



Internationalizing the Curriculum Project

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CHM107 Chemistry and Society—3 Credits

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- Course Description: Students study environmental issues, such as, air and water pollution and energy use and the chemistry necessary to evaluate these issues. An international perspective is a dominant focus--students are required to "adopt" a country and represent its view in written and oral activities and to apply the principles of chemistry to actual situations and to articles in the media. Position papers and round table discussions on ozone depletion and global warming involve taking the perspective of the "adopted" country. The final assignment asks the student to be the scientific advisor to a think tank preparing an "Energy Plan for 2020" for their country.
- Required Text: *Chemistry in Context*, American Chemical Society.

International Component Summary

Content Areas Which Include International Material/Components

Air pollution, Ozone layer, Greenhouse effect, Energy, Water Pollution, Acid Rain, Nutrition (World Hunger)

Description of Supplemental Material and How Integrated in Course

Internet: Resources for current problems.
Worldwatch Institute: State of the World Data Disks for data and graphs of changing trends.
Yearly State of the World Books as reference for student reports and instructor update.
World of Chemistry video series on environmental problems.

Special Assignments and Activities

Many group activities involving "Consider This" topics in text.
Position paper on Ozone Layer vs Global Warming.
Round Table on Position Paper representing many different countries.
Term paper on "Energy 2010" from perspective of selected country.
Conference on "Energy 2010" representing different countries.

Successes and Special Challenges

Successes: Student enthusiasm and cooperation; outstanding text.
Challenges: Keeping informed of new developments (time) and student attendance.

Tips/Suggestions to Instructor

Use many of the structured group activities. Involve other group learning techniques.

Syllabus/Course Outline

INTRODUCTION CHM 107, CHEMISTRY AND SOCIETY

In this course some real-world, environmental issues, such as air pollution, water pollution and energy use, will be presented. Then we will learn the chemistry necessary to evaluate these issues. The international impact and perspective will be a dominant focus. In fact you will be asked to "adopt" a country and represent its view in some written and oral activities. The first 6 chapters will serve as the core of the course. The class will determine 1 or 2 (time permitting) other chapters to also include. There will be many group activities and class discussions related to the issues and the chemistry behind those topics. There are three types of exercises embedded in each chapter: Consider This, Your Turn and The Sceptical Chymist. Consider This exercises involve thoughtful application of principles to actual situations. There may be no "correct" response. These will be used for graded class activities and homework assignments. Your Turn include drills and exercises for which answers are given. These will not be graded, but should be attempted when suggested. The Sceptical Chymist often focuses on application of chemical principles to information included in the media and may be used for extra credit (5 point each with a 20 point limit). At the end of each chapter there is a set of Exercises from which some will be selected for graded homework assignments. During the semester there will be 4 Chapter Tests worth 50 points each.

CHM 107 POSITION PAPER

OZONE DEPLETION-VS GLOBAL WARMING

After studying both ozone depletion (Chapter 2) and global warming (Chapter 3), determine which is more serious for your country. Consider location,--proximity to ozone hole or near oceans where increasing levels could cause serious trouble, for instance-- economy base (agricultural, tourism, etc.), major energy source (ability to control factors causing problems), life style and other factors that one of these problems would impact. Which problem is most easily solved?

Write a 1-2 page, typewritten position paper stating which problem is most serious for your country. State the reasons for this position. Cite at least two references. This paper is worth 40 out of 50 points. Standard margins are to be used and the paper should be double-spaced. The grading criteria are:

- Logic of argument - 15 points
- Scientific validity - 15 points
- Organization - 5 points
- Spelling and grammar - 5 points

The remaining 10 points can be earned by participation in a round table discussion in class. This will be a debate as to which is the most serious problem and why. You will be asked to make a 1-2 minute presentation stating your position. After all countries have reported, a debate will follow.

CHM 107 FINAL PAPER

Sustainable development is a phrase you will hear often in this semester. According to the UN World Commission on Environment and Development, sustainable development "meets the needs of the present without compromising the ability of future generations to meet their own needs." With this goal in mind, pretend you are a scientific advisor for a think tank that is preparing an "Energy Plan for 2020" for your country. For this paper you should detail the following:

1. Background of the country including
 - a. geographical location
 - b. demographics
 - c. lifestyle of the people
2. Current status of energy use for
 - a. utilities
 - b. transportation
 - c. other needs
3. Energy plan for the future, 2020, considering
 - a. sustainable development
 - b. diminishing greenhouse gases
 - c. support with chemical principles

This plan is to be a 3-5 page typewritten (double spaced) paper using standard margins. The bibliography should contain 5 cited references, no more than 3 from web sites. No footnotes are necessary. 125 points are possible for this paper and grading will be based on:

Thoroughness - 25 points

Feasibility - 25 points

Scientific support - 25 points Appropriateness - 25 points Organization - 15 points

Spelling and grammar - 10 points

An additional 25 points can be earned in participating in the "International Conference for Future Energy." The purpose of this conference is to come to agreement on international guidelines for future energy needs. Detail in your presentation what your country will provide or needs to provide the agreed upon guidelines providing 21st century standards of living to all while conserving resources and reducing greenhouse gases. Use your final paper as reference. This Conference will occur on Final Exam day.

CHM 107 LIFESTYLE QUESTIONNAIRE

As you study your country for the position paper and the final paper, consider some of the following factors about the country:

1. Country
2. Type of surroundings (with proportions): urban, suburban, isolated town, small village/rural
3. Population density
4. Major source of home heating
5. Source of lighting
6. Kind of public transportation used by family and monthly mileage
7. Kind of private transportation used by family and monthly mileage
8. Kind of cooking fuel
9. Food
 - a. Food grown on own land, in nearby location or shipped in?
 - b. If shipped in, what kind of transportation used?
 - c. If shipped, what kind of packaging?
 - d. Enough calories/variety for good health?
10. List of electronics/appliances (including kitchen/laundry):
11. Most prevalent type of fabric used for clothing
12. Source and availability of water

CONSIDER THIS: DEVELOPING NATIONS' OBJECTIONS

Read the scenario detailed in *Consider This* 2.19 on page 68. Discuss in your groups the rationale of the positions taken by a developing country as contrasted to an industrial country. Based upon whether the country you have "adopted" is a developing or industrial country, choose the appropriate assignment.

- a) As a government official, responsible for the health and economic welfare of your fellow citizens, draft a letter to the president of the U.S. outlining the reasons why the establishment of an international fund is a necessary part of your country agreeing to the Montreal Protocol.
- b) As a taxpayer in your industrialized country, you are helping contribute to the \$240 million international fund to help developing countries phase out their use of CFCs. You have already helped finance your country's phaseout through increased prices for consumer goods and products and tax incentives for industry. A decision is going to be made by your governing body as to whether to allocate the remainder of the money pledged to contribute to the international fund. Draft a letter to your governmental representative (state to whom your letter is addressed) outlining the reasons why or why not such money should be allocated.