



Chesapeake Bay Governor's School  
For Marine and Environmental Science  
Warsaw Campus

**Chemistry ~ 2015-2016**

**Instructor Information:**

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**Description (CHM 111-112):**

This course explores the fundamental laws, theories, and mathematical concepts of chemistry and will cover the structure of matter, the characteristics of the states of matter, types of reactions, thermodynamics, chemical kinetics, equilibrium, and electrochemistry. The lab component of the course, which counts approximately thirty percent of the overall grade, will focus on qualitative and quantitative support of the general chemistry concepts. A working knowledge of algebra is required. Applications to environmental phenomena will be emphasized where possible.

**Text:**

Brown, T., LeMay, Jr., H.E., Bursten, B., Murphy, C.. 2009. Chemistry, The Central Science. Pearson, Upper Saddle River, NJ. 1103pgs.  
*Please handle the textbook with care.*

**Course Credit:** 4 credits per semester, including lab. This is a total of 8 credits for the year.

**Required Materials:** At least one 3-ring binder with dividers, notebook paper, colored pencils, glue stick, graph paper, pens and pencils, highlighters, calculator, USB flash drive

**Recommended Materials:** Clear plastic sleeves to keep handouts in 3-ring binder

**Attendance:** Class attendance is, of course, required. Be reminded of the CBGS policy in the Handbook which you signed. Absences and tardies will be reported daily to your home school and to parents on interims and grade reports. Check for assignments you may miss by accessing Blackboard. You may also email or call me for assistance.

**Learning Sequence:**

<b><u>Chapter</u></b>	<b><u>Topics</u></b>
1	Introduction Basic Terms Uncertainty in Measurement Dimensional Analysis
2	Atomic Theory

	Atoms, Molecules, Ions, Isotopes Subatomic particles, Periodic Table Symbols, Formulas, Naming Nuclear chemistry
3	Molecular and formula mass The Mole and Avogadro's # Molar Mass, % Composition
6	Structure of Atom Nature of light, Electromagnetic spectrum The Photon, Quantum Theory Quantum numbers, orbitals Writing electron Configurations Orbital Diagrams
7	Periodic Properties Periodic Table, Group Trends
8	Chemical Bonding Lewis symbols, Octet Rule and exceptions Ionic bonds and lattice energy Covalent bonds, polar vs non-polar Electronegativity, bond length and energy Lewis structures and resonance
More 3	Writing and balancing Chemical Equations Stoichiometry problems Theoretical Yield, % yield, Limiting reactant
4	Solution Chemistry Acids, Bases, Salts Electrolytes, Precipitates Oxidation-Reduction
20	Balancing ReDox Reactions
5	Thermodynamics: Energy, Heat, Enthalpy Endothermic vs. exothermic Calorimetry, heat capacity, specific heat Hess's Law, Heats of Formation
9	Molecular Geometry: VSEPR Orbital hybridization
10	Gases: Ideal Gas, Pressure Gas Laws, gas stoichiometry Gas mixtures, partial pressure, Kinetic-Molecular Theory Effusion and Diffusion
11	Intermolecular Forces States of Matter, changes of state, Phase Diagrams
13	Solution concentrations: molality,

	molarity, mass %, mole fraction, normality, Colligative properties
14	Kinetics
15	Equilibrium, $K_{eq}$ LeChatelier's Principle Reaction Quotient
16	Acid-Base Equilibria $pH$ , $pOH$ , $K_a$ , $K_b$ , $K_w$ , $pK_a$ , $pK_b$ , $pK_w$
17	More on Aqueous Equilibria Common-ion Effect Buffer Solutions, Henderson-Hasselbalch Equation (Titrations revisited) $K_{sp}$ , Solubility Equilibria
19	Thermodynamics revisited Spontaneous reactions, entropy ( $S$ and $\Delta S$ ) Gibbs Free Energy ( $\Delta G$ )
20	Electrochemistry: voltaic cells, batteries, standard electrode potentials, Faraday constant, Nernst Equation

**Make-up work policy:** If you miss a class, you are responsible for discovering what work you missed. It needs to be completed and turned in within two days of your return to class. Tests and quizzes missed will be taken on the date of return to class as they are scheduled well in advance.

**Missing work:** 10% of the total points a day will be deducted from all work not turned in on the due date. Zeroes averaged into any component of your marking period average can have devastating effects, so be sure to turn something in!

**Honor Code:** Students are expected to follow the rules and procedures as outlined in the Student Honor Code. Please refer to the Student Handbook if you need guidelines. Failure to do so may result in dismissal from the course. Tests, quizzes, and other work as requested will be pledged.

### ***Course Expectations and Information:***

1. **RESPECT!** yourself, others in the room, the room and all equipment and materials, everyone we deal with, the environment.....!
2. **SAFETY!** Be aware of yourself and your surroundings in all lab situations. Follow all safety rules and always read lab directions.
3. **Class Participation:** You will get the most out of this class if you come prepared each day and participate in the discussions and other activities.
4. **Reading Assignments:** Reading a science text is not like reading a novel! Read the textbook prior to the class discussion of the topic. Answer any assigned questions prior to the discussion. Write down any questions you have and ask them in class. Some reading assignments will be on the internet.

**5. Note Taking:** You will need a notebook for the notes you will take in class as well as the notes you should take as you read each chapter. It is wise to learn now how to take detailed notes during class discussions. Note Making: You will need to stop periodically to review and rewrite your notes (at least at the end of each chapter). Summarizing your notes in this way is an excellent way to study, and, if you do it nightly, it will point out questions you need to ask the next day in class.

**6. Free Writing:** Sometimes you will be asked to write your thoughts and questions about a topic. You will be expected to write continuously (for 3-5 minutes) whatever comes into your head about the concept. This writing will be the starting point for many class discussions.

**7. Lab Work:** Lab work is an integral part of chemistry. We will do several labs throughout the year that are College level and designed to require data analysis and manipulation. In these labs you will investigate a question or relationship, collect and analyze data, interpret the results, and draw conclusions. You will write formal lab reports which include more details and informal lab reports. All lab papers and reports must be kept in your 3- ring binder. Personal involvement and performance is factored into the grade for the lab.

**8. Creative Projects:** During the year you will be asked to turn on your right brain and create a pictograph, participate in a competition, or develop a presentation to represent a complex chemical process or explain a chemical topic or concept. Studies indicate that the more learning modalities students use to process material, the better they will understand and remember it. Hopefully by turning on your creative processes you will come to a better understanding of certain chemical processes, topics, or concepts.

**9. Evaluation:** Formal evaluations (i.e. tests!) will be multiple choice and free response. Multiple Choice items will come from old AP Tests among other sources so that you will constantly be challenged to use that grey matter. The free response section can be problems, short answers, graphs with data analysis, and/or essays. These will all involve critical thinking skills to prepare you for future scientific endeavors. Evaluations will usually occur at the end of each chapter. Quizzes will be given as topic and homework checks.

**10. Grading:** Lab/Project work: 30%, Evaluations: 40%, Field trip and class participation: 10%, Classwork/Homework: 20%. We are on a 10 point grade scale (90% and above is an A for example).

**11. Classwork and Homework.** In the upper right hand corner of the page indicate your name, the date, the page (if more than one page), and the assignment you are doing. Homework is due at the beginning of the period on the due date. Classwork is due when the teacher asks for it. Please keep these pages in chronological order to facilitate classwork or homework checks in class. These assignments may also be collected from time to time. At the end of each chapter you will notice two types of questions: "Visualizing Concepts" and "Exercises." The VC's are designed to assess whether you have mastered the key concepts in each chapter. The Exercises are divided into sections that align with the chapter sections. This is where you will find the problems that need to be worked out. Please do these as we complete each section in class. We will put some of these on the board when we go over them in class. Chemistry is different than biology. Practice is the best way to master the concepts.

**12. Tips on how to survive this and other college level courses:**

- ❖ Keep up to date.
- ❖ Realize that you will have to work/read on weekends and holidays. You should spend at least 30 minutes a night on Chemistry related work. Lab analysis will require more time.
- ❖ You may have to stay late, come early, form a study group, ask for help.
- ❖ Ask questions in class.
- ❖ Get organized! Get a 3-ring binder and lots of dividers!
- ❖ Sharpen your critical reading, note taking, and problem solving skills.

- ❖ Review, review, review the problems!
- ❖ Schedule your time and use it effectively!
- ❖ Find a “study buddy”—just make sure that you actually use the time to study, not fool around. Your buddy may also help out if you are absent and need to make up work.
- ❖ You need to be self-motivated.

### ***Policies:***

**Cell Phone/Electronics Policy:** All cell phones and other electronic devices must be silenced and are not to be used during class, unless permission is given otherwise. Phones and electronics are tools; if used in an unauthorized manner, electronics will be confiscated and returned at the end of the class period.

### **Inclement Weather and School Closings Policy:**

- Closing of the Chesapeake Bay Governor’s School is determined by the site: Glenss or Warsaw or Bowling Green. For example: Essex County Schools may be closed due to weather but RCC-Warsaw is open; therefore CBGS will be open.
- If a school system is closed due to inclement weather and CBGS is open, students from the closed school system may attend pending the safety of the roads and permission from the parents.
- There may be an emergency in which CBGS is closed and the particular school system is open. Students shall report to their respective school instead of going to CBGS.
- If there is a one-hour delay for the CBGS site, CBGS will open one hour late.
- If there is a two-hour delay for the CBGS site, CBGS will be closed and students are to report to their home high school.
- If the home high school opens one hour late, and CBGS opens on time, students from the home high school are to report to CBGS one hour late.

### **CBGS Statement on Safety:**

What to know and do to be prepared for emergencies at CBGS/RCC:

- Sign up to receive RCC text messaging alerts and keep your information up-to-date.  
<https://alert.rappahannock.edu/index.php?CCheck=1>
- Know the safe evacuation route from each of your classrooms. Emergency evacuation routes are posted in campus classrooms.
- Listen for and follow instruction from CBGS/RCC or other designated authorities.
- Know where to go for additional emergency information.
- Report suspicious activities and objects.

### **Statement on Americans with Disabilities Act:**

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 require schools to provide an ‘academic adjustment’ and/or a ‘reasonable accommodation’ to any qualified individual with a physical or mental disability who self-identifies as having such. Students should contact CBGS faculty for appropriate academic adjustments or accommodations.

### **Title IX:**

Rappahannock Community College is committed to providing an environment that is free from harassment and discrimination based on any status protected by law. This institution promotes and maintains educational opportunities without regard to race, color, sex, ethnicity, religion, gender, age (except when age is a bona fide occupational qualification), disability, national origin, or other non-merit factors. More information on Title IX can be found at [www.rappahannock.edu](http://www.rappahannock.edu) by searching for “Title IX.” For questions related to Title IX, please contact RCC Title IX Coordinator Lorraine A. Justice, at 804-333-6737 or [titleix@rappahannock.edu](mailto:titleix@rappahannock.edu). To ensure that all members of our campus community are educated about Title IX, please complete Title IX training by visiting: [www.everfi.com/register](http://www.everfi.com/register) and using this code: **6d15087f**