



# PimaCommunityCollege

## West Campus

## CHM 121IN Chemistry and Society

### Syllabus for Fall 2007

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#### Course Information:

Course Prefix/Number: **CHM 121IN**

Course Title: **Chemistry and Society**

Semester: **Fall 2007**

CRN (Section Code): **14831**

Class Days/Times: **TTh 12:10-2:50 p.m.**

Site/Room: **SCI K207**

Credit Hours: **4.0**

Teaching Format: **Integrated Lecture-Laboratory**

#### Instructor Information:

Name: **David A. Katz**

Office: **E-235 (Tortolita Building)**

US Mail: **Pima Community College  
2202 W. Anklam Rd.  
Tucson, AZ 85709-0270**

Phone/Voice Mail: **(520) 206-6044**

E-mail: **David.Katz@Pima.edu**

Web site: **<http://www.chymist.com>**

Availability: **Office Hours: MW 8:30-9:30; 4:00-4:30; TTh 10:30-11:30; 3:30-4:00**

**Generally, in addition to my office hours, I am in the office at least 30 minutes before or after class (if I am not in the lab). I am also available by appointment.**

#### Instructional Materials:

**Required Text:** There is no required textbook for this course. **You must have access to a computer** with Internet connections. Course material will be supplied in class on CD-ROM or you will be referred to Internet sites for information.

**Laboratory Manual:** **Laboratory Experiments for Chem 121**, Pima Community College. The experiments will be available for **download from the internet** at <http://www.chymist.com> under the heading Pima Chem Courses (left-hand menu) and then Chem 121 (Left-hand menu) The web files are in PDF format and require Adobe Acrobat Reader (available for free at <http://www.adobe.com>)

**Laboratory Reference and Safety Manual:** Katz, David A., **The General Chemistry Laboratory Survival Manual**, Hayden McNeil Publishing Co., 2006

Note: Textbooks are available at the West Campus bookstore. The PCC Bookstore can be accessed and books ordered via the Internet at [www.Pima.bkstr.com](http://www.Pima.bkstr.com).

### **Instructional Materials** (continued)

#### **CD-ROM's** – Instructor Supplied in class at no charge

Atmosphere and Earth Chemistry – Articles and laboratory experiments

What is Nanotechnology – an overview of nanotechnology

Science and Science Fiction – Short stories and science articles

Forensics – Hands-on forensics with additional readings

### **Course Description:**

**CHM 121IN** is an integrated lecture-laboratory course that examines applications of the methods and theories of chemistry to social questions and “headline stories”. Students will explore, through discussions and hands-on activities and experiments, how current scientific information is applied to atmospheric and environmental issues, nuclear chemistry, radiocarbon dating and archaeological research, fuels and energy, alternative energy sources, and other selected topics in the news occurring during the duration of the course, or from instructor selected topics such as the science in science fiction books and films, crime investigation techniques, and nanotechnology. No previous chemistry course is required.

The major topics of discussion will come from a number of varied sources such as the Internet, newspapers, magazines such as *Time*, *Newsweek*, *Discover*, *Smithsonian*, *Scientific American*, etc..., television programs such as *Nova*, and specials on the *Science* and *Discovery* channels.

Some problem solving is a necessary part of this course. Students should review basic mathematics and algebra with emphasis on exponents and roots, manipulations of algebraic equations, and construction of graphs and tables. The use of scientific calculators is permitted for all aspects of this course. If needed, math review sessions will be scheduled by arrangement.

This course satisfies one semester of a general education laboratory science requirement.

### **Course Objectives:**

Upon completion of the course, the student will be able to do the following:

1. Classify all samples of matter as an element, compound or mixture, all with an intrinsic atomic nature.
2. Describe the arrangement of the basic subatomic particles within the atom which lead to differences in mass, stability and reactivity of the elements.
3. Describe how the properties of elements leads to their placement on the periodic table of the elements.
4. Understand the differences between inorganic and organic compounds and be able to interpret simple chemical formulas.
5. Describe the composition and behavior of gases in the atmosphere and aspects of air and water pollution.
6. Discuss the interaction of air and water chemistry with El Nino and climatic change.
7. Describe radioactivity in terms of atomic nuclear decay and the measurement and societal impact of radiation and nuclear power plants.
8. Discuss the science of fuels, energy, and alternative energy sources and resources.
9. Discuss current science problems and potential problems of the future.

## Course Outline

The following outline presents topics, activities, and experiments in the order they will be discussed in class. Although each topic is listed by specific date, there may be some changes due to extended class discussions or activities/experiments. Applicable readings will be supplied on CD-ROM or you will be given Internet addresses. Problem assignments will be covered in context with activities and/or laboratory experiments.

Class topics are subject to change as issues become current in the news.

Laboratory experiments should be downloaded and read before class and the appropriate sections on laboratory techniques should be read before class.

Date	Topic	Lab Experiment and/or Activities
Aug. 23	Course orientation	
Aug. 28	Are we alone? Elements and life in the universe and how they are detected Life on Mars (and elsewhere in the universe) Origin of the elements Detecting elements in space  Reading Assignment: Metric System and Temperature, Web site	Build a Spectroscope  Lab Techniques: (Read for next class) <b>The General Chemistry Laboratory Survival Manual</b> Safety in the Academic Lab, Chapter 1 The MSDS, Chapter 2
Aug. 30	Atoms and elements The periodic table  Reading Assignment: Element Symbols, Web site.	Laboratory Orientation Check-in Lab safety  Lab Techniques: <b>The General Chemistry Laboratory Survival Manual</b> Laboratory Glassware and Apparatus, Chapter 4 Your Laboratory Drawer, Chapter 5
Sept. 4	Chemical bonds and compounds  Reading Assignment: Formula Writing, Web site	Safety Test An Experiment in alchemy: copper, silver, gold  Lab Techniques: <b>The General Chemistry Laboratory Survival Manual</b> Laboratory Glassware: Its use, Care and Cleaning, Chapter 6 Volumetric Glassware: Graduated Cylinders, Burets, and Pipets, Chapter 7 The Bunsen Burner, Chapter 8 Mass Determination with Laboratory Balances, Chapter 9
Sept. 6	An introduction to organic compounds	Properties of Unknown Substances Homework: Verification of properties from handbooks and the Internet  Lab Techniques: <b>The General Chemistry Laboratory Survival Manual</b> Melting point determination, Chapter 11 Looking Up Data: Chemistry Handbooks, Chapter 19
Sept. 11	The nucleus and nuclear stability of atoms and isotopes	Nuclear chemistry – part 1 Exp. 1. Determination of the Background Radiation Exp. 2. Determination of Half-life Exp. 3. Determination of the Type of Radiation  NOTE: Data will be shared between groups
Sept. 13	Radioactivity, its applications and chemical and biological effects	Nuclear chemistry – part 2 Exp. 4. Absorption of Gamma Photons Exp. 5. Inverse Square Law  NOTE: Data will be shared between groups
Sept. 18	Radioactivity: Our Nuclear heritage Nuclear weapons Film: The Atomic Café	Nuclear chemistry – part 3 Class results and discussion of experiments

Date	Topic	Lab Experiment and/or Activities
Sept. 20	The atmosphere Gases The greenhouse effect  Reading assignment: Our atmosphere Our Changing Environment	How Do We Affect the Quality of Our Atmosphere: Gases Simulating the Greenhouse Effect Cloud in a bottle Crush a can with air pressure Simulated sunset (Instructor Demonstration)
Sept. 25	Air pollution Acid rain: acids, bases, pH and the environment  Reading assignments: Our Ozone Shield El Nino and climatic change	How Do We Affect the Quality of Our Atmosphere: (continued) Acids, bases and pH Acid rain simulation (Instructor Demonstration) Effect of acid rain on our environment
Sept. 27	Ozone depletion and Chlorofluorocarbons What have we done to our environment?	Sunscreens: Preparation and Evaluation  NOTE: Data will be shared between groups  Lab Techniques: <b>The General Chemistry Laboratory Survival Manual</b> The Spectronic 20 UV-Visible Spectrophotometer, Chapter 13
Oct. 2	Water and water pollution	Testing the Waters (Samples will be provided. You may bring in a 1 Liter [1 quart] sample of water from home to test.)  NOTE: Data will be shared between groups  Lab Techniques: <b>The General Chemistry Laboratory Survival Manual</b> The pH Meter, Chapter 14
Oct. 4	The Earth: Soil structure and minerals Minerals and mining	Earth Science: Edible Soil Profile Mining for natural resources
Oct. 9	Energy sources and resources: Natural resources: coal, oil, and natural gas Conservation of resources: recycling, reuse	Extracting a metal from its ore
Oct. 11	Energy sources and resources: Nuclear energy Nuclear waste	Extracting a metal from its ore (completion: isolation and weighing of product.)  Recycling a metal into a chemical compound: The preparation of Alum  Crystal growing (A homework assignment)
Oct. 16	Alternative sources: wind power, hydroelectric, geothermal, solar energy.	Build a wind turbine
Oct. 18	Energy from chemical reactions: Electrochemical cells and batteries	Build a wind turbine (continued)  Build a solar oven
Oct. 23	Energy from chemical reactions (continued) Fuel cells	Build a solar oven (continued)  Batteries (Part 1) The Voltaic Pile The Electrochemical Cell The Lemon Cell
Oct. 25	Nanotechnology  Viewing assignment: What is Nanotechnology?	Batteries (Part 2) The Storage Cell Construct a Dry Cell Battery  Fuel Cells
Oct. 30	Nanotechnology Discussion of articles/information	Magnetic Fluid (a nanotechnology project) Preparation of surface conducting glass

<b>Date</b>	<b>Topic</b>	<b>Lab Experiment and/or Activities</b>
Nov. 1	Nanotechnology Discussion of articles/information  The science in science fiction Readings and discussions of the science behind the stories	Liquid crystals (a nanotechnology project)
Nov. 6	The science in science fiction (continued) Readings and discussions of the science behind the stories	Construct a solar cell (A nanotechnology project)
Nov. 8	Forensic Science: Crime Scene Investigation Material Evidence	Faces: Identification of a suspect
Nov. 13	Fingerprinting	Fingerprinting Fingerprints Dusting and lifting of fingerprints Cyanoacrylate development
Nov. 15	No class (Instructor out of town)	
Nov. 20	Analysis of Inks and dyes Handwriting analysis	Ink Analysis Handwriting Analysis
Nov. 22	Thanksgiving Holiday (College Closed)	
Nov. 27	Fibers and fiber identification Hair identification	Fibers and fiber identification: TIS fabric stain Hair Analysis
Nov. 29	Blood and blood drops	Blood drop studies
Dec. 4	Drugs Poisons	Drug Testing of Some Over-The-Counter Drugs
Dec. 6	DNA	DNA Isolation DNA Identification
Dec. 11	Forensics Exam	Lab Check-out

### **Course Requirements:**

The final course grade will be based on attendance, class participation, quizzes, exams, lab experiments, projects, two short reports, and a final exam. The approximate percent weight of each is given below:

Attendance .....	10%
Short Reports (see schedule of important dates) .....	30%
Exams, quizzes, lab experiments, and projects .....	60%

# Chem 121IN Course Policies and Information

## Assignments and Activities

Assignments and activities, will be assigned in class. Depending on the assignment, they may be collected and graded, or, they will be reviewed in a question and answer session in class.

## Exams

There will be five exams or projects during the semester. The exams cover information discussed in class and supplementary readings or related material assigned. Problems or calculations, if required, must show proper set-ups and calculations. Questions will require written answers and some discussions (short essay type questions). Every effort is made to grade and return exams in about one week to ten days (about three class periods). Grades on exams may be calculated as percentages based on total possible point scores.

- Exam 1 will cover atoms, elements, the periodic table, chemical bonds, compounds, and radioactivity. (This is a take-home exam)
- Exam 2 will cover the atmosphere, water, air and water pollution, the earth, and energy sources and resources. (This is a take-home exam)
- Exam 3 will be a project on finding information on nanotechnology in the news. You will present a summary of your article in class.
- Exam 4 is writing a science fiction story following the discussions of science and science fiction.
- Exam 5 is a forensics exam. This is a hands-on exam. You will work in teams of 2 individuals. You will be given clues and asked to solve a crime using techniques you learned in the forensics part of this course.

## Final Exam

There will not be a final exam at the end of the semester.

## Laboratory Reports

A laboratory report will be due from each group for each experiment **one week** after the experiment is completed. The format of the reports will be explained in class.

## Short Reports

Students are required to write **two** short reports for the course. One report will be on a **current issue of your choice related to the chemistry** discussed in this course. The report may be a follow-up to class discussions, but must contain significant additional information. The **second report** will be on the chemistry of a **consumer product**, available in stores, or, if a drug, over the counter. The report may focus on a single product or can be a comparison of similar products. Topics for the short report must be approved by your instructor. (This is to reduce multiple duplications of topics and allow your instructor to make suggestions for finding information.) If the report concerns a manufactured product, you should contact the manufacturer for information. Reports must contain a bibliography of sources used. (Note: Obtaining information from companies can be unreliable. Available information may be very general and delivery may take several weeks. Allow sufficient time to get information.) Additional information on the report is given later in this syllabus.

The topic for your first report must be submitted for approval by **September 11, 2007**.

The topic for your second report must be submitted for approval by **October 9, 2007**.

(Should you encounter difficulty in obtaining information on the topic of your choice, the topic can be changed at a later date.)

The first report is due no later than **October 30, 2007**.

The second report is due no later than **November 29, 2007**.

You are required to submit **two copies** of each report. (One for your instructor's records)

## Submitting Work

All quizzes, exams, and reports should be submitted in writing no later than the dates specified. Late papers will be downgraded by 10 points in the first 24 hours and an additional 10 points until the next class period. After that, a grade of zero will be recorded for that assignment.

You may submit your assignment via the Internet if you cannot be in class on the day it is due. The time stamp on the message, when it is received, will determine the date. Please be advised that email occasionally gets misdirected, can end up being blocked by a spam filter, or lost in cyberspace. It is your responsibility to make sure that the message was received.

**Make-up Policy**

THERE ARE NO MAKE-UP ACTIVITIES, or EXPERIMENTS no matter how valid your excuse may be. All activities, and experiments are set up for specific classes and the materials are not available for later dates. THIS INCLUDES PARTS OF AN EXPERIMENT MISSED AS A RESULT OF LATENESS TO CLASS. (Any take home exams or activities will have 10 points deducted each day it is late.)

NOT SUBMITTING A SHORT REPORT WILL RESULT IN A GRADE OF "ZERO" FOR THAT ASSIGNMENT.

MISSING AN EXAM WILL RESULT IN A GRADE OF "ZERO" FOR THAT EXAM.

\*\*If you know in advance that you will not be present for a class, please inform your instructor.

\*\*If you have a conflict with the forensic exam, it must be resolved before the last week of the course. The forensic exam takes time to set up all the materials needed and cannot be set-up for an additional day.

**Academic Integrity**

Violations of scholastic ethics are considered serious offenses by Pima Community College, the Department of Chemistry and by your instructor.

Cheating on exams will result in a grade of "zero" for that exam, and, at the instructor's discretion, possibly an F for the course. The zero will be calculated into your final grade point average for this course.

All work done for this class must be your own. While you may discuss assignments with other class members, the final written project must clearly be your own. You may use work from books, the Internet, and other materials if it is properly cited. Copying from a published source without proper reference or from a person without acknowledgement, under any circumstances, will result in an F for the assignment, and, at the instructor's discretion, possibly an F for the course. There will be no exceptions.

Students may consult the PCC Student Handbook sections on student code of conduct, on scholastic ethics and on the grade appeal procedure. Copies are available at PCC campus libraries and at <http://www.pima.edu/~coadmissions/studresp.htm>.

**Attendance**

Attending class is a major responsibility you have in this course. As an integrated course, a major portion of your grade is based on activities and laboratory experiments which are part of each class. Relevant information and applications of course material, as well as demonstrations, are also presented in class, that material is not in the textbook. If you miss a class, your instructor can tell you what material was covered and summarize any discussions that took place, however, instructors do not have a set of formal lecture notes you can copy. It is your responsibility to get detailed notes from one (or preferably two) classmate(s).

Missing a significant number of classes will seriously affect your final grade.

If you are absent from class for an extended period due to illness, an accident, or another valid reason, please have someone contact your instructor.

**Extra Credit**

There is no extra credit.

You must demonstrate that you have mastered a substantial amount of the course material to obtain a passing grade.

**Lateness**

Since this class involves a great deal of hands-on learning, lateness to class results in missed information and is disruptive to the other students. Please make every effort to get to class on time. If you do arrive late for a class, please come into the room quietly, find a seat, and get organized for class. Please avoid walking across the front of the classroom, disrupting the lecture or discussion. Try to walk around the back of the room.

If work or other circumstances will prevent you from getting to class on time, please see your instructor as soon as possible to discuss the problem.

**Storms**

In the event of a severe storm, or other major weather problem, the area may experience transportation disruptions and traffic delays. If an exam or a major assignment is due on a day when there is a severe weather problem (this excludes normal rainfalls), the exam or assignment deadline will be postponed until the next class.

**Classroom Behavior:**

Because of insurance limitations, non-registered visitors are not allowed at class sessions or on field trips.

Possession of drugs, alcohol or firearms on college property is illegal.

Eating, drinking, smoking and soliciting are not allowed in classrooms.

Pets, telephones, pagers and other electronic devices that distract students are not permitted in classrooms. Please turn off these devices during classes.

Students creating disturbances that interfere with the conduct of the class or the learning of others will be asked to leave.

**Withdrawals**

Students may withdraw from class at any time during the first 2/3 of the semester without instructor permission and without incurring any grade penalty. Please be kind enough to inform your instructor if you withdraw.

Students who are not regularly attending class and who have not submitted any assignments nor taken any quizzes or exams by the 45<sup>th</sup> day census date (see calendar) are assumed NOT to be participating in the class and will be withdrawn.

Please be sure to withdraw yourself by **November 5** if you do not expect to complete the class; otherwise you may receive a grade of "F" for the course and may affect your academic standing at the college.

**Incomplete grades** are only given when a significant amount of class has been missed for medical or other legitimate reasons. (see information which follows)

**ADA Compliance**

Pima County Community College District strives to comply with the provisions of the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. Students with disabilities requiring special accommodations must notify the instructor of this need or directly contact the Disabled Student Resources Office on your campus at the beginning of the semester.

**Workload**

Students are expected to spend the normal amount of time required for a college course attending class sessions, doing assignments and research, reading and preparing for exams. The standard Carnegie Unit of college credit assigns 1 credit hour for each 15 hours of class time and assumes that students spend two hours working outside the classroom for each hour of classroom instruction. For a three-credit course, this translates to 135 hours per semester or an average of nine hours per week for a 15/16-week semester.

**Chem 121IN Grading System/Policies**

*Your final grade will be a weighted average of your work during the semester and are calculated as follows:*

<b>A</b>	<b>=</b>	<b>100-90%</b>
<b>B</b>	<b>=</b>	<b>89-80%</b>
<b>C</b>	<b>=</b>	<b>79-70%</b>
<b>D</b>	<b>=</b>	<b>69-60%</b>
<b>F</b>	<b>=</b>	<b>below 60%</b>

The actual percentage may vary based on a final class distribution, but will not be higher than these percentages.

A grade average of 60 or better is required to pass this course.

My policy is that no one will miss a grade by one point. If your actual average falls at 89, and 90 is an "A", then your grade will be rounded up to a 90. An 88.9 will be a "B". The same applies to the other grade ranges.

### **Incomplete (I) grade:**

"I" grades must be requested in writing by the student. Final decisions regarding an incomplete grade are made by the instructor and are subject to review by the Department Chair and the Division Dean. Generally, the student must have successfully completed at least 2/3 of the course material to receive an "I" grade.

Incomplete grades are generally reserved for medical and family emergencies that are of significant duration or occur at a critical time during the semester, they are not a way to withdraw if you are failing the course. Please contact your instructor before the last week of class to be sure that there is sufficient time to consider your request.

An incomplete grade generally implies that a student has completed a substantial portion of the course and has shown sufficient initiative to complete the course on his or her own in consultation with the instructor, however, there is no way to make up missed laboratory work. The student will receive a copy of the standard "I" form filed with the grade. This form will detail specifically what must be done to complete the course. A student has one year to complete the required work, otherwise the grade automatically reverts to an "F."

Due to liability reasons, an incomplete grade does not allow a student to sit through a course for another semester without paying tuition.

### **Late Withdrawal grade:**

Your instructor has the ability to enter a late withdrawal grade (W) at the end of the semester as a final grade for the course if you request it and have not withdrawn by the normal two-thirds mark of the semester. Once final grades have been entered, you cannot retroactively request a D or F to be changed to a W.

You must request a W grade no later than the last day of class. (Not final exam week.)

If you have not attended class, and have not withdrawn by the 2/3 semester date, your instructor will not honor a late withdrawal request.

Please be aware that a W may affect your financial aid or other funding. You are advised to check with the funding organization to make sure there are no adverse effects to a W grade.

### **Final Grades:**

Students do not receive a grade transcript from the college mailed to the address given with registration materials. At the end of the semester when all grades have been recorded, students should access their grades through Banner Services on the Pima Community College web site. For privacy and security reasons, instructors may not post grades and may **NOT** give grades over the telephone. Students may also check grades by calling MAX 2000 at 206-4880.

### **Fall 2007 Calendar of Important Dates**

Aug. 22	Spring classes begin
Sept. 3	Labor Day Holiday (College Closed)
Sept. 4	Last day to withdraw with a refund
<b>Sept. 11</b>	<b>Topic for 1<sup>st</sup> Report due</b>
<b>Oct. 9</b>	<b>Topic for 2<sup>nd</sup> Report due</b>
<b>Oct. 30</b>	<b>1<sup>st</sup> Report due</b>
Nov. 5	Withdrawal deadline
Nov. 12	Veterans Day Holiday (College Closed)
Nov. 15	No class (Instructor out of town.)
Nov. 22-25	Thanksgiving Holiday (College Closed)
<b>Nov. 29</b>	<b>2<sup>nd</sup> Report due</b>
<b>Dec. 4</b>	<b>Exam 4 – Write a science fiction story. Story is due no later than today.</b>
<b>Dec. 7</b>	<b>Last day to request a W grade from your instructor</b>
<b>Dec. 10-15</b>	Final Exam Week
<b>Dec. 11</b>	<b>Forensics Exam</b>

## Short Report Information:

Two short reports are required as part of this course:

**The 1st report** will be on a **current issue or topic, related to chemistry**, of your choice. The report may be a follow-up to class discussions, but must contain additional information beyond the class discussion and the textbook or supplemental readings. Ideas for topics can be found in specialized magazines such as *Discovery*, *Scientific American*, *Invention & Technology*, *Smithsonian*, or *Popular Science* (to name a few), news magazines such as *Time* or *Newsweek*, newspapers such as *The New York Times* science section or *The Arizona Daily Star* (or other local paper), and the Internet. (Note: most magazines and newspapers have web sites that include news stories from recent issues.)

**The 2<sup>nd</sup> report** will be on a **consumer product** (including over the counter drugs, but not prescription drugs) of your choice. This may be on a single product, a comparison of several similar products, and/or the results of your own testing the product(s). If the report concerns a manufactured product, the report should tell what the product is, the active ingredients (if applicable), how it was developed, how it works, and as much of the science behind it that you can find. Information can be obtained from a number of sources including books, magazines (such as *Consumer Reports*, *Consumer Digest*, *Time*, etc...), U.S. patents (Internet address: [uspto.gov](http://uspto.gov)), and the Internet. You should contact the manufacturer of each product for information using their consumer telephone number, usually listed on the product label. (Note: Some consumer departments are quite good at supplying information, others will be of little or no help. Do not ask them too much information as they are afraid you may be a competitor trying to get proprietary information. It may take 2-3 weeks, or more, to get information through the mail, and, in some cases, the information never arrives.) If you are using the Internet, try looking for a web site from the manufacturer or under the product names on the Internet (try addresses such as *Tide.com*, *Tylenol.com*, etc.).

When researching a topic on the Internet, use a search engine such as Google ([www.google.com](http://www.google.com)). Start out with one or two key words, then, after checking, add additional key words or terms. Use the word "and" or a "+" sign to join key words together. You can also use sentences or phrases in your search. Precede phrases or sentences by the term "intitle:" if you are looking for the phrase in the title of the article, or "intext:" if you are looking for the phrase in the text of the article.

**Topics for the short reports must be approved by your instructor.** (This reduces duplication of topics and will help you to manage information.)

The short report should be **five pages in length**, typed, and double spaced. (Do not quadruple space between paragraphs.) The report may be longer than 5 pages, if required, to complete your information.

**Margins** should be no greater than **one inch** (2.5 cm), top, bottom and sides.

**Type size** should be no greater than **12 point**, except for headings. Points will be deducted for large type size.

**Diagrams, chemical formulas, pictures, charts, and graphs** may be important information to explain or illustrate your topic. These items are considered additional material and **do not count toward the five pages of text required** for the paper length. The diagrams, formulas, pictures, charts or graphs may be placed in the body of the text or added on separate pages at the end of the text. Don't forget to reference this material.

**Use three or more references**, some of which should be fairly recent (within the past two years). Use multiple sources, do not use different sections of a single web site or a single book or magazine. Look for sources that may tell negative or unfavorable information about your topic to obtain a balanced overview of your topic. Do not believe everything you read, you must apply some critical thinking to the information you find. Put the information in your own words rather than copying directly from the reference or the internet. Use footnotes or appropriate citations, where applicable, to acknowledge borrowed material, informing the reader of the source of statements or quotations, or for presenting explanatory or supplementary material not appropriate to the text. Not citing direct quotes or downloaded material is considered plagiarism and will result in a grade of zero for the report.

All sources used in the researching and writing of the report should be listed in a **bibliography**. Generally, the bibliography will be on page 6 of the report. The bibliography (and also footnotes, if you use them in your writing style) presents the following information:

### For a book:

Author's name (last name first), the title of the book (underlined or in italics) including any series or volume number, the edition, if other than the first, the publisher, the place of publication (or home office of the publisher), the date of publication on the copyright page, and relevant page numbers. An example of a book reference is:

Saferstein, Richard, *Criminalistics, An Introduction to Forensic Science*, 7<sup>th</sup> Ed., Prentice Hall, Upper Saddle River, NJ, 2001, pages 228-257.

**For an article:**

The name of the writer, the title of the article in quotation marks, the title of the periodical (underlined or in italics), the volume number (underlined or in bold print), the date of the issue of the periodical, and the page numbers. An example of a magazine reference is:

Roger, J., P. Angel, and Neville J. Woolf, "Searching for Life on Other Planets", *Scientific American*, **274**, No. 4, April 1996, P. 60.

**For Internet material:**

The name of the author or publisher of the home page, the title of the article in quotation marks, the title of the magazine or journal or database (underlined or in italics), Internet address of the article, and the date the article or the home page was last updated. (The internet address, by itself, is not considered a valid reference.) An example of an Internet reference is:

Proctor & Gamble, "The Tide Fabric Care Network",  
[http://www.pg.com/frameset\\_fs.jhtml?frameURL=www.tide.com](http://www.pg.com/frameset_fs.jhtml?frameURL=www.tide.com), 2003

Internet references will be checked by your instructor. Failure to find and connect to an internet reference will invalidate that reference.

**For unpublished material:**

The name of the writer or individual (last name first), the title in quotation marks (if it is an article), and the date. If the information is relayed in an interview or by letter, tell the individuals professional position and use the term *personal communication* in place of the title. An example of unpublished information is:

Smith, John P., Technical Service Engineer, Nuclear Missile Company, *personal communication*.

Diagrams, charts, tables, and pictures may be included in addition to the text of the paper. They are best added as separate pages at the end of the report rather than trying to space them into the body of the text. When referring to a table, write see *Table 1* (Roman or Arabic number may be used) and when referring to a picture or diagram write see *Figure 1*. Give credit to the source if the table or figure is not original.

**If a proper bibliography is not included, the grade on the paper will be penalized by a minimum of 10 points.**

**English Composition:**

This is a chemistry course and the paper is on a scientific topic. You are, however, expected to write with proper organization, composition, spelling, and grammar befitting a college level report. It is suggested that you may want to have your paper reviewed by your English teacher before completing your final product.

**Binding:**

A single staple in the upper left hand corner of the report is sufficient for binding the pages together. Fancy report covers, spiral bindings, and other types of bindings are not necessary and do not improve your grade.

**Please submit two copies of your report.** (One for your instructor's files.) If you submit an electronic copy, the electronic copy must be in Microsoft Word format or RTF format. Points will be deducted if a second copy is not supplied.

**Report information and references may be checked** by your instructor through a variety of Internet sources and resources. Please note that the college subscribes to turnitin.com, a service that checks papers against thousands of sources for plagiarism, as such, be sure to properly cite references for all information and quotations.

**Grades** are based on content and accuracy of information, relevance to chemistry, proper references and citations, and composition. Reports are evaluated "as is" and are not returned for correction or updating of information.

**Late reports** will be penalized 5 points the first 24 hours, and 10 points for the rest of that week. An additional penalty of 10 points will be imposed for the following week. After the second week, late papers will not be accepted.

**Caveats:**

**Your instructor will make every attempt to follow the above procedures and schedules, but they may be changed in the event of extenuating circumstances.**

**Students submitting assignments are advised to make copies for their own protection.**

**If you move during the semester, please file a change of address form at any PCC campus registration office.**