

# GREETINGS SENIORS!

In order to prepare you for the rigorous curriculum that you will be facing during your senior year at the Governor's School, I have prepared the following materials to help you gear up for what will be a rather unique Organic Chemistry, Biochemistry, and Environmental Chemistry high school experience. The fact that you are getting ready for another school year studying even more advanced topics in chemistry tells me that you thrive on challenges, and I will see to it to help you achieve success in your senior year (at least as far as your chemistry class goes) to the best of my abilities.

As you enjoy your well-deserved summer vacation, I have prepared an assignment that I would like you to complete before the start of the new school year. Some of the problems you encounter in this summer assignment may be familiar to you, and it is possible that your notes from General Chemistry may help you complete them. Keep in mind that these problems are at the introductory level and are general enough so that you can find whatever solutions you need to solve the problems on the internet and/or a chemistry study guide. If you find yourself having to use a resource to solve a problem, please cite when and where you used the resource.

This summer assignment will not be graded, but I do reserve the right to give you a quiz (which will be graded) after reviewing the assignment in class. Just saying.

Please bring your completed summer assignment with you on **THE FIRST DAY OF CLASS**, since we will be going over some of the problems together.

I look forward to seeing everyone on the first day of class! Do not forget to relax and have fun during your summer vacation, but also do not lose your academic edge. Complete your summer assignment and learned the topics covered in the assignment to get a head start for the upcoming school year. Email me if you need help. I do check my work email over the summer, so I will respond to your messages whenever I can.

In addition to your summer assignment, please begin brainstorming possible ideas for your mentorship project. If you have any questions as to whether select research project topics are allowed in a basic chemistry laboratory, please do not hesitate to email me about it. We will discuss the mentorship project at the start of the school year.

Good luck, have fun, and I will see everyone when classes resume.

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## Introduction to Organic Chemistry

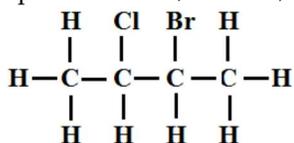
1. In your own words, please describe or explain what you think is *Organic Chemistry*.
2. What are 6 atoms that are commonly found in organic molecules?
3. State one reason why *polar, non-polar, and semi-polar bonds* are similar.
  - a. State two reasons why *polar, non-polar, and semi-polar bonds* are different.
4. Please fill in the following information specified in the table below:

Basic organic families	Typical atoms found in the family	Describe the bond type between the carbon atoms
Alkanes		
Alkenes		
Alkynes		

5. Adding a few additional atoms to the organic molecule can not only change its properties, but also turn the molecule into a different type of molecule altogether. Please fill in the following information specified in the table below:

Organic families	Name of family's characteristic functional group	Draw the arrangement/structure of the atoms making up the characteristic functional group
Alcohols		
Aldehydes		
Ketones		
Ethers		
Esters		
Amines		
Amides		
Carboxylic acids		
Nitro		

- Which of the following molecules in the tables specified in question 4 and 5 belong to the organic subset of *hydrocarbons*? Explain your answer.
- Which of the organic families in the table in question 5 are *isomers* of each other? Explain your answer.
- The following molecule is named 2-bromo-3-chlorobutane. The name may be broken down into 4 parts: *2-bromo*, *3-chloro*, *but*, and *-ane*. Do some research and justify this four part name.



- Explain why the molecule name is 2-bromo-3-chlorobutane and NOT 2-chloro-3-bromobutane.

### *Introduction to Biochemistry*

- In your own words, please describe or explain what you think is *Biochemistry*.
- Explain how an *unsaturated* fat is different from a *saturated* fat?
- How is a carbohydrate *oil* different from a carbohydrate *fat*?
- How are omega-3 fish oils different from omega-6 fish oils?
- Compose an information booklet about the different macromolecules with the following information:
  - Research about the following macromolecules – carbohydrates, lipids, nucleic acids, proteins.
  - For each of the four macromolecules, include the following information:
    - A general description of the macromolecule
    - General structure (a diagram is fine)
    - General nomenclature
    - Examples of macromolecules
    - Physical and chemical properties
    - Biochemical role
    - Interesting facts

## *Introduction to Environmental Chemistry*

Your summer assignment for environmental chemistry is meant to raise your awareness on why this topic is important. Chemistry not only plays a very important role in our daily lives, but it also has an impact (both negative and positive) on the environment. We are currently facing many serious environmental problems, and topics like global warming, acid rain, ozone depletion, and toxic waste disposal are a few of the issues that are of great concern. There are many newspapers, opinion pieces, magazines, journals, and websites that discuss these topics.

Your assignment for the summer is to collect, read, and analyze two (2) articles. The articles need to pertain to current events/concerns pertaining to environmental chemistry. Write down your analysis of each article. You may use a combination of both print and online sources for this assignment.

### **Instructions:**

1. Find a current article about any issue affecting the environment (water pollution, oil spills, mining, toxic waste, etc.). It must be a full article and not just an abstract.
2. Read the article – you may highlight important sections in the article.
3. Write a one paragraph summary; answer the questions who, what, where, why (is it a problem), and how.
4. Write an evaluation discussing how the problem affects you, why it is important, possible solutions for the problem, and a general reaction.
5. Neatly cut out, print, or photocopy the entire article. Staple or tape the article to the back of your summary and critique.