General Chemistry

Summer Assignment 2015-2016

Welcome to General Chemistry.

General Chemistry is for the student who desires an overall perspective of science that will incorporate *various aspects* of science and math with an emphasis on both mastery and critical thinking/application skills. This is a moderately fast paced course that requires much outside classroom preparation and application of both math and science. A summer assignment is essential to a good foundation as we incorporate more reading across the curriculum and giving all students an opportunity to learn more about what chemistry prior to starting the course! This class requires a strong work ethic and the ability to work independently. Let's start strong by getting a head-start!

Make sure that you complete all parts of the summer assignment! No two students' assignments should be identical and your work should not be copied directly from any of the sources you are using. The assignment will be due on the first day of the 2015-2016 school year. Do not wait until the end of the summer to start working!

You MUST complete ALL sections and be ready for the 1st day of school

1. **Memorize the 50 required elements – expect a quiz** the first day of school (August 4th 2015) over the 50 required elements
   - symbol, correct spelling of the element (all lower case – not proper nouns)

2. **Handwritten responses (collate in a journal/notebook or 3 ring binder) to all the questions in the assigned summer reading of "Napoleon's Buttons by Penny Le Couteur and Jay Burreson** (*collated handwritten responses due on Thursday August 6th 2015) (*see questions on pages 2-5)
   General Chemistry student are responsible for the following chapter guided questions and responses to Chapters: 1, 3, 10, 13, and 15. However we would suggest reading the entire book since its very fascinating reading.

We look forward to having you in class!!

LHS Chemistry Team

Section 1: Memorize the 50 required elements – expect a quiz the first day of school (August 4th 2015) over the 50 required elements

- symbol, correct spelling of the element (all lower case – not proper nouns)

Required Elements List: MEMORIZE the element symbols and names exactly as given below. Correct spelling and written symbols are required!

- **Spelling of elements names are in lower case (not proper nouns!)**

Al	aluminum	Cu	copper	N	nitrogen	Sn	tin
Ar	argon	F	fluorine	O	oxygen	Ti	titanium
As	arsenic	Au	gold	P	phosphorus	W	tungsten
Ba	barium	He	helium	Pt	platinum	U	uranium
Be	beryllium	H	hydrogen	Pu	plutonium	Xe	xenon
Bi	bismuth	I	iodine	K	potassium	Zn	zinc
B	boron	Fe	iron	Ra	radium		
Br	bromine	Kr	krypton	Rn	radon		
Cd	cadmium	Pb	lead	Sc	scandium		
Ca	calcium	Li	lithium	Se	selenium		
C	carbon	Mg	magnesium	Si	silicon		
Cs	cesium	Mn	manganese	Ag	silver		
Cl	chlorine	Hg	mercury	Na	sodium		
Cr	chromium	Ne	neon	Sr	strontium		
Co	cobalt	Ni	nickel	S	sulfur		

Section II: Handwritten responses (collate in a journal/notebook or 3 ring binder) to all the questions in the assigned summer reading of "Napoleon's Buttons by Penny Le Couteur and Jay Burreson (*collated handwritten responses due on Thursday August 6th 2015)

Expectations:

i. **Turn in your COMPLETED answers to the reading by** Thursday August 6th 2015
ii. **You do not have to re-write the question.**
iii. **Please number each response based on the chapter and question #. Your handwritten responses should be collated in a journal/notebook or 3 ring binder.**
iv. **You must write *in complete sentences* and *respond to the questions thoroughly* (*this is a part of learning how to communicate as a scientist).**
v. **ALL writing should be in ink – BLACK or BLUE ink pen only and it should be legible.**
vi. **Reference page – in text citation and reference page (APA citation format).**

Chapter 1: Peppers, Nutmeg, and Clover

1. Describe the different production methods for black, white, and green pepper.
2. Explain how pepper was originally used by the Greeks. When and why did it gain importance as a

spice?
3. How did the popularity of pepper initiate “The Age of Discovery”?
4. What causes the sensation from pepper, chili peppers, and ginger that we call “hotness”? Include a description of the chemical structures that are similar.
5. What is thought to be the reason that humans like hot foods?
6. How might the lure of spices be responsible for the beginning of capitalism?
7. What benefits do these molecules provide to plants?
8. Describe what each of the following spices provides medicinally to humans:
    a. Cloves
    b. Nutmeg
9. Why was nutmeg called “the spice of madness”? What compounds gave it these properties?
10. Why is sassafras no longer used in root beer? Explain

Chapter 3 – Glucose

1. Historical time frame: When was the molecule first identified either as a specific molecule or as a specific substance of importance?
2. Geographical Aspect: What part of the world was the molecule originally found or first used?
3. Individuals Involved: Which person or persons is historical identified with this molecule?
4. Historical Impact: What influence did this molecule have on history?
5. Molecules: List the molecules discussed in the chapter and their use.
6. Processing: Does this molecule have any special process or manufacturing activity needed to make or isolate the molecule?
7. Uses: What use or uses does this molecule currently have? Was the molecule used for anything different in the past?

Chapter 10: Wonder Drugs

1. Which types of medicinal molecules played some of the most influential roles in lengthening the average lifespan of humans?
2. Who invented aspirin? How could one speculate that the increase in the demand for aspirin may have hastened the development of TNT-based explosives?
3. Explain the chemistry behind the idea of Ehrlich’s “magic bullet”.
4. How did sulfa drugs drastically alter the number of injury-related deaths between WWI and WWII?
5. Why is the sulfanilamide drug so effective in killing bacteria? Explain in detail.
6. Why don’t sulfanilamide drugs have the same harmful effects on human tissue?
7. Although penicillin was highly effective in treating bacterial infections, the chemical structure of the antibiotic was not known at the time of discovery. How would this present a major problem in its widespread use?
8. What made the structure of penicillin so unusual? Why was this structure so difficult to synthesize? How does this structure make the chemical so effective in fighting bacteria?
9. Why does penicillin have to be stored at low temperatures?
10. How have antibiotics changed the world we live in today?

Chapter 13: Morphine, Nicotine, and Caffeine

1. Where and when did the use of opium by humans originate? How was opium used in ancient civilizations?
2. Codeine and morphine are both isolated from opium. What about their structures are different? What about their medicinal effects are different?

3. What is diacetylmorphine? How does this differ from regular morphine? What is the common name for this drug? What about this drugs structure gives it these qualities?
4. What chemical is created during heroin production? What about this chemical allows police an easy way to search for the drug?
5. Describe tobacco's influence on the world. How did different countries respond to the growing trend of smoking, chewing and snuffing tobacco? Be sure to mention countries that supported the distribution of tobacco as well as those who were against it.
6. What affect does nicotine have on the body? What about nicotine makes it highly addictive?
7. Describe what the molecule caffeine does once inside the body. What does caffeine do that gives the human body a "caffeine buzz"?
8. What gives chocolate its mood altering effects? Why is chocolate not a banned substance like other mood altering drugs?
9. Explain how the cultivation of coffee led to the development of Central America.
10. You decide: Caffeine is currently widely available to people of all ages. Should caffeine be outlawed like heroin, restricted to adults only, like nicotine, or should it remain as available as it is today? Be sure to discuss the pros and cons of outlawing or restricting caffeine containing substances. What laws has the government already passed to restrict caffeine in certain substances? Is caffeine restricted for athletes competing at the professional level?

Chapter 15: Salt
1. Describe 3 methods of salt productions. Detail each process in your description.
2. What makes sea salt a lower quality than brine salt or rock salt?
3. How did salt production largely contribute to the deforestation of parts of Europe?
4. How did the salt trade affect the cultures of countries around the world? Give at least three examples.
5. How has salt played an important role in deciding the outcome of wars? Give at least three examples.
6. Why do saline solutions conduct electricity while regular water does not?
7. Explain in detail why sodium chloride is particularly soluble in water. How does this characteristic make salt such an excellent preservative?
8. Explain, giving specific examples, why salt is so vital in maintaining healthy human body processes.
9. What was gabelle? Where was it instituted? When was it eliminated? What were its lasting effects?
10. Give two examples of chemicals produced using NaCl as a starting material. Give a brief summary of how each chemical is formed.