

Honors Chemistry- Summer Assignment 2016-2017

Welcome to Honors Chemistry.

Honors Chemistry is for the student who desires a more in-depth study 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 fast-paced course that requires much outside classroom preparation. 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 ahead-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

Section 1: **Memorize the 72 required elements – expect a quiz** the second day of school (August 2nd 2016) over the required elements

- symbol, correct spelling of the element (all lower case – not proper nouns)
- The first 6 rows of the periodic table (1-86 not counting 58-71)
- You do not need to know the numbers

Section 2: **Khan Academy video: (*take notes so that you have a good review, have your notes in class August 4th 2015).**

- Introduction to the Atom
<http://www.khanacademy.org/science/chemistry/introduction-to-the-atom/v/introduction-to-the-atom>
- Introduction to Atoms and Elements
<http://www.khanacademy.org/science/chemistry/introduction-to-the-atom/v/elements-and-atoms>

Section 3: **Honors Chemistry students are responsible for reading the book “The Disappearing Spoon” by Sam Kean. After reading, students should answer all of the questions listed below. All answers need to be handwritten and collated in a journal/notebook/3 ring binder. All questions must be answered, and they must be answered in complete sentences. You must cite your answers in APA format.**

- Collated handwritten responses due on the second day of school Tuesday August 2nd 2016) (*see questions on pages 2-5).
- Expectations:**
 - Turn in your COMPLETED answers to the reading by **Tuesday August 2nd 2016**
 - You do not have to re-write the question.
 - Please number each response based on the chapter and question #. Your handwritten responses should be collated in a journal/notebook or 3 ring binder (Typed responses will NOT be accepted).
 - You must write *in complete sentences and respond to the questions thoroughly* (*this is a part of learning how to communicate as a scientist).

Honors Chemistry- Summer Assignment 2016-2017

Section 1: Practice Page

This page is to help you learn the required 72 elements. For each element 1-86 (excluding elements 58-71), you must be able to correctly spell the name of the element and you must be able to recall the element symbol with proper capitalization. This page is not to be turned in.

| # | Name | Symbol | # | Name | Symbol |
|----|------|--------|----|---------------------|--------|
| 1 | | | 38 | | |
| 2 | | | 39 | | |
| 3 | | | 40 | | |
| 4 | | | 41 | | |
| 5 | | | 42 | | |
| 6 | | | 43 | | |
| 7 | | | 44 | | |
| 8 | | | 45 | | |
| 9 | | | 46 | | |
| 10 | | | 47 | | |
| 11 | | | 48 | | |
| 12 | | | 49 | | |
| 13 | | | 50 | | |
| 14 | | | 51 | | |
| 15 | | | 52 | | |
| 16 | | | 53 | | |
| 17 | | | 54 | | |
| 18 | | | 55 | | |
| 19 | | | 56 | | |
| 20 | | | 57 | | |
| 21 | | | | SKIP ELEMENTS 58-71 | |
| 22 | | | 72 | | |
| 23 | | | 73 | | |
| 24 | | | 74 | | |
| 25 | | | 75 | | |
| 26 | | | 76 | | |
| 27 | | | 77 | | |
| 28 | | | 78 | | |
| 29 | | | 79 | | |
| 30 | | | 80 | | |
| 31 | | | 81 | | |
| 32 | | | 82 | | |
| 33 | | | 83 | | |
| 34 | | | 84 | | |
| 35 | | | 85 | | |
| 36 | | | 86 | | |
| 37 | | | | | |

Honors Chemistry- Summer Assignment 2016-2017

Section 3: The Disappearing Spoon Questions

The Disappearing Spoon Questions: Chapter 1

- 1) How are elements classified on the periodic table?
- 2) By whom, when, and where was the concept of the atom first formulated?
- 3) Who minted the word element and what does it mean?
- 4) What are electrons and how are they arranged in an atom?
- 5) What is special about the alkali metals and where are they located on the periodic table?
- 6) What is an acid? How is an acid's strength measured?
- 7) What is an isotope and how do we denote or identify them?

The Disappearing Spoon Questions: Chapter 2

- 8) In 1892, the first virus was discovered. What was the name of this virus, and what type of substances did it affect?
- 9) What element is the back bone of amino acids?
- 10) What element is often cited as an alternative to carbon-based life in other galaxies?
- 11) What element was the key component of the first transistor produced at Bell Labs in NJ in 1947?

The Disappearing Spoon Questions: Chapter 3

- 12) Who is considered the father of the modern periodic table? Why did he use the term eka- when referring to some elements?
- 13) Who invented the spectroscope and what is it?
- 14) 7 elements were found in a feldspar mine outside of Stockholm, Sweden. What elements were found and why were they mining there?
- 15) Who worked on identifying the elements found in the feldspar mine and what element was named after him?
- 16) Thoroughly explain the "trick" of the disappearing spoon.

The Disappearing Spoon Questions: Chapter 4

- 17) What planet is so big that we could have been a solar system with 2 stars (the sun is a star) and it would have been a brown dwarf star but instead it cooled too rapidly and became a planet? Astrophysicists think it may contain planet-sized diamonds and pools of oily, black hydrogen metal.
- 18) How was Clair Patterson able to estimate the age of the earth and our solar system and what did she find?
- 19) Explain the process that the cyclotron at Princeton Plasma Physics Lab, NJ tries to replicate artificially.

The Disappearing Spoon Questions: Chapter 5

- 20) The Hague Convention of 1899 banned what type of weapon and why?
- 21) Elements with 7 electrons in the outer energy level are known collectively as what?

Honors Chemistry- Summer Assignment 2016-2017

- 22) What substance is a derivative of an insecticide created by Haber (a German Jew) before WW I and was used to gas the Jews by the Nazi's during WW II?
- 23) What gas is captured during the Haber process that is a key component in fertilizers and bombs?
- 24) What element was used in the production of steel to make it much harder and more lethal when used in the bomb making process? Where was this element found before we entered the war?
- 25) What element was coveted by Nazi Germany for making machinery and armor piercing missiles during WWII? Where does its elemental symbol come from?
- 26) What two metals are used extensively in the making of cell phone batteries? What properties do they have that make them the ideal substance for making cell phone batteries?

The Disappearing Spoon Questions: Chapter 6

- 27) Who proposed the idea of a highly positive, densely packed nucleus in 1913? What experiment lead him to this idea?
- 28) What is the connection between an element's atomic number and the element's nuclear charge? Who realized this connection?
- 29) Who discovered the neutron in 1932? What is the weight and charge of a neutron?
- 30) What research program was designed by the United States during WWII and what was the purpose of this program?
- 31) What is the last natural element that was not discovered until 1942 at the Oak Ridge National Laboratory in Tennessee?
- 32) What two elements did the US use when creating the first nuclear bombs? Which one was naturally occurring? Which one was synthesized and purified?

The Disappearing Spoon Questions: Chapter 7

- 33) What did Edwin McMillan create in 1940?
- 34) Who discovered/created more elements than anyone else in history while at US Berkeley? (2 scientists)
- 35) What is the name of the international body that governs chemistry?
- 36) Glenn Seaborg was the only living scientist ever honored by having an element named after him. What element is this?

The Disappearing Spoon Questions: Chapter 8

- 37) What element has been discovered for the "first time" more than any other element? Who claimed to discover it?

The Disappearing Spoon Questions: Chapter 9

- 38) Dr. N. Hagino identified a disease called "*itai, itai*". What element is responsible for this disease?

Honors Chemistry- Summer Assignment 2016-2017

- 39) What element was once considered unimportant sludge in Japan and is now used as an anti-corrosive agent in batteries and computer chips?
- 40) What element is known to be the deadliest element on the periodic table? Why is it so deadly?
- 41) What radioactive element is used to run smoke detectors? How does this element cause the alarm to go off?

The Disappearing Spoon Questions: Chapter 10

- 42) What was the first anti-bacterial drug ever created by man? How does it work when placed in mammals' cells?
- 43) What element was used to preserve milk across pioneer America in Conestoga Wagons? If too much of this is ingested, what are the side effects?

The Disappearing Spoon Questions: Chapter 11

- 44) What is referred to as the chemists' "Koran" and what is it known for?
- 45) What type of gas can be added to an oxygen rich atmosphere to suppress flammability?
- 46) What element is the largest component of the mixture we call air?
- 47) What gas burns fast and hot, and in its pure form could be ignited by a spark created by the Velcro on an astronaut's space suit?
- 48) What element is the standard for implants i.e. hip sockets, total knee joints, and even teeth? Why do we use this element?
- 49) What element is toxic, hard to melt, is pale, and tastes just like sugar?
- 50) What element will cause you to reek of pungent garlic for several weeks if spilt on oneself?
- 51) What ingredient in salt prevents people from developing goiter and mental retardation?

The Disappearing Spoon Questions: Chapter 12

- 52) What did Marie and Pierre Curie utilize to obtain pure uranium?
- 53) What was Marie Curie awarded the Nobel Prize for in 1911?

The Disappearing Spoon Questions: Chapter 13

- 54) What element was once considered to be more precious than gold? Which monument contains this element because of its importance?

The Disappearing Spoon Questions: Post Reading

- 55) What was the most surprising fact you learned from reading *The Disappearing Spoon...*? Were there any elements or scientists you thought you knew a lot about, but then discovered you didn't?
- 56) American science was often viewed as second-rate compared to Europe in the 1800s. What enabled U.S. Science to become so powerful in the 20th Century?
- 57) Does Mendeleev deserve the credit he gets for "discovering" the periodic table, even though other scientists had the same idea before him?

Honors Chemistry- Summer Assignment 2016-2017

- 58) ***The Disappearing Spoon...*** shines a light on many female scientists who have made significant contributions in scientific history. What role do you think their gender played in their work? Or do you think that these scientists' gender was irrelevant?
- 59) How did reading ***The Disappearing Spoon...*** change your ideas about the day-to-day life of scientists and the work they do?
- 60) Sam Kean makes connections to many areas of science, nature and life that normally are not discussed in association of the periodic table. What connections surprised you?
- 61) Now that you have read ***The Disappearing Spoon...***, what is your favorite element? Why?
- 62) What elements been discovered since this book was published?