Honors Chemistry – Lawrence McAfoos

Overview of the Honors Chemistry program

Class Schedule

Our high school runs on a 4 day cycle. AP Chemistry meets 2 days a cycle for approximately 55 minutes and once a cycle for a double period of approximately 115 minutes. One section of Honors Chemistry is taught this year: Set 8 with a 2B lab. All classes meet in room 325 of LMHS.

Teacher Schedule

My teaching schedule can be found on my website (www.fooschem.lmsdscitech.org).

E-Board information

My class resources are located on my web site, not on the e-board, although the e-board has a link to the web site for the convenience of students and parents. My web site can be accessed directly at www.fooschem.lmsdscitech.org. On the site students and parents can access my schedule, a current class calendar with assignments and other important dates, old tests, worksheets, labs, and all other on-line resources (WebAssign, TurnItIn, etc.)

Grading Policies

Student grades are calculated based on the percentage of points earned on assessments, lab and homework. Homework is generally done through WebAssign. Lab Writeups are graded though TurnItIn.com although calculations are graded on paper. Assessments include tests, and quizzes. There is no weighting used.

Final grades are calculated according to the district policy.

Text

We do not use a text in class, although students have been offered a text if they wish to have one as a reference. The text offered is Introductory Chemistry – A Foundation, Zumdahl, fourth edition, Houghton Mifflin.

Required Materials

Students may use whatever form of notetaking they prefer. No specific requirement are made. Since notes are posted on-line after class, students even have the option (although not recommended) of not taking notes at all and printing them out later.

Students are required to have a lab notebook. This needs to be bound (in any way) and separate from everything else (even their chemistry notes). This is used to record lab outlines, data and for calculations.

Students also need a scientific or graphing calculator for much of the work done this year.

Course Description

Honors Chemistry is an introductory course in chemistry. It is designed for the college bound student who expects to major in or has a strong affinity for the sciences and will have a strong emphasis on the laboratory program and on problem solving. Although problem-solving strategies will be discussed in class, it is not a substitute for a solid background in the basics of algebra.

Course Goals
Students who successfully complete this course will have strong problem solving skills and will have an excellent understanding of the forces that govern the materials around them and how/why they interact the way they do. They will understand what makes good scientific writing and will have made progress toward creating solid, well-written lab reports.

Standards
These course topics are matched to the district standards (actually the district standards were adapted from this)

The course is also aligned with the (few) state standards that apply to chemistry. Specifically: Physical Sciences 1.1 (relationship between structure and properties of matter) and Physical Sciences 2.1 (transfer and conversion of energy) These are noted below along with their relevant topics. The nature of Science Standards (nature of science, patterns and change, experimental design, systems, models and patterns) are infused throughout the entire curriculum.

During the course of the year we cover the following topics:
Introductory material: definitions, density, metric system, significant figures, and factor label calculations.
Atomic structure and history: what we know about the atom and how we know it. (1.1)
Modern Electron Theory: what the electrons are up and why that matters (1.1)
Periodicity: The trends seen in various properties on the periodic table and why those trends appear and matter. (1.1)
Bonding: How molecules come together, their shapes and structures and the polarity of their bonds(1.1)
Nomenclature: naming compounds and writing formulas
Moles: calculations involving chemical quantities and converting between units
Intermolecular attractions: how molecules and ions interact with each other and why (1.1)
Gases: the behavior of gases, laws, real-life applications(1.1)
Condensed states of matter: the behavior of solids and liquids(1.1)
Mixtures and solutions: why things mix, how they do so and the effect of those mixtures on behavior(1.1)
Reactions: interactions that involve chemical changes, identifying types, predicting products, balancing, determining whether or not reactions occur (2.1)
Stoichiometry: calculations involving reaction amounts
Thermochemistry: the energy of interactions and reaction, measuring, and calculating (2.1)

Kinetics: rates of reactions, how we can influence those rates, calculations involving rates (2.1)
Equilibrium: reversible reactions, how we can influence these reactions and calculations involving these reactions (2.1)
Acids and bases: basic definitions, reactions, properties, titration, calculations(1.1)

When time permits we also discuss nuclear science and electrochemistry

Teaching Strategies
I use the following strategies when teaching my AP Chemistry course.

1. Instruction is done Socratically. Class time is spent with leading questions and discussion.
2. Provide an safe learning environment that encourages students to take risks answering questions even when they are unsure of the answer, and to ask those questions that are troubling them even when they think no other students are confused.
3. Review time for tests is always student driven. Students know that they are expected to keep me busy with questions and problems to be answered in class and that if they do not have prepared questions that I will begin the next unit. This ensures that students begin preparing prior to the night preceding the test.
4. Homework problems are assigned for each unit. Students have access to a large number of problems on instructor developed worksheets and from the text. In addition, problems are assigned using the on-line program WebAssign that checks student work and allows them to go back and correct mistakes.
5. Students have access to a teacher developed and maintained web site. The web site provides students with access to class calendars, problems sets, old class tests, and links to important resources.
6. Teacher notes are done in class on a Smart® Airliner virtual white board and notes are uploaded each day so that students have access to what was written in class.
7. Teacher maintains a blog of class activities. This blog, detailing what happens in class each day is updated daily so that students who are out know what they have missed. It also allows quick distribution of announcements for all students.
8. An on-line forum is available to students to discuss upcoming assignments, tests, and other topics of interest.

Course resources:
The Honors Chemistry course at Lower Merion uses the following resources for instructional and evaluative purposes:

1. On-line blog and web-site with teacher developed problem sets and sample tests.
2. On-line lab manual. Some of these labs have been developed independently, others based on labs done at Cornell University in the freshman chemistry program, others were developed jointly with another Lower Merion teacher.

3. WebAssign – on-line homework site. Through this site, students do assigned problem sets with randomized numbers that encourage working together but discourage copying without understanding.
4. Atomic Microscope. Computer simulation of gas particles that allows easy visualization of gas laws and kinetic molecular theory.
5. Atomic Orbitals CD. Computer simulation that shows the Ψ graphs and electron distributions for atomic orbitals up through level 4. This program also contains simulations of the work by Thomson, Rutherford, Millikan and others.
6. Various other on-line resources gathered and made available to students through the website and blog.

The Laboratory Program – the laboratory program is designed to challenge students to minimize sources of error, minimize hazards, and to maximize reliability and yield. Students keep a laboratory notebook of all work done, do a full mathematical workup for all labs and a full laboratory report for at least two or three labs every quarter. Full laboratory reports include theory discussion, data analysis and results, conclusion and full discussion of sources of error.