade, labs, lab quizzes, and projects are 30%, and Free Response problems and homework quizzes are 10% of the grade. For students who receive a C or higher, KAP and AP courses at Hilliard Davidson High School receive an extra quality point when calculating grade point average. (A = 5.0, B = 4.0, C = 3.0, D = 1.0, F = 0.0)

Homework Students should be doing homework daily. Homework will be checked by pre-announced quizzes. Homework is for **practice**, and some students need more practice than others. Therefore, students should have the opportunity to continue to show that they have learned from their mistakes. If a student needs more time to understand a topic, he or she should get help with the topic and take a requiz the next day.

Examples:

1) There is a quiz on Tuesday over gas laws. When the quiz is returned on Wednesday, the student realizes that she misunderstood part of the topic. She can meet with me after school on Wednesday and take a make-up quiz on Thursday.

2) There is a quiz on Tuesday over gas laws. When the quiz is returned on Wednesday, the student realizes that she misunderstood part of the topic. She buried the quiz in her binder. On Friday, she wants to retake the quiz. Sorry—too late!

3) There is a quiz on Tuesday over gas laws. When the quiz is returned on Wednesday, the student realizes that she misunderstood a small component, but her grade was good enough. At the end of the quarter she realizes that she needs three more points. She wants to retake the quiz. Sorry—too late!

Free Response Questions are questions from old AP tests. All students must turn in Free Response questions.

Labs are done frequently. Since most occur on double-block days, students should try not to miss lab days. All labs must be completed to receive credit for the course. Some universities require students to submit a lab notebook or portfolio to receive college credit.

Quizzes are given frequently. The primary purpose of the quizzes is to make sure everyone is keeping up with the material.

Tests are given at the end of each unit. Tests will be similar in format to the AP Test that students will take in the spring. Lab questions will be included on tests. **All** students take an in-class college-level test. The grade is part of the fourth quarter.

More about tests and quizzes...

- Tests and quizzes serve several purposes: they are typically viewed as a way for me to evaluate your progress, but they are also learning experiences for students.
- Tests will always be announced at least two days prior. Quizzes will almost always be announced. They may be written or lab-based.
- To receive full credit on tests and quizzes, show all calculations. Explain your answers completely and concisely—explanations help me to understand your thoughts.
- Each new test will include material from previously studied chapters as well as the summer review. Quizzes over earlier material will appear throughout the year.