



Honors Chemistry

Yearlong 2022-2023



ELIGIBLE STUDENTS:

10-12th graders who are either taking Algebra II concurrently or have already taken Algebra II. Familiarity with dimensional analysis is highly recommended. Students must also be able to read and interpret the text, take notes, memorize vocabulary, and express themselves through essay questions and written laboratory reports. Finally, students must have the maturity to study regularly and keep pace with the course.

Please note:

Students enrolled in this course will complete between five and seven quantitative laboratory experiments. Written reports will be required for each lab and must conform to the standards of scientific writing. A parent is expected to be present during the formal experiments to assure safety and adherence to the protocols. There are additional, informal investigations utilizing household items that supplement certain concepts in chemistry. For labs and demonstrations performed during class, supplies will need to be collected prior to class and students prepared to execute the assigned activity. The student completing this course earns one high school course credit.

Class Dates: Wednesday, September 7, 2022 – Friday, May 26, 2023.

Class Times: Monday, Wednesdays, and Fridays: 11:00 a.m. — 12:15 p.m. (EST)

Instructor: Dr. Chris Clancy

E-mail: clancy_scholé@comcast.net

HONORS CHEMISTRY SCHEDULE

CLASS SESSIONS DATES:

Classes will take place on Mondays, Wednesdays, and Fridays: 11:00 a.m. — 12:15 p.m. (EST) for 32 weeks and 94 classes on the following dates*. Office hours will be available by appointment.

* Please note the above dates and times are the anticipated class sessions for this course. However, all dates are subject to change as the instructor's circumstances might dictate (e.g., illness, family emergency). Any classes canceled by the instructor will be accounted for by the instructor.

September (11): 7, 9 | 12, 14, 16 | 19, 21, 23 | 26, 28, 30
October (13): 3, 5, 7 | 10, 12, 14 | 17, 19, 21 | 24, 26, 28 | 31
November (10): 2, 4 | 7, 9, 11 | 14, 16, 18 | [**Thanksgiving Break**] | 28, 30
December (7): 2 | 5, 7, 9 | 12, 14, 16 | [**Christmas Break**]
January (10): [**Christmas Break**] | 9, 11, 13 | 16, 18, 20 | [**End 1st Semester**]
23, 25, 27 | 30
February (9): 1, 3 | 6, 8, 10 | 13, 15, 17 | [**Winter Break**] | 27
March (14): 1, 3 | 6, 8, 10 | 13, 15, 17 | 20, 22, 24 | 27, 29, 31
April (8): 3, 5, 7 | [**Holy Week**] | 19, 21 | 24, 26, 28
May (12): 1, 3, 5 | 8, 10, 11 | 15, 17, 19 | 22, 24, 26 | [**End 2nd Semester**]

HONORS CHEMISTRY COURSE MAP

TOPICS

1. Introduction/Review
2. History of Atomic Theory
3. Atomic Structure
4. Periodicity
5. Chemical Bonds
6. Intermolecular Forces
7. Chemical Reactions
8. Stoichiometry
9. Kinetic Theory
10. States of Matter
11. The Gas Laws
12. Solution Chemistry
13. Acids and Bases
14. Redox Chemistry

Additional topics studied as class pace allows:

- Thermochemistry
- Chemical Equilibrium
- Introduction to Organic Chemistry

LABORATORY EXPERIMENTS

Possible experiments include:

- Separation of Components in a Mixture
- Determining the Empirical Formula of Copper Chloride Hydrate
- Calorimetry of Organic Compounds
- Mole Amount of a Gas
- Acid Base Titration

- Effectiveness of Antacids
- Titration Curves and K_a

HONORS CHEMISTRY COURSE DESCRIPTION

Honors Chemistry is for juniors and seniors who have taken, or are concurrently taking, Algebra II. The course utilizes mathematical skills such as algebraic manipulations of equations, ratios and proportions, exponential functions and logarithms, dimensional analysis, and significant figures. Students are also expected to read the text, take notes, and write in full sentences.

The course text, *Chemistry for Accelerated Students* by John D. Mays, contains thirteen modules covering topics ranging from atomic structure and chemical bonds to kinetics and redox reactions. Please see the Course Map above for a complete list of topics. This course will also review scientific calculations and the history of atomic theory.

This course employs a mastery approach. Our goal is to have a solid, working comprehension of concepts in chemistry and to become adept at their quantitative application. Mastering these concepts will create a solid foundation upon which higher level concepts can be built from biology, chemistry, advanced physics, and any other scientific discipline. Regular review of important standard problem types throughout the course helps to keep concepts relevant and fresh. Students are expected to keep up with a daily workload of reading, taking notes, attending class, completing homework, and reviewing previous material. A cultivation of these activities will create important skills that the student will find useful in all academic pursuits.

Laboratory: A good scientist must understand how to design and conduct experiments, interpret results, and clearly and precisely communicate his findings. The robust, high quality laboratory component for Honors General Chemistry provides for experiments that use laboratory-grade materials. The laboratory text *Chemistry Experiments for High School at Home* by Christina Swan and John D. Mays accompanies the textbook closely. Guidelines for lab report writing will follow *The Student Lab Report Handbook* by John D. Mays and templates as provided by Dr. Clancy. Supplies can be found at Home Science Tools under the name “Economy Lab Kit for use with Novare General Chemistry”, but families are encouraged to collect supplies in the most convenient and economic fashion that suits their needs. However, it is crucial that supplies for the experiments are acquired in a timely fashion and that students are prepared even before the days the experiments are performed.

NOTE: Parents will be expected to be present during laboratory exercises to ensure the safety of their student and the following of proper procedure. Students and parents should pre-read the exercise and set up supplies prior to class time when experiments are conducted during class time.

Grading: Students' grades will be based on frequent cumulative quizzes, semester exams, class participation, homework completion, and written laboratory reports.

HONORS CHEMISTRY REQUIRED COURSE MATERIALS

1) *Chemistry for Accelerated Students, 2nd edition*, John D. Mays, Novare Science and Math. 2018.

<https://classicalacademicpress.com/products/chemistry-for-accelerated-students-2nd-ed? pos=8& sid=3821f454c& ss=r>

2) *Chemistry Experiments for High School at Home*, Christina H. Swan and John D. Mays, Novare Science and Math, 2019.

<https://classicalacademicpress.com/products/chemistry-experiments-for-high-school-at-home>

3) *The Student Lab Report Handbook: A Guide to Content, Style, and Formatting for Effective Science Lab Reports* (2nd ed.) by John D. Mays. Novare Science and Math. 2014.

<https://classicalacademicpress.com/products/the-student-lab-report-handbook-2nd-edition? pos=1& sid=11e6dba61& ss=r>

4) *Solutions Manual to Chemistry for Accelerated Students*, John D. Mays. *This is a companion answer key to the problems in the text allowing students to check their work. Do **not** purchase the complete solutions manual (teacher only).*

<https://classicalacademicpress.com/products/solutions-manual-for-chemistry-for-accelerated-students>

5) *Economy Lab Kit for Use with Novare General Chemistry*, Home Science Tools. Please note that it may be worthwhile to determine whether the student already has access to the items in this kit. There is an option to buy the items individually rather than buying the whole kit.

<https://www.homesciencetools.com/product/economy-lab-kit-novare-general-chemistry/>

6) Household Items for Lab. Possible items include sand (sand box sand or other coarse sand), aluminum foil, soda can, ethyl or isopropyl alcohol (>90%), baking soda, long-tipped butane lighter, distilled water, straight pin, three types of antacids. A final list will be provided before the course begins.

7) Equipment such as a tablet with stylus or Wacom Intuos to allow the student to share writing done by the student with a stylus, not a mouse. Please note that class participation is a very effective way for students to learn and master the material. It will also determine 15% of students' grades.

8) Scientific calculator. The students should *not* use calculators on their computer during class, as using a mouse to operate a desktop calculator is cumbersome and slow.

9) Composition book to be used as a lab book. The pages should not be removable and ideally should be graph paper.

10) Spiral notebook or loose-leaf notebook paper, 3-ring binder, index cards, and other similar supplies that would aid the individual student in studying and organizing the course material.

STUDENT EVALUATION: GRADING CRITERIA

Dr. Clancy will communicate with students regarding assignment feedback and grading through the free online grading system, Schoology. The teacher will provide students with more detailed information via the *Honors Chemistry* course page.

Grades will be comprised of:

1. Exams
2. Quizzes
3. Class Participation
4. Homework Completion
5. Lab Reports

STUDENT EVALUATION: GRADING

While studying *Honors Chemistry* through Scholé Academy will be “restful”, we also recognize the need to provide grades for students who will be using this course as part of their prepared college transcript. It is a delicate balance to achieve both restful learning and excellent academic performance but earning a specific grade should not overshadow achievement goals for mastery of this discipline. The expectations of the course are clearly laid out for each student via objectives for each chapter and a standard problems list for the entire course. Our goal is to master these topics while utilizing the techniques of classical learning and deep contemplation, rather than cramming information to pass a test just to move on to the next topic. Chemistry is one discipline of science, and mastery of the material in this course will prepare students for other scientific and mathematical pursuits. I will assign the following Scholé grades according to the student’s level of achievement: *magna cum laude* (with great praise); *cum laude* (with praise); *satis* (sufficient, satisfactory), and *non satis* (not sufficient). Grades will also be assessed numerically and will be available at the students’ course Schoology pages throughout the year.

Parents of should keep abreast of their student's progress during the year and if necessary should meet with Dr. Clancy for advice on how to help their student develop better study habits and utilize resources to help him succeed in the class.

Dr. Clancy will provide quarterly reports of progress and a transcript of the Scholé grade (and traditional grade for transcript purposes) at the end of the year. Ideally, an average student working diligently should do praiseworthy work (*cum laude*). One who excels beyond this expectation would be a *magna cum laude* student. Students who do adequate but not praiseworthy work will receive a *satis* designation. *Non satis* means lacking sufficiency or adequacy.

Inasmuch as you might be fully on board with this grading method in theory, there will undoubtedly be the need to complete a high school transcript with either a numeric or traditional letter grade. Traditional percentage grades will be provided and readily accessible on the *Honors Chemistry* Schoology page. Additionally, Dr. Clancy will provide a transcript of that grade to the requesting parent at the end of the year.

STUDENT EVALUATION: MASTERY PORTRAIT

Mastery portrait: Students who are prepared to take this class are typically early to late teens, adolescents approaching young adulthood. This course will not only provide the academic components necessary to achieve mastery of the content of the class and skills associated with analytical thought, but will also help engage the student in development of their moral virtues.

At the completion of this course *cum laude* students will be able to do the following:

- Use the metric system, dimensional analysis, scientific notation, and significant figures fluently.
- Demonstrate a solid understanding both verbally and computationally of the topics covered in the course.
- Understand the principles of Chemistry and their historical development and deepen their appreciation and understanding of the nature of God's creation.
- Students will also be guided in development of the virtues and encouraged to fight against vices.

STUDENT EXPECTATIONS: EXECUTIVE FUNCTION SKILLS

Students enrolling in *Honors Chemistry* will be encouraged and expected to develop Executive Function Skills. As students develop and hone these skills, their ability to get the most out of current and future academic will also mature and progress.

Each teacher will invariably have his own set of requirements and skills he requires students to bring to their studies. Scholé Academy believes there are five such qualities that are necessary for students in various subjects:

1. Engagement: A student should be willing to step into the arena of class discussion, ask questions, supply answers, generate the internal dialogue necessary to determine if what's being discussed is important and necessary to himself.

2. Note Taking: A student should be able to note important and relevant content in an organized fashion during and after being engaged with the class (Cornell Notes may be a great option). Furthermore, the student should consult his notes for application in assignments and assessments.

3. Attention to Detail/Preparedness: A student should consistently adhere to deadlines, submission requirements, confirm technology is working prior to the start of class, determine how to proceed after an absence, be responsible for consulting his course syllabus and adjusting as the class proceeds, etc.

4. Employ Critiques: A student should be able to receive feedback about his work or performance and then apply that feedback to future assignments rather than repeating mistakes. He should also learn how to apply the in-class critiques of fellow students to his own studies.

5. Initiative/Maturity: A student should be able to keep up with the workload for the class, make use of resources made available as needed, and contact the teacher for help if necessary.

STUDENT EXPECTATIONS IN ACTION

In this class, students will be expected to listen attentively and participate actively in class discussions and practices. Students are expected to arrive to class on time and with all assigned material completed. The instructor will facilitate learning for the student, but the responsibility for staying up to date with classwork and assignments ultimately falls to the student.

All assignments should be submitted to the appropriate Schoology Assignment folder prior to the start of class each day. Students turning in late work will earn a 10% penalty for each day the assignment is late. Students will submit their work by scanning their homework pages as a PDF document and uploading it into the Schoology course site. Photographs of completed assignments will generally not be accepted as they can be incredibly difficult to read.

Students and their parents should read John D. Mays's outline on his method of study for mastery learning in the *Preface for Students* on pp. xx-xiii of the text. The *Preface for Teachers* may also be of interest to parents and students. More resources can also be found at the Novare site <https://novarescienceandmath.com>, including "A Letter from Teachers to Parents" <https://novarescienceandmath.com/a-letter-from-teachers-to-parents/>.

STUDENT EVALUATION: ACADEMIC DISHONESTY

Students will often take tests and quizzes privately at home. Students are on their honor to abide by [Scholé Academy's Learning Philosophy](#) which assumes the personal cultivation of Student-Virtues described in the Student-Parent Handbook.

Additionally, plagiarism is a serious and punishable offense. Proper citation of all sources is essential to the academic endeavor. Remember to cite any source if the information is not common knowledge or is an opinion obtained through any source. A plagiarized assignment will result in a failing grade. Students should consult an MLA style for specific instruction for obtaining, quoting, and paraphrasing sources.

THE VIRTUAL CLASSROOM

We will be using the free online “virtual classroom” software provided on Zoom. The virtual classroom will provide students with interactive audio, and text chat. We will also be using ziteboard.com, a web based interactive whiteboard in which texts and diagrams can be displayed and shared, and through which the students will also be expected to contribute using their tablet and stylus (see Required Course Materials above). It is necessary for the student or family to create a free ziteboard account. We will provide students with links (via email) that will enable students to join both the virtual classroom on Zoom and the class ziteboard.

Specific information regarding the technology used by Scholé Academy (including required technology) can be found by visiting the [Technology in the Classroom](#) section of the Student Parent Handbook.

Students will submit assignments by uploading them as PDFs to the *Honors Chemistry* Schoology assignment page (access granted after enrollment is secured). Parents will receive individual parent access codes for their student's Schoology page.

ABOUT THE INSTRUCTOR

Chris Clancy earned her PhD in Chemistry from the University of North Carolina at Chapel Hill. After working as a postdoctoral researcher at Duke University and the University of Chicago, she decided to leave academia and stay home with her first-born son. She and her husband homeschool their three remaining school age children. After reading Dorothy Sayers' “The Lost Tools of Learning”, she was inspired to teach her children in the classical style of learning.

Chris has taught high school Biology, Chemistry, and Physics to both her own children and other homeschoolers at a Catholic homeschool coop which she and her husband helped

found. Last year she had a great time teaching *Introductory Physics* at Scholé Academy. She is equally enthusiastic about history and literature, and is always willing to play a board game, cribbage, or backgammon.