

**Clearview Regional High School District
2019 Summer Assignment Coversheet**

Course:	Honors Chemistry
Teacher(s):	Mr. Navins, Mrs. Huhman
Due Date:	Completion Check: 9/6/19 Assessment: After 9/9/19
Purpose of Assignment:	To measure and maintain/sharpen skills learned in previous science courses that are relevant to honors chemistry.
Description of Assignment:	<ul style="list-style-type: none"> • Reading/Questions on the origin of the metric system • Lab Equipment Video and Questions • Atomic Structure Activity • Periodic Table Webquest/Blank PT Fill in
NJ Student Learning Standards	<ul style="list-style-type: none"> • <u>HS-PS1-7</u> - Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction • <u>HS-PS1-1</u>. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.
Grading/Use of Assignment: Category/Weight for Q1:	The packet will be four daily assessment grades: <ol style="list-style-type: none"> 1. Metric System Questions 2. Lab Equipment Identification Chart 3. Atomic Structure 4. Periodic Table Webquest
Specific Expectations:	The packet will be checked for completion and reviewed in class. A major assessment will be given after 9/9/19 on this material and additional material after it has been reviewed in class.
Where to Locate Assignment:	The summer packet will be picked up by students before leaving for summer break. It will also be located on the Google Classroom (class code at the bottom) and the Clearview website.
Teacher Contact Information:	Mr. Navins: Navinsja@clearviewregional.edu Mrs. Huhman huhmanma@clearviewregional.edu Ms. Pereira, department supervisor: pereiraka@clearviewregional.edu
Additional Help/ Resource(s)	For access to readings, clickable links, or if you need help with the packet you can log onto the Google Classroom Honors Chemistry Summer Packet Forum. Classroom code: 7f0ehj

Honors Chemistry Summer Packet

Welcome to the wonderful world of chemistry! The Clearview Science Team has prepared a summer preparatory packet to reinforce the science that you have previously studied and will prepare you for the topics that you will see in September. We are encouraged that many students are enrolling and doubling up in additional science classes in their sophomore year, as well as challenging AP courses in math and science, during their junior and senior years. This summer preparatory packet will prepare you for the required summer work in many other AP classes. Please completed this packet to the best of your ability. The packet will be graded for completion on Friday, September 6, 2019, and checked in class for correctness before an assessment will be given on the material. We will have an assessment on the material the week of September 9, 2019. The majority of the summer packet is a reinforcement of your science skills from middle school and freshmen year. The instructions for the summer packet are listed below. We are looking forward to meeting all of you in September!

Thank you!

Jim Navins and Maureen Huhman

Please email us if you have any questions and we will reply in a timely manner:

navinsja@clearviewregional.edu, huhmanma@clearviewregional.edu

Summer Packet Instructions

Each section is designated to review and reinforce science topics and applications that you have learned in the past. You may encounter some problems that you have forgotten or are not quite sure of how to solve. There are a plethora of websites (YouTube) that offer tutorials and explanations for any of these problems. Try to solve all problems and circle any problems that you have difficulty with. We will resolve any misconceptions and difficulties the first full week of class in September.

Section #1: Reading & questions on the Origins of the Metric System, Metric Reference Sheets

Section #2: Video: Introduction to Basic Lab Equipment and Chart

Section #3: Atomic Structure Guided Activity

Section #4: Periodic table WebQuest and Blank Periodic Table Fill In

Summer Reading & Questions

This portion of your summer packet requires you to log on to the website below, read the article thoroughly and answer the following questions. Be prepared for class discussion on these articles in September. If you do not have access to the internet, copies of this article are located in the Guidance office. Also attached are metric system reference sheets that you should become familiar with for future use in class.

Reading

The Origin of the Metric System

<http://www.us-metric.org/origin-of-the-metric-system/>

Questions

1. What is the official name of the modern metric system and what is its abbreviation?
2. Your younger sibling is introduced to the metric system in her 8th grade science class. She is having difficulty understanding what the metric system actually is. She comes to her dear older sibling for advice instead of turning to Google. How would you explain what the metric system is to her in your own words? Please use complete sentences in your explanation.
3. The metric system contains seven base units of measurement. What are the seven base units of measurement, and what do they measure?
4. Virtually the entire world uses the metric system. What measurement system(s) does the U.S. use? When does the United States use the metric system?

Clearview SI Conversion Factors for Test Hand-Out

Meters

Kilometers > Meters > Millimeters

1 kilometer equals 1000 meters or 1 meter equals 0.001 kilometers

1 hectometer equals 100 meters or 1 meter equals 0.01 hectometers

1 dekameter equals 10 meters or 1 meter equals 0.1 dekameter

1 meter equals 10 decimeters or 1 decimeter equals 0.1 meter

1 meter equals 100 centimeters or 1 centimeter equals 0.01 meter

1 meter equals 1000 millimeters or 1 millimeter equals 0.001 meters

Kilograms

Kilogram > Gram > Milligram

1 kilogram equals 1000 grams or 1 gram equals 0.001 kilograms

1 gram equals 1000 milligrams or 1 milligram equals 0.001 gram

Liters

Kiloliters > Liters > Milliliters

1 kiloliter equals 1000 liters or 1 liter equals 0.001 kiloliters

1 liter equals 1000 milliliters or 1 milliliter equals 0.001 liter

Seconds

1 second equals 1000 milliseconds or 1 millisecond equals 0.001 second

1 second equals (1,000,000) microseconds or 1 microsecond equals 0.000001 seconds

1 second equals (1,000,000,000) nanoseconds or 1 nanosecond equals (0.000000001) seconds

Liter Conversions to Volume and Mass

1 mL of H₂O at 4^oC equals 1 cm³ (cubic centimeter) of H₂O

1000 cm³ is equal to 1000 mL which is equal to 1 Liter

1 Liter is equal to 1 dm³ (cubic decimeter)

1 M³ (cubic meter) is equal to 1000 dm³ or 1 dm³ is equal to 0.001 M³

1 cm³ of H₂O at 4^oC is equal to one gram

Metric Conversions With Factors

“Or King Henry is Dead”

Name	Symbol	Size	Factor	or
nano	n	10^{-9}	$\frac{10^9 \text{ nm}}{1 \text{ m}}$	$\frac{1 \text{ m}}{10^9 \text{ nm}}$
micro	μ	10^{-6}	$\frac{10^6 \mu\text{m}}{1 \text{ m}}$	$\frac{1 \text{ m}}{10^6 \mu\text{m}}$
milli	m	10^{-3}	$\frac{10^3 \text{ mm}}{1 \text{ m}}$	$\frac{1 \text{ m}}{10^3 \text{ mm}}$
centi	c	10^{-2}	$\frac{10^2 \text{ cm}}{1 \text{ m}}$	$\frac{1 \text{ m}}{10^2 \text{ cm}}$
kilo	k	10^3	$\frac{1 \text{ km}}{10^3 \text{ m}}$	$\frac{10^3 \text{ m}}{1 \text{ km}}$
Mega	M	10^6	$\frac{1 \text{ Mm}}{10^6 \text{ m}}$	$\frac{10^6 \text{ m}}{1 \text{ Mm}}$

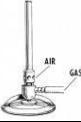
Chemistry Lab Equipment Identification and Use

The honors chemistry curriculum includes many lab experiments that require you to properly identify various pieces of lab equipment. It is equally important to understand the proper use of each piece of equipment. During lab activities in class you will be graded on your lab techniques, which includes the ability to identify lab equipment and use them correctly. Please watch the video clip below in its entirety and fill out the chart attached. (A clickable link to the video clip is located on Google Classroom)

YouTube Video Clip

[https://www.youtube.com/watch?v= A3JxpMU63s](https://www.youtube.com/watch?v=A3JxpMU63s)

Science Equipment Study Sheet

<u>Apparatus</u>	<u>Name</u>	<u>Use</u>
		
		
		
		
		
		
		
		
		
		
		
		

		
		
		
		
		
		
		
	Electronic Balance	
	Plastic Weigh Boat	
	Stirring Rod with Rubber Policeman	

Atomic Structure: What is an atom?

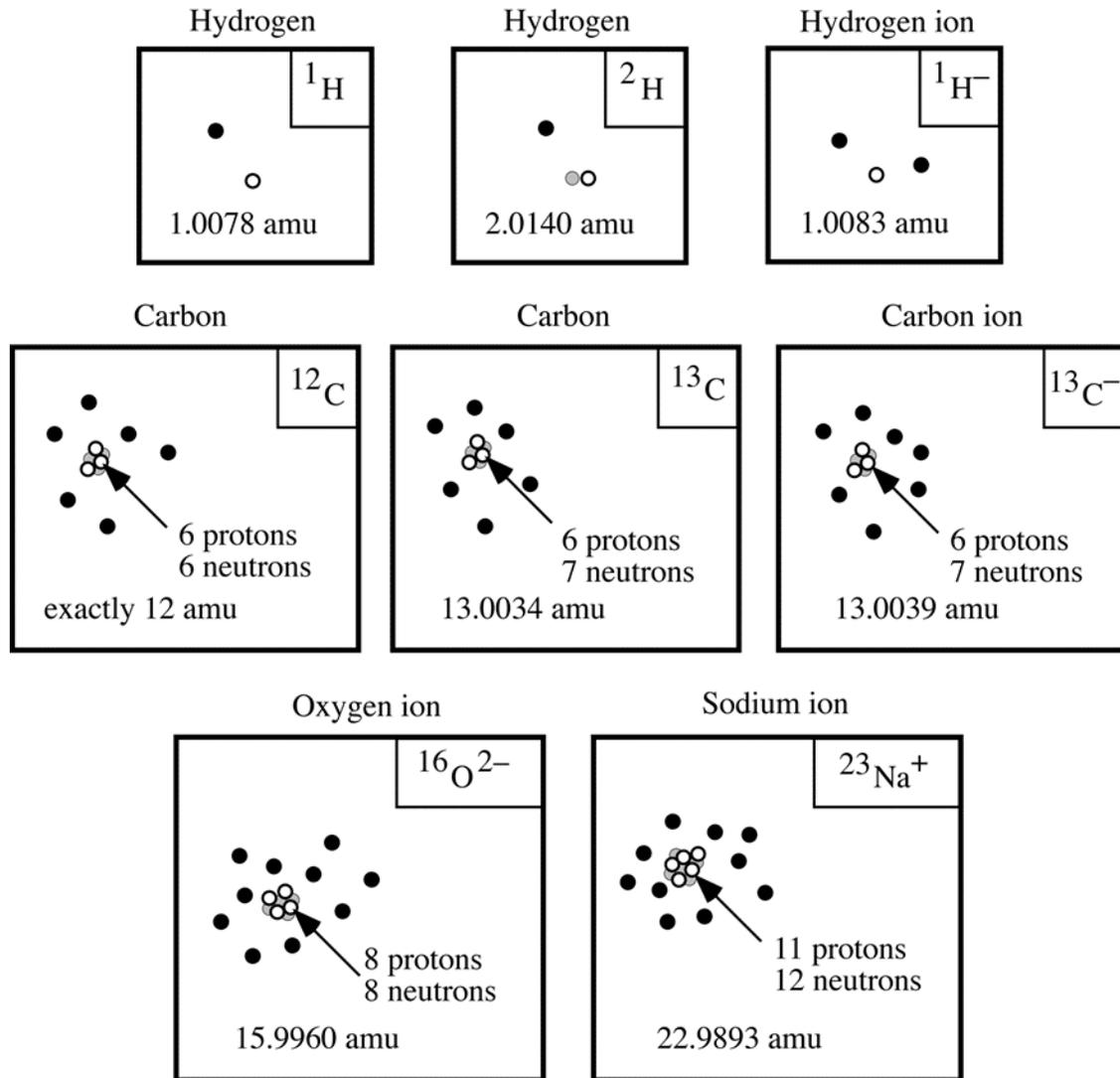
Analyze the model below and answer the questions that follow.

Model 1: Diagrams for Various Atoms

- electron (-)
- proton (+)
- neutron (no charge)

$$1 \text{ amu} = 1.6606 \times 10^{-24} \text{ g}$$

The **nucleus** of an atom contains the protons and the neutrons.



^1H and ^2H are isotopes of hydrogen

^{12}C and ^{13}C are isotopes of carbon

Critical Thinking Questions

1. How many protons are found in ^{12}C ? ^{13}C ? $^{13}\text{C}^-$?
2. How many neutrons are found in ^{12}C ? ^{13}C ? $^{13}\text{C}^-$?
3. How many electrons are found in ^{12}C ? ^{13}C ? $^{13}\text{C}^-$?
4.
 - a) What feature distinguishes a neutral atom from an ion?
 - b) Provide an expression for calculating the charge on an ion.
5. Based on the model,
 - a) what do all carbon atoms (and ions) have in common?
 - b) what do all hydrogen atoms (and ions) have in common?
 - c) how many protons, neutrons, and electrons are there in one atom of $^1\text{H}^+$?
6. What structural feature is different in isotopes of a particular element?
7. How is the mass number, A, (left-hand superscript next to the atomic symbol as shown in the Model) determined (from the structure of the atom)?

Model 2: Atomic Structure Continued

An atom is made up of protons and neutrons (both found in the nucleus) and electrons (in the surrounding electron cloud.) The atomic number, Z, is equal to the number of protons. The mass number, A, is equal to the number of protons plus neutrons. In a neutral atom, the number of protons equals the number of electrons. The charge on an ion indicates an imbalance of protons and electrons. Too many electrons produce a negative charge, too few, a positive charge.

Example 1: Isotopic Symbol



X = Atomic Symbol; Z = Atomic Number; A = Mass Number

Example 2: Periodic Table



Using a periodic table, complete the following chart.

Symbol	Atomic Number	Mass Number	Protons	Neutrons	Electrons	Charge
${}^2\text{H}$	1	2	1	1	1	0
${}^3\text{H}$						
${}^{22}\text{Na}^{+1}$					10	
	12	24			12	
	12	25			13	
${}^{46}\text{Ti}^{-2}$						
${}^{107}\text{Ag}$						
${}^{19}\text{F}^{-1}$						
${}^{12}\text{C}$					6	
${}^{13}\text{C}$					6	
${}^{14}\text{C}$					6	
${}^{12}\text{C}$					7	
${}^{12}\text{C}$					5	
${}^4\text{He}$						
	8			8	10	
argon-40	18				18	
${}^{70}\text{Ga}$						
${}^{70}\text{Ga}^{+3}$						
	4	9			2	
	7			8	8	

Introduction to the Periodic Table: Web quest

The periodic table is going to be your best friend in chemistry! Use the links provided to become familiar with the layout and use of the periodic table. Fill in the blanks accordingly. After you are finished with the webquest, color and label all of the different families on the blank periodic table. Use different colors for each family.

For questions #1-8, use this link: <http://www.chem4kids.com/files/elementable.html>

1. Why are the elements placed in specific places on the Periodic Table?
2. Periods are _____ that run from _____ to _____.
3. Elements in the same period have the same _____.
4. Every element in the first period has _____ shell for its _____. Every element in the second period has _____ for its _____. See the pattern?
5. Groups are _____ that run from _____ to _____.
6. The elements of a group have the same number of _____ in their _____ shell.
7. Every element in group one has _____ electron in its outer shell. Every element in group two has _____ electrons in its outer shell.
8. Although helium has only _____ electrons in its outer shell, it is grouped with elements that have _____.

Use the following site to fill in the blanks below: <http://chemicalelements.com/>

9. Click on Alkali Metals (left bar) and answer the following questions.
 - a. What is the group number? _____
 - b. Are these metals reactive? _____
 - c. Do these metals occur freely in nature? _____
 - d. How many electrons are in their outer shell? _____
 - e. What are the three characteristics of ALL metals? _____
 - f. Name the two most reactive elements in this group? _____ and _____.
 - g. What happens when they are exposed to water? _____
10. Click on Alkaline Earth Metals (left bar) and answer these questions.
 - a. What is the group number? _____
 - b. Are these metals reactive? _____
 - c. Do these metals occur freely in nature? _____
 - d. How many electrons are in their outer shell? _____ (Hint: It's the same as their oxidation number or group number.)
11. Click on Transition Metals (left bar) and answer these questions.
 - a. How many elements are in this group? _____
 - b. What are the group numbers? _____ through _____
 - c. What are valence electrons? _____
 - d. Because the valence electrons are present in more than one _____, transition metals often exhibit several common _____.
 - e. Name the three elements in this family that produce a magnetic field. _____, _____, and _____.

12. Click on Other Metals (left bar) and answer these questions.

- How many elements are in this group? _____
- What are the group numbers? _____ through _____
- How are these other metals similar to the transition metals? _____
- How are these metals different than the transition metals?

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- List three physical properties of these other metals. _____
 - What are the oxidation numbers for this group? _____

13. Click on Metalloids to answer these questions.

- Metalloids have properties of both _____ and _____.
- Define semiconductor _____.
- Name two metalloids that are semi-conductors. _____ and _____.
- This property makes metalloids useful in _____ and _____.

14. Click in Nonmetals to answer these questions.

- What are the group numbers? _____ through _____
- List four characteristics of ALL nonmetals.

c. What two states of matter do nonmetals exist in at room temperature?

d. The nonmetals have no _____ and do not _____.

15. Click on the Halogens (left bar) to answer these questions.

- What is the halogen group number? _____
- Are halogens metals or nonmetals? _____
- The term "halogen" means _____ and compounds containing halogens are called _____.
- How many electrons are in their outer shell? _____
- What is their oxidation number? _____
- What states of matter do halogens exist in at room temperature?

16. Click on Noble Gases (left bar) and answer these questions.

- What is the group number? _____
- Why were these gases considered to be inert or stable? _____

17. Click on Rare Earth Elements (Inner Transition) (left bar) and answer these questions.

- How many Rare Earth elements are there? _____
- The Rare Earth metals are found in group _____ and periods _____ and _____.

18. Complete the following on the blank periodic table included on the next page:

- Label group numbers
- Label period numbers
- Color each family with a different color and label them.

