Judson Early College Academy

HONORS CHEMISTRY
SUMMER ASSIGNMENT 2023-2024

Dear Parent/Guardian and Future Chemistry Student,

Welcome to Honors Chemistry!!!!!! I hope you are excited about enrolling in Honors Chemistry for the upcoming school year. Chemistry is always around you, and you encounter chemistry every waking moment of your life. Chemistry studies Matter, energy, and, more importantly, the changes between them. Chemistry is a problem-solving science. You will become a better problem solver. This will equip you to better understand other sciences and problems in your life and career areas.

First, students are expected to complete a mandatory summer assignment (explained below.) Second, Honors Chemistry students must possess a strong work ethic and **advanced** mathematics skills, exhibit responsibility in completing and turning in assignments on time, and consistently maintain an 80 or higher. Chemistry is a course in which content in later units builds upon mastery of earlier topics. Students who fall behind will find it especially challenging to catch up. Students must take personal responsibility for seeking tutorials or other assistance **immediately** when they feel they have not mastered the day's concepts. Honor Chemistry students must study independently and are routinely assigned homework and projects that must be completed outside of class. They should expect to devote an average of one to two hours per week to these activities.

To prepare you for the Honors Chemistry course, a packet of work covering concepts from previous science courses and the basic skills of this course has been assigned. This packet has been separated into seven different parts. All parts of this packet need to be fully completed and turned in on the first day of class. There are no exceptions to this due date. You are expected to complete this packet on time and not at the last minute. I know that unexpected things come up, but you are given the entire summer to complete the packet.

Information to help grasp concepts/skills is provided in the packet, including links to great online resources. You are not limited to only using the resources and information provided. I strongly suggest that if you need more guidance or help to understand a concept, do further research independently. Please remember that not all websites are "credible." Wikipedia is **NOT** credible!

You will have the opportunity to ask questions or clarifications at any time throughout the summer by emailing me at **ctaylor@judsonisd.org** or by consulting with other classmates. Remember, this does not mean copying off your peers. I will check my email at least once weekly to keep up with questions. Seek help early rather than waiting until the last minute.

The pre-test will be given on the second day of class. If there are any questions when you turn in your packet from the summer, there will be a Q & A session at the end of the period. Any last-minute questions that still need to be answered can be addressed at that time.

If you do not have a computer or internet access, use a friend's or relative's computer or go to the community library and use one of theirs. Do not try to complete them the night before they are due. You have the entire summer to come up with a solution and get access to a computer, and NOT having one will NOT exempt you from this assignment.

Summer Assignment:

Purpose:

*The purpose of this exercise is two-fold. The first purpose is to serve as a refresher for various skills to which each student should have already been exposed. There may be a few new terms, but most of this material is remedial. The second purpose is to serve as a preview of what is to come. Most of you are entering this class after completing biology. This class is **VERY** different from biology. It is both a science class and a math class. In fact, math is the language through which chemistry is explained.*

This assignment essentially covers the first two chapters in the book minus a couple of items with which I will start the year.

Section I:

Make flashcards for memorization – Use index cards, not cut paper strips, to produce your flashcards. You will need flashcards for the following.

Section II:

Resources you will need to complete the assignment over the summer. You may need to access the internet for some parts of the assignment, but most of what you need is in this packet.

Section III:

Print the Resources pages: To prepare you for the upcoming safety and equipment test. **Print** the separate document for the "reference" section of your binder. It is located on the school's website as a reference page. Read and study the Laboratory equipment and rules for a safety quiz once you return to school. You must be able to identify all the laboratory equipment.

Section IV: Skill Sheets

Worksheets have been placed in this package that are to be completed and turned in on the **first week of school**. You are more than welcome to use the internet. There will be a test within the first weeks of school, so copying someone else's work will not help you to learn the material.

If this packet gets lost over the summer, you can obtain another copy from either my teacher's webpage or the main JECA webpage.

I look forward to working with you.

C. R. Taylor, M.A.

C.R. Taylor, M.A.
Honors Chemistry Instructor

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Element Flashcards

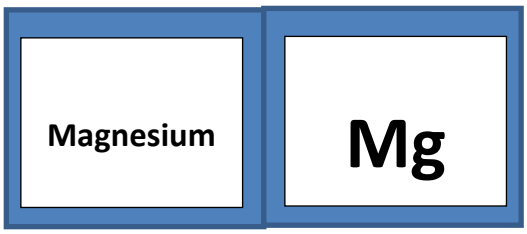
Directions: Use index cards, not cut paper strips, to produce your flash cards. Write the element symbol on one side and the name on the other

There are approximately 115 chemical elements on the periodic table. Each element has a chemical name and a chemical symbol, such as sodium (Na). You will notice that not all of the chemical symbols seem to correspond to their name. Look at the examples below.

Chemical Name	**Chemical Symbol**
Potassium	K
Carbon	C

You must be **VERY** familiar with the most common elements. This occurs because the symbols of these elements are derived from the Latin language. We will be using these throughout every concept in this class. For this reason, you are going to be required, as part of this summer assignment, to create flashcards of the identified elements listed below. Place the element's name on one side and the symbol on the other. You must bring this set of notecards with you on the 1st day of class to turn in with your packet.

Example Flashcard:



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Note: When memorizing elements & symbols, keep in mind that spelling should be CLOSE and symbols

Aluminum	**Al**	chlorine	**Cl**	iron	**Fe**	phosphorus	**P**	sulfur	**S**
Argon	**Ar**	chromium	**Cr**	krypton	**Kr**	platinum	**Pt**	tellurium	**Te**
Arsenic	**As**	cobalt	**Co**	lead	**Pb**	potassium	**K**	titanium	**Ti**
Barium	**Ba**	copper	**Cu**	lithium	**Li**	radium	**Ra**	thorium	**Th**
Beryllium	**Be**	fluorine	**F**	magnesium	**Mg**	radon	**Rn**	tin	**Sn**
Bismuth	**Bi**	francium	**Fr**	manganese	**Mn**	rubidium	**Rb**	tungsten	**W**
Boron	**B**	gallium	**Ga**	neon	**Ne**	scandium	**Sc**	uranium	**U**
Bromine	**Br**	germanium	**Ge**	mercury	**Hg**	selenium	**Se**	vanadium	**V**
Cadmium	**Cd**	gold	**Au**	Molybdenum	**Mo**	silicon	**Si**	xenon	**Xe**
Calcium	**Ca**	helium	**He**	neon	**Ne**	silver	**Ag**	zinc	**Zn**
Carbon	**C**	hydrogen	**H**	nitrogen	**N**	sodium	**Na**	Antimony	**Sb**
Cesium	**Cs**	iodine	**I**	nickel	**Ni**	strontium	**Sr**		
				oxygen	**O**				

involving more than one letter are always written with the first letter capitalized and the second lowercase. This is important to help identify when one element ends, and the next begins.

Example: **SI** – would be a compound containing sulfur and iodine

Si – would be the element of silicon

Memorization Hints: Elements/Symbols

Silver	Ag	If a person who is expecting a present of a gold necklace and receives a silver one. He might say, "**Ag**, I didn't want silver"
Gold	Au	"Hey you, I want that gold necklace!" Said with a "Hey you" sounding like **Au**.
Bromine	Br	That brother of mine – **Br**o of mine!
Calcium	Ca	"**Ca**ws give milk!" Pronounced with an accent to make cows sound like it's spelled with an A.
Chlorine	Cl	"You can **Cl**ean with chlorine!"
Iron	Fe	"**Fe**, Fi, Fo, Fum, I'm an iron man!"
Helium	He	If you breathe in helium, you will laugh. **He**, He, He!
Mercury	Hg	Greek mythology – Hg stands for **H**elmet **g**uy!
Potassium	K	You will get **K**icked out of school for the double nasty! You can't do the first three letters and cannot say the next three!
Sodium	Na	"**Na**w, I don't way any sodium!"
Nickel	Ni	"**Ni**ck owes me a nickel!"
Oxygen	O	"**O**pen your mouth wide to take in oxygen!"
Lead	Pb	**P**encil **b**roke!
Silicon	Si	**Si**lly con!
Tin	Sn	A tin roof gets hot in the **Sn**.
Manganese	Mn	Take the first three letters - **Man**
Magnesium	Mg	Take the first three letters - **Mag**

Part II:

2023-2024 Summer Assignment Notes Pages

1. *Variables*

The scientific method often employs *variables* to carry out a particular study.

There are two types of variables:

- The ***independent variable*** is the variable that is being manipulated (changed) in the procedure. (*The cause*)
- The ***dependent variable*** is the variable (thing) that is being affected by the manipulation of the independent variable (*The effect*)

The term *control* can have two meanings in a controlled experiment.

- A ***control (trial)*** is often used as a comparison to the independent variable.
  - This serves as the "normal situation" for a given sample or situation.
- A study is considered to be ***controlled*** if all variables, except the independent, are held constant (fixed) for every trial that is done.

NOTE: When describing variables, it is essential to be specific. For example, if the amount of water is changed, the independent variable is "mass of water" or "volume of water." If the color of water is changed, the independent variable would be "color of water," etc.

Example: Enrique and Lacey are testing soil for contamination outside a nuclear power plant. They test the concentrations of contaminants at different distances from the plant.

1. What is the independent variable? ***The distance from the plant. (Lacey and Enrique select the distances to test)***

2. What is the dependent variable? ***The concentration of contaminants (this is the data they will collect & the factor will depend on how far they are from the plant)***

3. What are some factors that Enrique and Lacey will keep constant? ***Test using the same equipment, test soil at the same depth in each location, test from the same power plant, test at the same time of day, etc.***

2. *Graphing and Data Analysis*

Graphs are a helpful tool for displaying scientific data because they show relationships among variables in a compact, visual form. You may have used *x-y* graphs, or ***Cartesian graphs***, in your math classes. Below are the four basic steps to constructing a graph from data in the chemistry lab.

1. *Determining the variable*
   - In an experiment, the ***independent variable*** is the property that is under control and can be varied.
   - The ***dependent variable*** is the property that is measured, observed, counted, or found.
   - The independent variable is ***usually***, but not always, assigned to be the *x* value, and the dependent variable is usually assigned to be the *y* value.

   If the study involves a measurement as a function of time, time is plotted on the *x*-axis.

2. *Scaling the axes*
   - The scale of the axes includes all data points and allows as much room as possible on both axes. Each axis should be evenly divided with plenty of space between divisions, making the graph easy to read and understand.

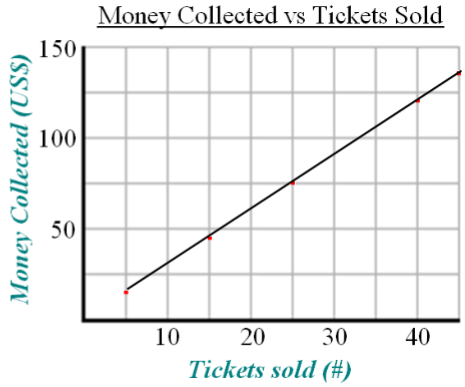
- The divisions should be labeled in multiple units of (i.e., 1, 2, 5, 10, etc.).

- Each axis should also be labeled with a description of what it represents and the units of measurement.

3. *Plotting the data*
   - If the plotted data points roughly form a straight line, use a transparent ruler to draw a line that best represents the data points. This is known as the ***best-fit line***.
   - If the points do not form a straight line but appear to form a curve, lightly sketch the curve with a pencil, connecting all the data points.
4. *Titling your graph*
   - It is essential to add a title to the top of your graph so that anyone looking at the graph can quickly identify its purpose. Choose a title that is brief and descriptive of the data.

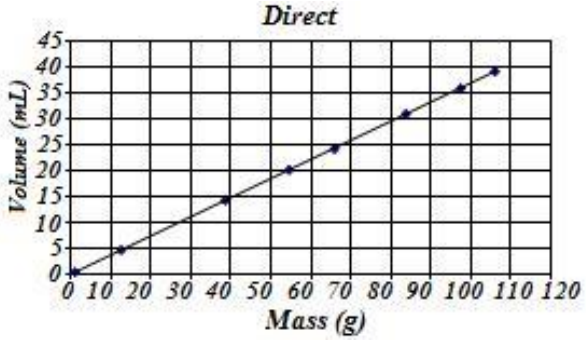
Example: Your school is putting on a play. To raise money for the event, tickets for the play are being sold for $3.00 each. The chart below shows how much money will be made from selling certain numbers of tickets.

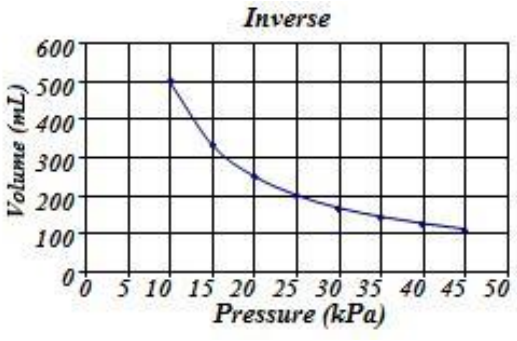
Tickets sold	*Money collected*
5	$15
15	$45
25	$75
40	$120
45	$135



Graphs show the relationship between *x* and *y* variables.

- If data forms a straight line when plotted, then *x* and *y* have a **linear relationship.**
- This line can be described by the general mathematical equation ***y*** = ***mx*** + ***b*** where ***m*** is the slope of the line and ***b*** is a constant.
- Linear data is said to be **directly proportional** when dividing one variable by the other gives a constant value. This means that as one variable changes, the other changes at the same rate
- Not all data forms a straight line when graphed; your graph may show a curve.
- If the curve drops as you move from left to right, and dividing one variable by the other gives a constant reciprocal value, then your graph has an **inverse relationship.**





Quite often, you will need to determine whether or not a graph expresses a linear relationship. To do this, you must draw what is known as a "best fit" straight line, also called a "regression line."

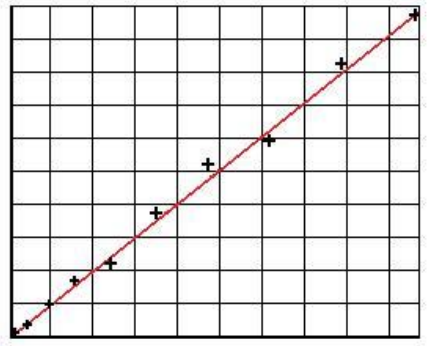
- The purpose of the graph is to visually display relationships

that may not be apparent from data tables.

Summer assignment Notes pages.

- Experimental errors, which are always present, may obscure the relationships.

- The best-fit line averages out the errors.
- Without computer software, you will need to draw the lines "by hand" and then make a judgment about whether the points are "linear."



Remember, sometimes a graph represents neither a direct nor an inverse of relationship but, rather, simply traces the effect of x on y.

Many types of graphs exist: line graphs, bar graphs, pie charts, histograms, etc. In order to display the results of the experiment appropriately, the right type of graph should be used.

- A line graph is used when the independent variable changes in regular increments and must be placed in a specific order. Points are plotted and then connected.
- A bar graph is used when the independent variables can be placed in any order.
- A histogram is a type of bar graph used when the data involves the frequency of occurrence.

3. *Using Scientific Notation*

Adjusting values for proper scientific notation:

- When there is more than 1 number to the left of the decimal:
  - Move the decimal to the left and increase the power of 10 by the number of places you moved your decimal. (big number goes to a smaller number, makes a "small" power of 10 bigger)
  - Example #1: $456 \times 10^{5} = 4.56 \times 10^{7}$
  - Example #2: $6750. \times 10^{-20} = 6.750 \times 10^{-17}$

- When there are fewer than 1 non-zero numbers to the left of the decimal:
  - Move the decimal to the right and decrease the power of 10 by the number of places you moved your decimal. (small number goes to a bigger number, makes a "big" power of 10 smaller)
  - Example #1: $0.000783 \times 10^{12} = 7.83 \times 10^{8}$
  - Example #2: $0.0541 \times 10^{-7} = 5.41 \times 10^{-9}$

- The powers of 10 must be the same in order to add or subtract values
  - Example #1: $(5 \times 10^{7}) + (4 \times 10^{9})$

Multiplying:

- Add the powers of 10
  - Example #1: $(2 \times 10^{24}) \times (3 \times 10^{4})$

    $(2 \times 3) \times (10^{24 + 4}) = 6 \times 10^{28}$
  - Example #2: $(4 \times 10^{14}) \times (6 \times 10^{-5})$

    $(4 \times 6) \times (10^{14 + (-5)}) = 24 \times 10^{9} = 2.4 \times 10^{10}$

Dividing:

- Subtract the powers of 10
  - Example #1: $(8 \times 10^{15}) / (2 \times 10^{5})$

    $(8/2) \times (10^{15 - 5}) = 4 \times 10^{10}$
  - Example #2: $(3 \times 10^{16}) / (4 \times 10^{-4})$

    $(3/4) \times (10^{16 - (-4)})$

    $(3/4) \times (10^{16 + 4}) = 0.75 \times 10^{20} = 7.5 \times 10^{19}$

4. Metric Units of measurement and Conversions

Le Systeme International d'Unites : SI

- System of measurement agreed on all over the world in 1960
- Contains 7 **base units** (This class will focus on 5 of them)
- Units are defined in terms of standards of measurement that are objects or natural occurrence that are of constant value or are easily reproducible

5 base unit important to chemistry

Quantity	***Quantity Symbol***	***SI Unit Name***	***SI Unit Abbreviation***	***Defined Standard***
Length	l	Meter	m	The length of the path traveled by light in a vacuum during a time interval of 1/299792458 of a second.
Mass	m	Kilogram	kg	The unit of mass equal to the mass of the international prototype of the kilogram.
Time	t	Second	s	The duration of 9192631770 periods of the radiation corresponding to the transition between two hyperfine levels of the ground state of the cesium-133 atom.
Temperature	T	Kelvin	K	The fraction 1/273.16 of the thermodynamic temperature of the triple point of water.
Amount of Substance	n	Mole	mol	The amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kilogram of carbon-12

Derived units are SI units created from a combination of SI base units.

- Examples of derived units are density, volume, and area
- **Volume** is the amount of space that an object occupies.
- The metric unit is the **Liter (L).**
- The common unit used in the lab is the **milliliter (mL)**.
- **1 mL = 1 cm^3**

Examples of derived units: measurements calculated using other measurements

Quantity	*Quantity Symbol*	*SI Unit*	*SI Unit Abbreviation*	*Derivation*
Area	A	Square meter	m^2	length *x* width
Volume	V	Cubic meter	m^3	length *x* width *x* height
Density	D	Kilograms per cubic meter	kg/m^3	mass / volume
Molar Mass	M	Kilograms per mole	kg/mol	mass / amount
Energy (heat)	E	Joule	J	force *x* length
Pressure	P	Pascal*	Pa	force / area

***The Pascal is a cumbersome unit and is rarely used. Kilopascals (kPa) is much more commonly used. Also commonly used are, atm (atmospheres) and psi (lbs./in^2)**

Prefixes are added to the base and derived unit names to represent quantities smaller or larger

- A table of prefixes is provided below (on the next page).

- For example, a kilometer is larger than a meter, while a micrometer is smaller than a meter.

Table of metric prefixes:

Prefix	*Unit abbreviation*	*Exponential factor*	*Example*
tera–	T	10^{12}	1 terabyte (Tbyte)
giga–	G	10^{9}	1 gigabyte (Gbyte)
mega–	M	10^{6}	1 megawatt (Mwatt)
kilo–	k	10^{3}	1 kilometer (km)
hecto–	h	10^{2}	1 hectogram (hg)
deka–	da	10^{1}	1 dekaliter (daL)
		10^{0}	1 gram (g)
deci–	d	10^{-1}	1 decimeter (dm)
centi–	c	10^{-2}	1 centigram (cg)
milli–	m	10^{-3}	1 milliliter (mL)
micro–	μ*	10^{-6}	1 microsecond (μs)
nano–	n	10^{-9}	1 nanogram (ng)
pico–	p	10^{-12}	1 picometer (pm)

*****_This is the Greek letter mu "μ" and not a "u"_

To convert between metric prefixes using dimensional analysis, use the BS method. If the unit size gets bigger, the number gets smaller. If the unit size gets smaller, the number gets bigger. (One gets **b**igger, the other gets **s**maller, get it?)

- If you are converting 1500 mL to L, will the number be bigger or smaller than 1500?
  - The unit L is bigger than mL. Therefore, the number will be smaller.
  - 1500 mL = 1.5 L
- If you are converting 12 kg to ng, will the number be bigger or smaller than 12?
  - The unit ng is smaller than kg. Therefore, the number will be bigger.
  - Kilo = 1000 and nano = 1×10^{-9}, therefore the decimal will be moved 12 places to the right tto make a bigger number
  - 12 kg = 12000 g = 1.2×10^{13} ng

One thing we will cover when school starts is dimensional analysis (also known as the factor-label method). Dimensional analysis is another way to solve this problem, as shown below. If you are familiar with this technique, feel free to use it. Feel free to solve it in whatever way you wish.

$$12 \text{ kg} \left(\frac{1000 \text{ g}}{1 \text{ kg}} \right) \left(\frac{1 \times 10^{9} \text{ ng}}{1 \text{ g}} \right) = 1.2 \times 10^{13} \text{ ng}$$

5. ***Isolating Variables (Algebraic equations)***

Many of the relationships that are studied in chemistry involve algebraic equations. A student of chemistry must be able to solve algebraic equations and apply them to the solution of problems.

Example #1: Isolate the **x-**intercept variable from the equation for a line. $y = mx + b$

$y = mx + b$

$y - b = mx + b - b$

1. **Subtract "b" from both sides**

$y - b = mx$

$\frac{y - b}{m} = \frac{mx}{m}$

2. **Divide both sides by "m"**

$\frac{y - b}{m} = x$

6. *Density calculations*

Mass is a measure of the amount of matter in an object.

- Essentially, how much "stuff" is inside an object.

Weight is the force that mass has as a result of gravity.

- When the gravity changes, the weight will change, but the mass will remain constant

Volume is the amount of space an object occupies.

- This remains constant for solids and liquids.

Density is the amount of matter per the amount of space. It is calculated by dividing the mass by the volume.

- Density is an intensive property; it will remain the same no matter how much of the substance there is.
- The density of an object will determine if it will float or sink in another phase. If an object floats, it is less dense than the other substance. If it sinks, it is denser.

$$density = \frac{mass}{volume}$$

or, in short form:

$$d = \frac{m}{v}$$

Example: What is the volume of a substance with a mass of 75.8g and a density of 7.87 g/cm^3?

3. $D = \frac{m}{V}$

1. **Input the information provided in the problem into the formula for density:** —

2. **Multiply through by "V"**

3. **Divide both sides by 7.87 g/cm^3**

$$7.87\ g/cm^3 = \frac{75.8\ g}{V}$$

$$\left(V \mid 7.87\ g/cm^3 = \frac{75.8\ g}{V}\right)$$

$$V\left(7.87\ g/cm^3\right) = 75.8\ g$$

$$\frac{V\left(7.87\ g/cm^3\right)}{7.87\ g/cm^3} = \frac{75.8\ g}{7.87\ g/cm^3}$$

$$V = 9.63\ cm^3$$

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7. *Describing Matter*

Matter is anything that has mass and occupies space (has volume).

Property- a quality that serves to describe

- **Physical property** – a quality that can be observed without changing the identity of the substance (Ex. Color, shape, density, melting point)
- **Chemical property** – a quality that, in order to be observed, requires the substance to change chemically (Ex. Flammability, reactivity)
- **Intensive property** – a quality that does NOT change when the quantity of the substance changes (Ex. Density, boiling point, melting point, flammability)
- **Extensive property** – a quality that DOES change when the quantity changes (Ex. Volume, length, width, number of particles, mass)

Change – an action that alters the substance in some way

- **A physical change** – is an action that does NOT alter the chemical make-up (changes the chemical composition or the chemical formula). A change of state is a physical change from one state to another

– Melting, freezing, vaporization, condensation, sublimation, and deposition are the processes that change one phase to another.

- The phases are:

– **Solids** have definite volumes and definite shapes.
✓ Tight, rigid structure

– **Liquids** have definite volumes and variable shapes.
✓ Particles slip past each other.

– **Gases** have variable volume and shape.
✓ Particles are not strongly attracted to each other.

– A fourth phase, **plasma**, also has variable volume and shape
✓ It is a high-temperature physical state of matter in which atoms lose their electrons.
✓ Not found very often in nature

- Creating any form of a mixture is also a type of physical change, along with crushing, tearing, and magnetizing

- **A chemical change** – an action that DOES alter the chemical make-up (changes the chemical composition or the chemical formula)

– *Reactants → products*
– **Exothermic** reactions liberate (release) energy
– **Endothermic** reactions require (absorb) energy

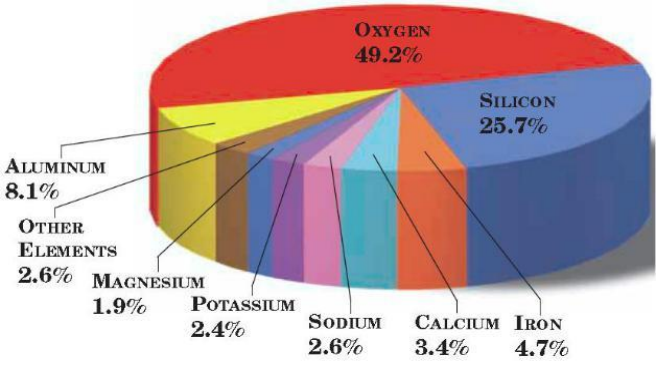
- **Indicators of a Chemical Change**

– Production of gas (production of bubbles, odor, gas)
– Production of a precipitate (production of an insoluble solid)
– Production of thermal energy (gain or loss of heat independent of the environment)
– Production of light
– Permanent color change
– **Combustibility** is a specific type of chemical change in which any substance rapidly reacts with oxygen producing light and heat.

Elements, Compounds, and Mixtures

An **element** is a type of pure substance that cannot be broken apart into its components by using physical methods of separation, such as boiling or filtration, and cannot be broken into its components using chemical means, such as chemical reactions. Depending on your source, there are between 112 and 114 elements. Of those, about 91 to 98 exist naturally on Earth, depending on your source.

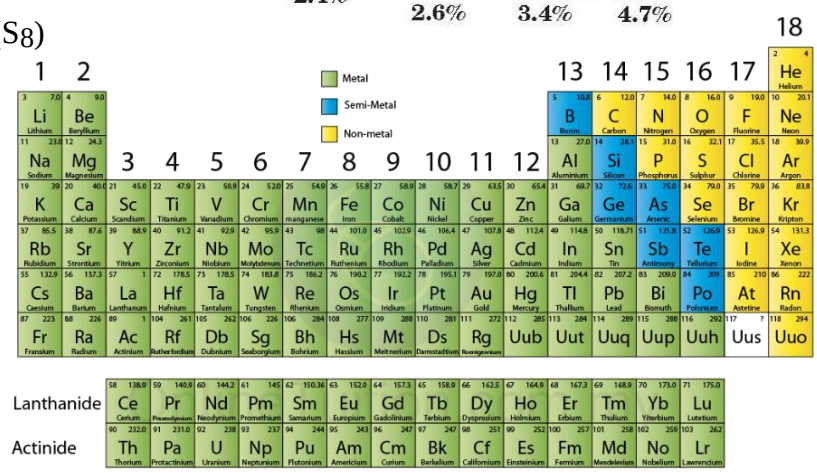
- The Earth's atmosphere is about 78.1% N_2, 20.9% O_2, 0.9% Ar, and CO_2, He, Ne, CH_4, Kr, and H_2 round out the remaining 1% by the relative abundance of each.
- The breakdown of the Earth's crust is in the diagram to the right



- The single unit of an element is the atom for <u>most</u> elements.

– The **atom** is the smallest unit of an element that maintains the properties of that element.

- For the diatomic elements (Hydrogen, Oxygen, Nitrogen, and The Halogens (group 17), the single unit is the molecule, which means that it has two atoms combined (H_2, O_2, N_2, F_2, Cl_2, Br_2, I_2).
  - Two other molecular elements are sulfur (S_8) and phosphorus (P_4).



The **periodic table**

- Vertical columns in the Periodic Table are known as **groups** or **families**.

– There are 18 of them

- Horizontal rows are called **periods**

– There are seven of them

The Periodic Table is divided into two sections by the "staircase."

- To the left of the staircase are all the **metals**.

– This includes the two rows at the bottom (the Lanthanides and the Actinides).

– Does not include hydrogen

- To the right of the staircase are the **non-metals** (including hydrogen).

– The properties of non-metals are the opposite of metals.

- **Metalloids** are the elements that compose the staircase between metals and non-metals.

– Properties are a blend of metal and non-metal.

Metals:

- have **luster** (shine)
- have **ductility** (ability to be drawn into "ducts," long pieces known as wires)
- have **malleability** (the ability to be flattened by a mallet into sheets)
- have the ability to conduct heat and electricity.
- Are solid at room temperature.

Summer assignment Notes pages.

Metals:

- The exception is mercury, which is a liquid at room temperature.
- will lose electrons when they become positive ions.
- have **luster** (shine)
- have **ductility** (ability to be drawn into "ducts," long pieces known as wires)
- have **malleability** (the ability to be flattened by a mallet into sheets)
- have the ability to conduct heat and electricity.
- are solid at room temperature.

– The exception is mercury, which is a liquid at room temperature.

- will lose electrons when they become positive ions.

Non-metals:

- are dull (they do not have shine)
- are brittle (they cannot be formed into wires or sheets)
- are non-conductors.
- can be solids at room temperature (sulfur, carbon, phosphorus, selenium, iodine, astatine)
- can also be liquids, as in the case of bromine.
- can be gases (hydrogen, nitrogen, oxygen, fluorine, chlorine, and noble gases (group 18).
- will gain electrons to form negative ions.

– The addition of a negatively charged particle yields them a negative charge.
– Some non-metals, the ones that do not gain electrons, will not form ions at all.

Metalloids are elements that have characteristics of the previous two.

- There are seven: boron, silicon, germanium, antimony, arsenic, tellurium, polonium
- Sometimes astatine is included bringing the total to eight

Compounds, like elements, are pure substances.

- Pure substances cannot be broken down by physical means.
- Every particle in a pure substance has the same properties.

Compounds are different than elements in many ways also.

- 1) Made up of two or more types of elements.
- 2) Can be broken apart by chemical means.

Mixtures contain two or more substances that are not chemically combined and, therefore, can be separated by physical means.

- Sugar water is a mixture. The sugar and water can be separated by boiling off the water.

– Both components will still retain their properties after separation. Neither will change.

- Brass is a mixture of copper and zinc; separation is based on differing melting points

Mixtures can be separated by several different physical means.

- **Distillation** is a process similar to boiling where the substance that evaporates is captured and condensed; it uses differences in boiling point.
- **Filtration** is a process that uses particle size.

– Smaller particles pass through the pores in the filter, while the larger particles stay behind.

- A **centrifuge** can be used to speed up the process of separating substances by density.

– More dense particles will sink to the bottom.

- **Chromatography** is a physical process that uses substances' stationary and moving phases.

Summer assignment Notes pages.

Sub-classifications of mixtures:

1. A homogeneous mixture is uniform in composition

- **Solutions –** mixture parts are so small the human eye or a microscope cannot see them.

– Composed of a **solute** dissolved into a **solvent** (usually the more abundant part of the mixture).

– **Alloys –** mixtures of metals

✓ Examples include: brass, bronze, and steel.

- **Colloids –** mixture particles cannot be seen by the human eye, but CAN be seen by a microscope.

– Consist of two separate phases; particles are dispersed into a **dispersing medium**.

– Colloids particles are large enough to scatter light, called the **Tyndall effect**.

– headlights of cars seen in fog (colloid) but not in air (solution).

Types of colloids

Dispersion	Name	Example
gas in liquid	*foam*	*soap suds*
gas in solid	*solid foam*	*foam rubber*
liquid in a gas	*liquid aerosol*	*fog*
liquid in liquid	*liquid emulsion*	*milk*
liquid in solid	*solid emulsion*	*cheese*
solid in gas	*solid aerosol*	*smoke*
solid in liquid (shapeless)	*sol*	*ink*
solid in liquid (with shape)	*gel*	*gelatin*
solid in solid	*solid sol*	*rubber*

2. Heterogeneous mixtures are not uniform

- **Suspensions** - pieces are large enough to be seen by the human eye.

– Particles are "suspended" in another substance and will separate if left standing.

Summary

Solutions	***Colloids***	***Suspensions***
Homogeneous	*Homogeneous*	*Heterogeneous*
Particle size: 0.01nm to 1nm	*Particle size: 1nm to 1000nm*	*Particle size: over 1000nm*
Atoms, ions, molecules (dissolved)	*Aggregates or large molecules (dispersed)*	*Large particles or aggregates (suspended)*
Do not separate on standing	*Do not separate on standing*	*Particles settle out*
Cannot be separated by filtration	*Cannot be separated by filtration*	*Can be separated by filtration*
Do not scatter light	*Scatter light (Tyndall effect)*	*May scatter light but are not transparent*

8. Chemistry as a Science

It began with **alchemy**

 A pseudoscience is known for its attempt to change common metals into gold through trial and error **Roger Bacon**

- Suggested using observation and experimentation rather than pure logic or trial and error to explain natural phenomena.

Antoine Lavoisier

- He made precise measurements of mass changes during chemical reactions.
- He is often referred to as the founder of modern chemistry because of his emphasis on careful experimental measurements

Chemistry studies the composition, structure, and properties of substances and the changes they undergo.

Summer assignment Notes pages.

- A chemical is any substance with a definite composition.
- All matter has a chemical basis, whether it is living or nonliving.

Divisions of Chemistry

There are at least 25 specialty areas of chemistry, but each one can be classified under one of the following six major divisions or branches of chemistry:

1. **Organic chemistry:** the study of most carbon-containing substances
   - *Example:* how gasoline is produced from oil
2. **Inorganic chemistry:** the study of all substances not classified as organic, mainly those that do not contain carbon
   - *Example:* how table salt reacts with different acids
3. **Analytical chemistry:** the study of the identification of the components and composition of materials
   - *Example:* how much chlorine is in a sample of tap water
4. **Physical chemistry:** the study of the properties, changes, and relationships between energy and matter at the atomic scale
   - *Example:* how the size of a water molecule determines the rate at which it dissolves salt
5. **Biochemistry:** the study of substances and processes occurring in living things
   - *Example:* How sugar in the bloodstream of cats affects insulin production
6. **Theoretical chemistry:** use of math and computers to understand chemical behaviors and design new compounds
   - *Example:* Modeling the folding of a protein

Obviously, these divisions will often overlap

Types of Research

1. **Basic research** is done to increase knowledge
   - Example: Examine all the reactions involving water
2. **Applied research** is done to solve a problem
   - Example: Investigate the side effects of a new drug
3. **Technological development** is done to improve the quality of life
   - Not research itself, but, rather, the outcome of research
   - Often lags behind the basic research done on the same substance
   - Example: The creation of a renewable fuel source for home heating
   - **Technology** is the application of knowledge (usually scientific) for practical purposes.

Model - commonly used to help visualize atoms and molecules.

- Chemists' models of atoms and molecules are much larger than the real thing.
- Models can be mathematical or even imaginary.

Summer assignment Notes pages.

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Student Name _____ Date _____ A/B Day Period _____

Summer Assignment 2023-2024

Skills Refresher Pages (S.R.P.)

Before we get started with the content in this packet, it is essential to understand what chemistry is, its origins, and its meaning. Watch this short YouTube clip using the link below. The video clip is called "Introduction to Chemistry" and is only a few minutes in length.

http://www.youtube.com/watch?v=izeuGr0lbN0

Use the following URL address to access a podcast posted on YouTube, answer the remaining questions, and complete all tasks in part one. You may also use Google to help you answer the following questions.

http://www.youtube.com/watch?v=Exbn-AJIJAs

Disclaimer: The following videos contain theories that may be controversial in nature. They are not the opinions shared by the district but theories to be explored.

Part III: Introduction to Chemistry

This section is to get Answer the following questions. Complete sentences are not needed; instead, they imply the question in the answer. For example, **do not answer** "gains electrons"; instead, write "Lithium gains electrons**." The internet will be your friend on this assignment.** *You must use a pencil for this whole assignment.*

1. What is the definition of chemistry?

2. What is a chemical element?

3. Why is the scientific method used?

4. What is the chemical formula for ozone?

5. How is qualitative data different from quantitative data? Provide an example of each.

6. List one use for each of the following

   a. Lithium

   b. sodium

   c. potassium

   d. Calcium

   e. Mmagnesium

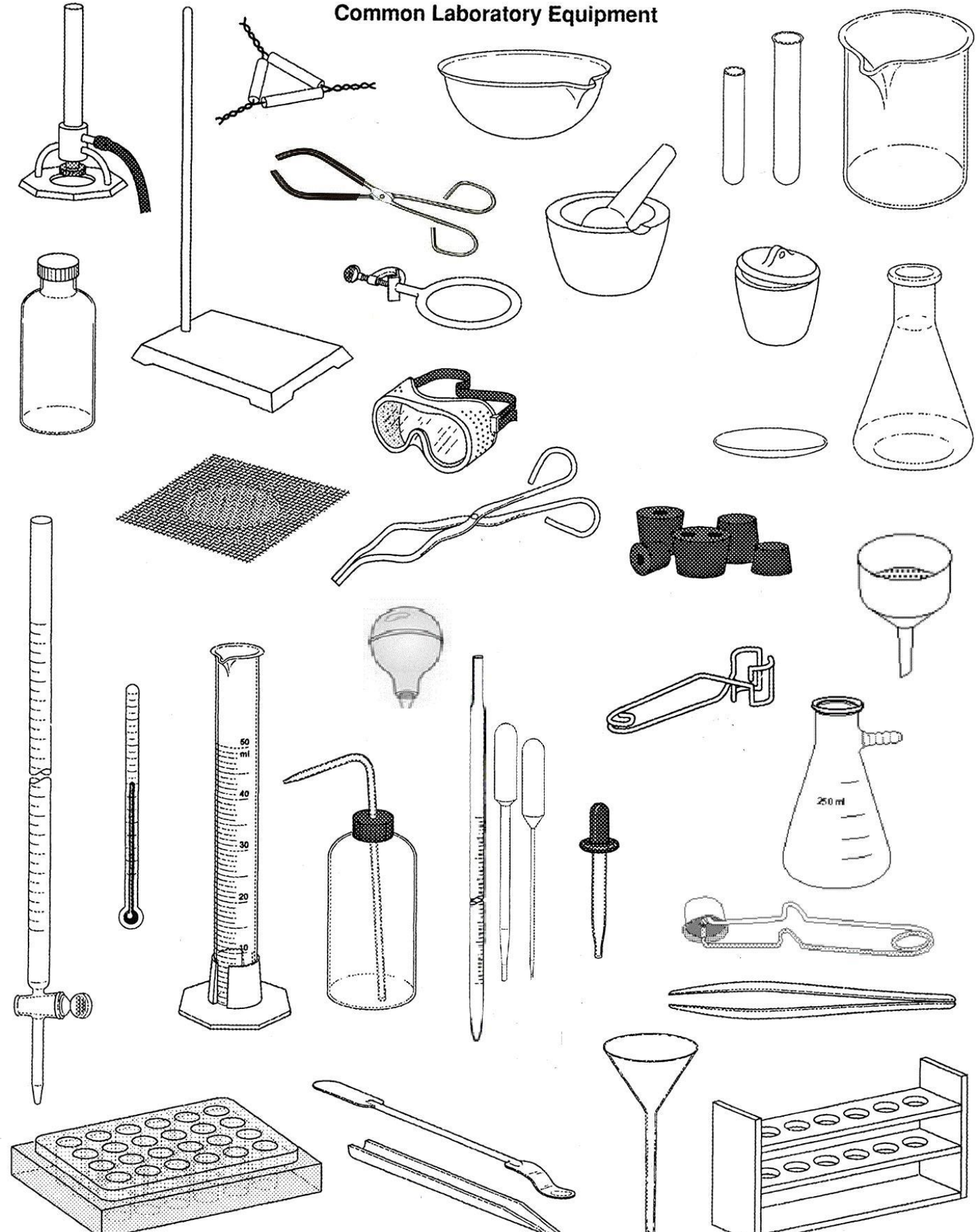
   f. Nitrogen

   g. Phosphorus

7. What elements are found in CFCs?

Part IV: Laboratory Equipment, Safety Rules, Scenarios & Measurement

- Identify and fill in the name of each piece of equipment next to the item (Use the resource pages).



The laboratory is a huge component of our chemistry class. You will quickly learn the set-up, the safety rules, and the general operation of the lab when you return to school in the first few days. To save crucial learning time, we will introduce you to the different pieces of equipment you may use at some point in the chemistry lab. You may be familiar with some of the equipment, but most will be brand new. Lab procedures will run more effectively and quicker if you know what equipment you are working with, how to use them, and what to use them for. The following section will allow you to learn about all the different pieces so that you are ready for lab as the first one approaches in the fall.

Watch the video for each piece of lab equipment below and fill in the definition and use. https://youtu.be/_A3JxpMU63s

Name	Definition/Use
Bunsen Burner	
Clay Triangle	
Evaporating Dish	
Test Tubes	
Beaker Tongs	
Ring Clamp	
Ring Stand	
Gas Collection Bottle	
Mortar and Pestle	
Crucible and Cover	
Rubber Stoppers	
Crucible Tongs	
Wire Square	
Thermometer	
Buret	
Graduated Cylinder	
Pipette Bulb	
Measuring Pipette	

Transfer or Beral Pipettes (plastic)	
Dropper	
Striker	
Forceps (tweezers)	
Wash bottle	
Beaker	
Erlenmeyer Flask	
Buchner Funnel	
Filter Flask	
Test Tube Rack	
Scoopula	
Spot Well	
Graduated Cylinder	
Spatula	

There may be other various pieces of equipment that we use throughout the year, but this list is the most common. Your task is to study the pieces of equipment, paying particular attention to **what they look like** and **what they are used for**.

Print the Safety Laboratory and Procedure Resource pages and study for laboratory quiz at the start of the school year. This is be your first set of notes in your chemistry binder.

Lab Safety –

LAB SAFETY RULES *

1. All chemicals are considered dangerous. Do not touch, taste or smell anything unless you are told.

2. Anytime chemicals, heat, or glassware are used, students will wear lab goggles. No exceptions.

3. Clean all work surfaces, apparatuses, and equipment at the end of the experiment. Return all equipment clean and in working order to the proper storage area. Never leave materials unattended.

4. Do not eat food, drink beverages, or chew gum in the lab.

5. Do not point the open end of a test tube being heated at yourself or anyone else. Point it away. (There is no #6)

3. **Lab Safety** – continued

7. Dress properly during a lab activity. Long hair must be tied back, and dangling jewelry or loose/baggy clothing should be secured, as these are hazardous in the lab.

8. Exercise extreme caution when using a gas burner. Keep hair, clothes, and hands at a safe distance from the flame at all times. Do not place substances into the flame unless told to do so.

9. Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, ask the teacher before proceeding.

10. Keep hands away from face, eyes, mouth, and body while using chemicals or specimens. Wash your hands with soap and water after performing all experiments.

11. Never fool around or run around in the lab. This is dangerous and prohibited.

12. Never handle broken glassware with your bare hands. Brush into a dustpan to clean up broken glass. Place broken or waste glassware in the designated glass disposal container.

13. Never look directly into a container that is being heated

14. Never smell a substance directly. Always "waft" it.

15. Never work alone, perform an experiment, or mix chemicals together without a teacher present. Follow all instructions in the lab you are given and the instructions that the teacher explains.
16. Report any spill, breakage, cut, or burn to the teacher immediately, no matter how minor it may seem.

17. Work areas should be kept clean and tidy at all times

LAB SCENARIOS

SCENARIO 1	**SCENARIO 2**
SpongeBob and Gary put their contracts away and decided to test the properties of a mystery substance since their teacher was gone. They left Their safety goggles on the table. And SpongeBob lit the Bunsen burner. He then reached across the flame to get a test tube from Gary. In the process, he lit his tie on fire, knocked over a bottle of the mystery substance and a little bit splashed on Gary.	SpongeBob poured some of the substance into a test tube and began to heat it. When it started to bubble he looked into the test tube to see what was happening and pointed it towards Gary so he could see. Gary thought it smelled weird so he took a deep whiff of it. He didn't think it smelled poisonous and tasted a little bit of the substance. They were worried about running out of time, so they left the test tube and materials on the table and moved to a different station to try another experiment.
RULES VIOLATED: #'s _____	**RULES VIOLATED: #'s** _____
EXPLAIN WHY & WHAT THEY SHOULD HAVE DONE TO FOLLOW THE RULES: (on the next page)	EXPLAIN WHY & WHAT THEY SHOULD HAVE DONE TO FOLLOW THE RULES: (on the next page)

Par V: Graphing Review

Directions: *Complete the following items in the spaces provided. If you feel that there is not enough room to complete the item in the space provided, you may use a separate sheet of paper and attach it to this portion of the document when you turn in this assignment.*

1. A new drug is suspected to reduce the number of malignant tumors in patients diagnosed with cancer. Dr. DeJesus gives his patients different doses of the medication.

   a. What is the independent variable?

   b. What is the dependent variable?

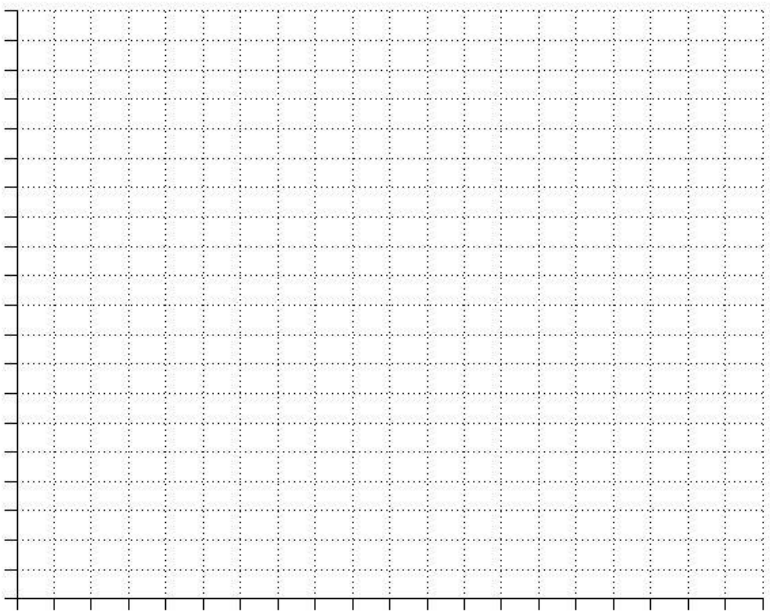
c. What are some factors Dr. DeJesus is likely to keep constant (as control variables)?

d. What could Dr. DeJesus do as a controlled trial, and why would this experiment benefit from it?

5. The length of six different objects was measured in both centimeters and inches. The data was recorded in the table to the right.

Object	***Length (cm)***	***Length (in)***
1	15.00	5.88
2	27.95	11.00
3	23.90	9.41
4	12.09	4.75
5	29.00	11.41
6	14.30	5.63

a. Plot the length in centimeters vs. the length in inches using the provided coordinate axes below. Label both axes.



b. Draw a best-fit line for the data. Calculate the slope of the line.

c. Calculate the y-intercept of the line

d. Write the equation of the line.

e. Based on your analysis of the data, if a measurement of 5.00 cm was made, how many inches long would the object be?

Part 6: Describing Matter

1. Complete the chart below

State	***Shape (fixed, varies)***	***volume (fixed, varies)***	***Compressibility (yes, no)***	***Particles move (yes, no)***	***Energy***
Solid					
Liquid					
Gas					

2. *For each property on the left, please identify each as 1) physical or chemical and, if it's a physical change, then 2) intensive or extensive*

Property of Copper	***Physical Property***	***Chemical Property***	***Intensive Property***	***Extensive Property***
Reddish brown with luster				
Good conductor of heat and electricity				
Will react will nitric acid				
Can be melted and mixed with zinc				
Density = $8.95 g/cm^3$				
Will form a blue-green carbonate in moist air				

3. *For each of the following changes, describe it as a "physical change" or a "chemical change."*
    a. Grass is cut: _____
    b. Iron reacts with water: _____
    c. Water boils: _____
    d. Sodium carbonate is mixed with hydrochloric acid, and the container becomes cold: _____
    e. A piece of magnesium is cut into two pieces: _____
    f. A soccer ball is left outside. The next morning the soccer ball has decreased in volume: _____

4. *For each of the following, classify as a **pure substance** or **mixture**. For pure substances provide the sub-classification of **element** or **compound**. For mixtures, provide the sub-classification of **homogeneous** or **heterogeneous**. For these sub-classifications, provide the appropriate sub-sub-category, if possible, of **solution**, **suspension**, or **colloid**. For solutions, identify if it is an **alloy** as well, if appropriate. You can use abbreviations to save room.*

a. Diamond (C) _____
b. $C_6H_{12}O_6$_____
c. Sodium Carbonate_____
d. Air_____
e. Granite_____
f. Stainless Steel_____
g. Potassium_____
h. Gasoline_____
i. Fog _____
j. Chex mix _____
k. Ink _____
l. Beach sand _____
m. H_2 _____
n. $Al_2(SO_4)_3$ _____

5. Complete the following chart:

Element Symbol	***Element Name***	***Metal or Non-metal?***	***Solid, liquid, or gas?***	***Group Number***	***Period Number***
Li					
Ca					
	Magnesium				
	Aluminum				
N					
	Phosphorus				
O					
	Sulfur				
	Chlorine				
Xe					

a. A horizontal row of elements in the periodic table is called a(n) _____

b. The symbol for the element in Period 2, Group 13, is _____

c. A vertical row of elements in the periodic table is called a(n) _____

d. Would an element that is soft and easily cut likely be a metal or a non-metal? _____

e. Who is known as the "father" of modern chemistry? _____

f. What property must be carefully considered when distilling two liquids? _____

g. In the following reaction, $\mathbf{C_2H_6 + O_2 \rightarrow H_2O + CO_2}$, identify which are products and which are reactants?

Products: _____ Reactants: _____

6. *Some measurements or descriptions of properties are listed below. Write which of the following properties is being described in each case:* ***combustibility***, ***density***, ***melting point***, ***ductility***, ***malleability***, ***volume***, *a* ***tendency to corrode***

a. $15\ dm^3$ a. _____

b. can easily be hammered into sheets b. _____

c. $2.8\ g/cm^3$ c. _____

d. burns when heated in the presence of O_2 d. _____

e. shiny metal forms a chalky white layer on its e. _____

7. *Select the most appropriate branch of chemistry from the following choices to best describe each of the investigations:* ***organic chemistry***, ***analytical chemistry***, ***biochemistry***, ***theoretical chemistry***.

a. A forensic scientist uses chemistry to find information at the scene of a crime. a. _____

b. A scientist uses a computer model to see how an enzyme will function. b. _____

c. A professor explores the reactions that take place in a human liver. c. _____

d. An oil company scientist tries to design a better gasoline. d. _____

e. An anthropologist tries to find out the nature of a substance in a mummy's wrap. e. _____

f. A pharmaceutical company examines the protein on the coating of a virus. f. _____

8. *For each of the following types of chemical investigations, determine whether the investigation is:* ***basic research***, ***applied research***, *or* ***technological development***.

a. A laboratory in a major university survey all the reactions involving bromine. a. _____

b. A pharmaceutical company explores a disease in order to produce a better medicine. b. _____

c. A scientist investigates the cause of the ozone hole. c. _____

d. A chemical company develops a new biodegradable plastic. d. _____

e. A laboratory explores the use of ozone to Inactivate bacteria in a drinking-water system. e. _____

Part VII: The Metric System & Conversions

*****Note on grading*****

The free-response problems are graded on an "internally consistent" basis. That means that if you need the answer from part (a) to do part (b) and make a mistake in part (a), you can still get full credit for part (b), **PROVIDED** that the reader (the person who grades your test) can see your work and follow what you did. That means "***SHOW YOUR WORK***." Remember:

NO WORK → NO CREDIT

Try these yourself, and make sure to show your work like the above examples!

SI Unit Conversions

Convert the following**: (Make sure to show all work) using dimensional analysis.**

Example: 4 km = _____ m 4km $\frac{1000\ m}{1\ km}$ 4000m

---

a. 52 g = _____ kg

b. 500 g = _____kg

c. 5 L = _____ mL

d. 25000 mL = _____ kL (Hint: this is a two-step process)

The Metric (SI) System

Introduction: The following worksheet is a self-paced program for the metric system. As you read each statement, you will be given information that you can use to fill in the blanks. There are many repetitions in order to reinforce the concepts to be learned. The answers are usually found in the previous statement(s). If you don't get the answer right away, go back and read the previous statement(s) again. Read each step carefully, as the program is designed to make you thoroughly familiar with each unit by the time you finish.

- Since chemistry deals with quantitative data, you should be familiar with the measuring system employed by chemists. This is called the metric system or SI system.

- Although other units can be expressed in the metric system, this program will familiarize you with three of the most commonly used units - length, volume, and mass.

1. The basic unit in the metric system for measuring length is the meter (m). If we state that a pencil measures 0.17 m, we are expressing the _____ of the pencil.

2. The basic unit for volume is the liter (L). If we say a certain container holds 0.5 L, we are expressing the _____ of the container.

3. The basic unit for mass (weight) is the gram (g). If we say a certain object weighs 0.5 g, we are expressing the _____ of the object. (**However, the SI base unit is the kilogram**.)

4. The basic metric unit for volume is the _____.

5. The basic metric unit for length is the _____.

6. The basic metric unit for mass is the _____.

7. The abbreviation g stands for _____.

8. The abbreviation m stands for _____.

9. The abbreviation L stands for _____.

10. The unit meter refers to measurement of _____.

11. The unit gram refers to the measurement of _____.

12. The unit liter refers to the measurement of _____.

Since chemists often measure quantities that are much smaller or larger than the basic units of grams, liters, and meters, it is convenient to change the basic units so they are also smaller or larger.

Adding a prefix to the words gram, liter, and meter can simply change the basic units.

13. One such prefix is kilo, which means one thousand. For example, one kilometer means one _____ meters.

14. A thousand grams can more conveniently be expressed by the word _____. A thousand liters can more conveniently be expressed by the word _____.

15. The prefix meaning one thousand is _____.

16. One thousand grams is equal to one _____.

17. One thousand meters is equal to one _____.

18. One thousand liters is equal to one _____.

19. The unit kilometer could be used to measure a) volume b) mass c) length

20. The unit kilogram could be used to measure a) volume b) mass c) length

21. The unit kiloliter could be used to measure a) volume b) mass c) length

22. A milliliter is a) larger than a liter b) smaller than a liter

23. A kilogram is a) larger than a gram b) smaller than a gram

24. A gram is a) 1000 milligrams b) 0.001 milligrams

25. A milliliter is a) 1000 liters b) 0.001 liter.

Other prefixes are also used with the metric system, but we seldom use them in chemistry. The chart below will show you those we have learned in this program, and a few other prefixes, all multiples of 10. The underlined prefixes are the ones most commonly used in this course.

(μ)	micro - 1 millionth	(0.000001 of a unit)
(m)	milli - 1 thousandth	(0.001 of a unit)
(c)	centi - 1 hundredth	(0.01 of a unit)
(d)	deci - 1 tenth	(0.1 of a unit)
(da)	deka or deca - 10	(10 times a unit)
(h)	hecto - 100	(100 times a unit)
(k)	kilo - 1000	(1000 times a unit)

7. *Put the following into **proper** scientific notation.*

a. 870.94×10^{6} _____ b. 543×10^{-8}_____

c. $0.000\ 0504 \times 10^{23}$_____ d. 304.78×10^{-16}_____

8. *For this exercise, show how the exponent is manipulated, just like the example exercises provided in the review. Perform the indicated functions using proper scientific notation. **DO NOT** simply plug into the calculator.*

a. $(5.7 \times 10^{9}) + (6.8 \times 10^{12})$ b. $(4.38 \times 10^{-17}) + (5 \times 10^{-21})$

c. $(4.7 \times 10^{8)}) \times (2.0 \times 10^{4})$ d. $(6.2 \times 10^{-5}) \times (3.1 \times 10^{-9})$

9. *Isolate the indicated variables in the following chart:*

Velocity	***Density***	***Energy of Light***	***Combined Gas Law***	***Ideal Gas law***
$\mathbf{V = \frac{d}{t}}$	$\mathbf{D = \frac{m}{V}}$	$\mathbf{E = h\nu}$	$\mathbf{\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}}$	$\mathbf{PV = nRT}$
$V =$	$D=$	$E=$	$P_1=$	$P=$
$d =$	$m=$	$h=$	$P_2=$	$V=$
$t =$	$V=$	$\nu=$	$T_1=$	$n=$
			$T_2=$	$R=$
			$V_1=$	$T=$
			$V_2=$	

10. *Solve the following problems. Be sure to show all work for full credit*

a. Determine the density of a brick in which 49.92 grams occupies 4.01 cm^3.

b. Determine the density of a rectangular piece of concrete that measures 3.7 cm by 2.1 cm by 5.8 cm and has a mass of 43.8 grams.

c. A graduated cylinder contains 30.0 mL of water. An object is placed in the cylinder, and the water level moves to 46.7 mL. Find the density if the mass of the object is 121.3 grams.

(END OF Skills Refresher Pages)

Part 8 - Final Comments:

In order to be prepared from the 1st day of class, you must finish the packet before the night before returning to school. Remember, you will turn in your summer assignment on the first week of school and take the pre-test. The packet should not only be completed but used as a study tool. Do not forget to bring your flashcards with you when you return. Your element flashcards are an excellent thing to take with you if you travel this summer and have a long car or plane ride. I would STRONGLY urge you to dedicate a small chunk of time each week to complete a portion of this packet. Be responsible! If the packet is not completed, we must discuss your future in this course. I know that you all are tech-savvy and can use the internet, so do so for this assignment; just make sure you utilize credible sites.

Suggestions for Preparing

1. Chemistry is more like a math class, less like a biology class. A lot of math is involved (your calculator will also become your chemistry best friend.)
2. Chemistry involves more understanding of concepts and applying them, less memorizing terms.
3. Please come to class knowing about rounding and scientific notation. We will review these concepts in class, as they are critical to your future success in chemistry.
4. Please familiarize yourself with laboratory safety rules, techniques, and symbols which can be found on my website.

HONORS CHEMISTRY I

SUPPLY LIST

1. Three Ring Binder (2in or wider)
2. Composition Book
3. **8** tabbed dividers
4. index cards (3 x 5) (white or colored)
5. Loose-leaf notebook paper
6. Highlighters
7. Pen (**blue or black** ink only) or Ppencil
8. Text Book – (will receive once school starts)
9. Plastic Paper protectors (optional)
10. binder ring or plastic case for index cards (optional)
11. Scientific Calculators (optional)
12. Individual dry-erase board with markers (optional)

I look forward to working with you.

GOOD LUCK, and HAVE A WONDERFUL SUMMER! Get plenty of rest and relaxation, as we have a big year ahead!

Mrs. Taylor