Beaches too crowded for you? Corona Virus got your down. Bored and looking for something to do? Do I have something fun for you!

**Summer Chemistry Fun!**

There are no expectations for any of the chemistry classes to do or finish this work during the summer. If you are anxious to get a head start or want things to go smoother through the year, you are welcome to work on these concepts. This should get us through first and part of second quarter. Have a great summer!

It would be great if you were to make flash cards of all the vocabulary that is listed here. This is pretty basic stuff; I have saved the extra special words for when we are together in class. The quicker you can get down the easy ones, the more time you will have to focus on the special ones as you are learning the chapters with me.

**Chapter 2 – Analyzing Data**

*Chemistry Basics*

Vocabulary-

* Matter
* Qualitative/Quantitative data
* Accuracy
* Precision
* Scientific theory
* Scientific law

Concepts-

* Difference between mass and weight
* Difference between macroscopic and microscopic

***How to make a Graph***

The graph should contain 5 major parts: the title, the independent variable, the dependent variable, the scales for each variable, and a legend.

1.) The title: this shows what the graph is about. Reading the title should give the reader an idea about the graph. It should be a concise statement placed above the graph.

2.) The Independent Variable: this is the variable (part of the experiment that changes) that can be controlled or manipulated by the experimenter. This variable should be placed on the horizontal or x-axis. When one of your variables is time, it is always placed on the x-axis.

3.) The Dependent Variable: this is the variable directly affected by the independent variable. It is the result of what happens because of the independent variable. This variable is placed on the y or vertical axis.

*\* Remember DRY-MIX – Dependent or responding variable goes on the y-axis and the manipulated or independent variable goes on the x-axis.*

4.) The Scales for each Variable: In constructing a graph, one needs to know where to plot the points representing the data. In order to do this a scale must be employed that will include all the data points. Each block should have a consistent amount or increment on the axis. While the scale should allow as much of the graph to be taken up as possible, it is not a good idea to set up a scale that is hard to manage. For example, multiples of 1, 5, 10, etc. are good, while multiples such as 1.22 are not! Your scale must be plotted on the amount of graph space available and will be dictated by the data points.

5.) The Legend: this is a short descriptive narrative concerning the graph's data. It should be short and to the point and placed directly under the graph.

Memorization-

* SI Base units

|  |  |  |
| --- | --- | --- |
| **Base Quantity** | **Unit** | **Symbol** |
| Mass | kilogram | Kg |
| Time | second | s |
| Thermodynamic *Temperature* | kelvin | K |
| Amount of substance | mole | mol |

Powers of 10 Video: <https://www.youtube.com/watch?v=0fKBhvDjuy0>

**Chapter 3**

Matter – Properties & Changes

Vocabulary –

* Physical property
* Chemical property
* Physical change
* Chemical change
* Homogeneous
* Independent/Dependent variables
* Control
* (Pure) Substance
* Mixture
* Model
* Procedure
* Experiment
* Observation
* Conclusion/Analysis
* Heterogeneous
* Compound
* Element

Concepts –

* Difference between a chemical and physical property
* Difference between physical and chemical change

*Chapter 3 will be taught with chapter 12.*

**Chapter 4**

*The structure of an Atom*

Vocabulary-

* Conservation of mass
* Mass number
* Electron
* Nucleus
* Proton
* Neutron
* Atomic number

Concepts-

* Indications of a chemical change are:
	+ Change in color
	+ Change in odor
	+ Change in temperature
	+ Formation of a precipitate (looks like a solid appearing out of a liquid)
	+ Formation of a gas (looks like bubbles)
* Atom
	+ Protons, neutrons and electrons
		- <https://www.youtube.com/watch?v=TYEYEIuTmGQ>
		- https://www.youtube.com/watch?v=03iWCjxjCdA
	+ Scientists- Mendeleev, Rutherford, Chadwick, JJ Thomson, Aristotle, Democritus, Dalton
		- <https://letstalkscience.ca/educational-resources/stem-in-context/genius-mendeleevs-table> (Mendeleev)
		- <https://www.youtube.com/watch?v=Xb9KnwadI6Y> (Rutherford)
		- <https://www.youtube.com/watch?v=E9zB1X_EFqU> (Chadwick)
		- <https://www.youtube.com/watch?v=B_Z4IIIGIsU> (JJ Thomson)
	+ Size, symbol, location, charge, and relative mass of the proton, neutron, and electron

*Chapter 5*

*Electrons in Atoms*

Vocabulary –

* Wavelength
* Frequency
* Amplitude
* Ground state
* Atomic orbital
* Valence electron
* Aufbau principle
* Photon
* Pauli’s exclusion principle
* Hund’s rule

Concepts

* Electromagnetic spectrum- this is a little intense and yes, we will be learning what is in this article. If you are struggling with this, that is all right, that is why I am here. <https://www.khanacademy.org/science/physics/light-waves/introduction-to-light-waves/a/light-and-the-electromagnetic-spectrum>

*Chapter 6*

*The Periodic Table & Periodic Law*

***6, 7, & 8 are the most important chapters in first semester for content, without it you will struggle through the rest of the year. This leads to chapter 9 concepts/math and 10 & 11 math.***

Vocabulary-

* Periodic law
* Group
* Period
* Representative element
* Metal
* Transition metal
* Inner transition metal
* Metalloid
* Lanthanide series
* Actinide series
* Nonmetal
* Halogen
* Noble gas
* Alkali metal
* Alkaline earth metal
* Valence electron
* Ion
* Ionization energy
* Octet rule
* Electronegativity

Concepts-

* Periodic table <http://www.ptable.com/>
* Valence electrons on periodic table <https://www.khanacademy.org/science/biology/chemistry--of-life/electron-shells-and-orbitals/v/valence-electrons-and-ionic-compounds>
* Reading the periodic table <http://www.wikihow.com/Read-the-Periodic-Table>

Activity (General Only – Applied will do something similar for summer work) -

Get a blank periodic table. (<http://www.homeschooling-ideas.com/printable-periodic-table.html>)

* Fill it out with the following information:
	+ Metals, nonmetals, and metalloids
	+ Label the representative and transition elements
	+ Label the groups: Alkaline earth metals, transition and inner transition metals, Halogens, Alkali metals, Noble gases
	+ Draw on the table the trend for ionization and electronegativity, from most metallic to least metallic.
	+ Write the group numbers on top.
	+ Write the valence numbers on top of the representative groups.

We will make our own periodic tables in class (test grade) that you will use for the rest of the year. This is great practice.

Memorization-

* You will be expected to memorize the first 20 elements (possibly more). You will be expected to know the symbol, the atomic number and the atomic mass number rounded to the nearest whole number.

*Chapter 7 & 8*

*Ionic & Covalent Bonding*

Vocabulary-

* Cation
* Anion
* Ionic bond
* Electrolyte
* Formula unit
* Monatomic ion
* Polyatomic ion
* Covalent bond
* Polar covalent bond
* Molecule
* Endothermic reaction
* Exothermic reaction

Concepts-

* How and why does an atom become an ion? <http://www.bbc.co.uk/schools/gcsebitesize/science/add_aqa_pre_2011/atomic/ionicrev1.shtml>

Memorize-

* A metal and nonmetal form an ionic bond
* A nonmetal and nonmetal form a covalent bond
* A covalent bond shares the electrons
* An ionic bond transfers the electrons
* Common polyatomic ions- name, formula & charge (<https://ch301.cm.utexas.edu/help/ch301/polyatomics.pdf>)
	+ Ammonium
	+ Hydroxide
	+ Nitrate
	+ Nitrite
	+ Peroxide
	+ Phosphate
	+ Phosphite
	+ Sulfate
	+ Sulfite

*You will be expected to know these for tests and quizzes throughout the year.*