You are invited to Join Chem Club, Beta Club, STEAM Club, and Polymer Club which go hand in hand in enhancing your skills in chemistry and your evolution as a productive citizen of the world. Please email me expressing your interest – I will send you the forms. Beta Club fee is $ 20 – onetime payment until you graduate – GPA requirement: 3.25 – three teacher recommendations, essay, and completed application. Chem Club is $20 per year. Same requirements as the Beta Club. Each year you will buy a shirt for both the clubs. STEAM and Polymer Clubs have no fee but other requirements are the same.

Summer Assignment for Honors and Regular Chemistry Students

My Dear Incoming Chemistry Students

I am excited that you have successfully completed your Biology Course/Physical science Course and are poised to take up Chemistry. I welcome you all to the Chemistry Class be it Regular Chemistry or Honors Chemistry.

Chemistry is a very interesting subject and is the most important of the science courses you pursue for your high school graduation. Chemistry is called the "Central Science" because of its role in connecting all the sciences, medicine, math, and engineering. This means that during your chemistry course, you will be mastering very many skills and competencies that provide you with a strong foundation in all the branches of science, medicine, math, and engineering. Those who master chemistry well will be very successful in all further courses in science, math, and engineering not only in the high school but also at the college level.

Doubtless, chemistry is a very rigorous subject by its very nature. Also, being a subject of a higher-grade level, Chemistry Syllabus is heavier than the Biology and Physical Science syllabus. Being in a chemistry classroom and doing chemistry labs demand a mature behavior on your part, especially, in consideration of the safety aspects. Mastering of chemistry concepts is fun but it requires deep learning in the class plus doing several off-the class assignments. Therefore, students are expected to maintain consistently systematic study habits and are required to complete the tasks in a timely manner and turn in the assignments before the deadline. You have the freedom to take up assignments as early as you could so that you can finish them early and move on to the next tasks.

Summer Assignment is a very important component for enhancing your success in chemistry. Please take them seriously, complete them, and turn in them for your first Quiz Grade (60 pts) for your chemistry course. You have the liberty to take up the Summer Assignment right now. If you have done with your Biology requirements and have time, you can complete these assignments before you leave this school year on May 29 or else you have time until the first 4.5 weeks of the chemistry course to turn in this. Please find below the Summer Assignments. (Your Summer Assignment comes in three parts – and all of them need to be completed.)

Part I: Introduction to the Periodic Table

Assignment Set I-1

Create Special Periodic Tables from empty periodic table templates by coloring, labeling, and naming (see empty periodic table and models in this packet).

Assignment Set-I.2

Carry out the following three sets of labs under Reaction Zones

(a) Reactivity Trends in Group 1
(b) Reactivity Series of Metals
(c) Reactivity Series of Halogens

at the following website: http://www.syngentaperiodictable.co.uk/reaction-zone.php

Part II: Review of the Scientific Method

Assignment II-1

Model the Scientific Method Flow Chart by Reproducing the given Flow Chart on a Copy Paper or a Construction Paper.

Assignment II-2

Apply the Scientific Method by making observations of free fall of objects of different masses and shape – proceed through the steps of the Scientific Method and arrive at the law. Document the following:

Hypothesis
Theory
Improvised Theory
Law

Part II: Strengthening the Foundations in Atomic Structure

Assignment III-1

Watch the Following youtube videos
https://www.youtube.com/watch?v=FxDpZ8wGgZ8
https://www.youtube.com/watch?v=zUtIrO3fUgg
https://www.youtube.com/watch?v=LA9juHlyhKw

and then take the following three quizzes:

(1) Subatomic Particles Quiz at
http://www.softschools.com/quizzes/chemistry/atomic_structure/quiz319.html

(2) Atomic Theory I Quiz at
http://www.softschools.com/quizzes/chemistry/atomic_heory/quiz666.html

(3) Atomic Theory II Quiz at
http://www.softschools.com/quizzes/chemistry/early_models_of_the_atom/quiz672.html

~~**Assignment III-2**~~

~~Do the Virtual Lab at~~
~~http://www.glencoe.com/sites/common_assets/science/virtual_labs/E20/E20.html~~
~~Your task in this lab is to construct the Bohr atomic model for Hydrogen, Carbon, Oxygen, and Aluminum~~

Your first test will be based on the content of the Summer Assignment. If you may need any assistance from me to complete your Summer Assignment during the IF time.

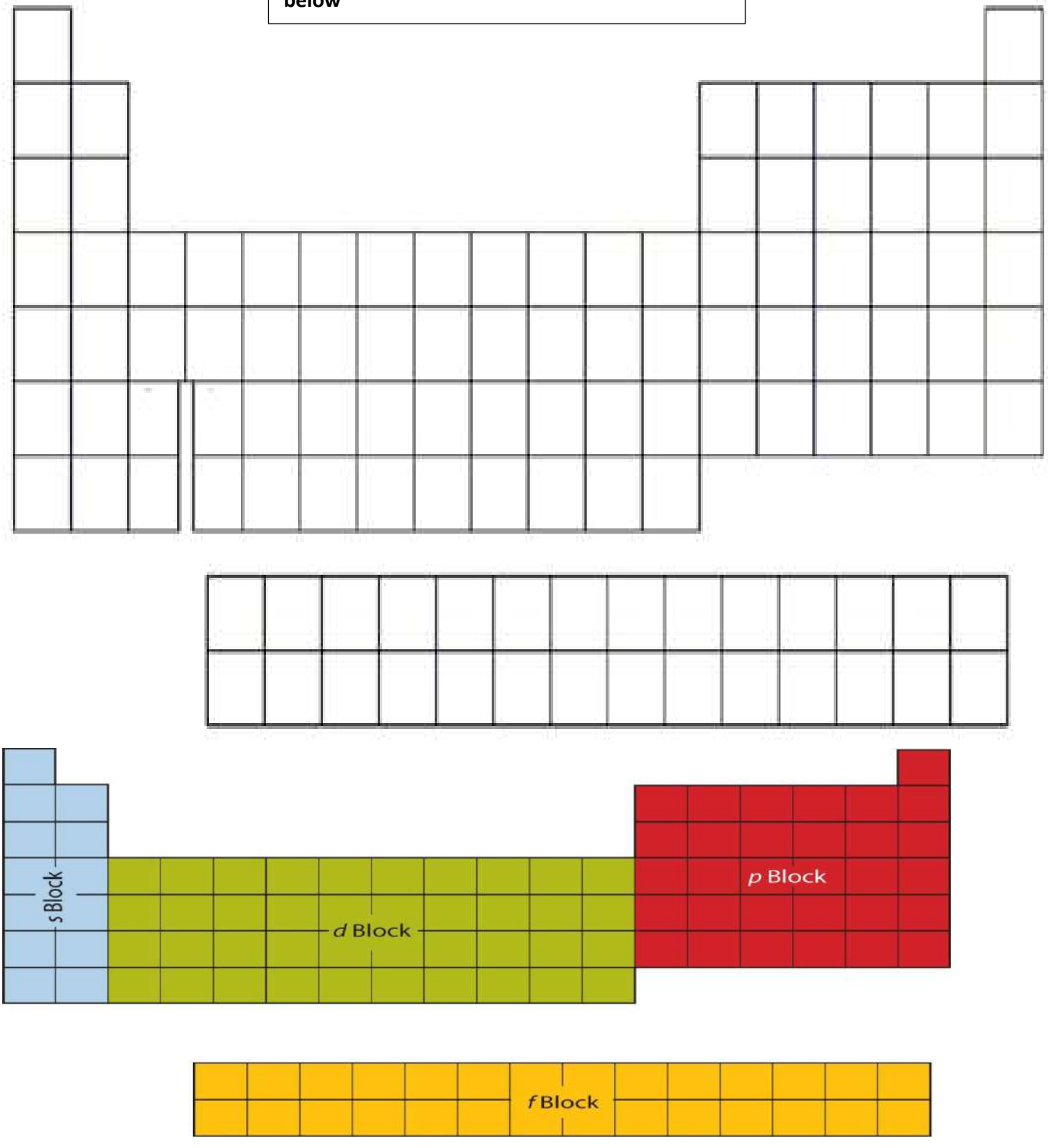
Looking forward to seeing you!

Sincerely
Dr. Renuka Rajasekaran
(Dr. R.)
Classroom:126
Renuka.rajasekaran@henry.k12.ga.us

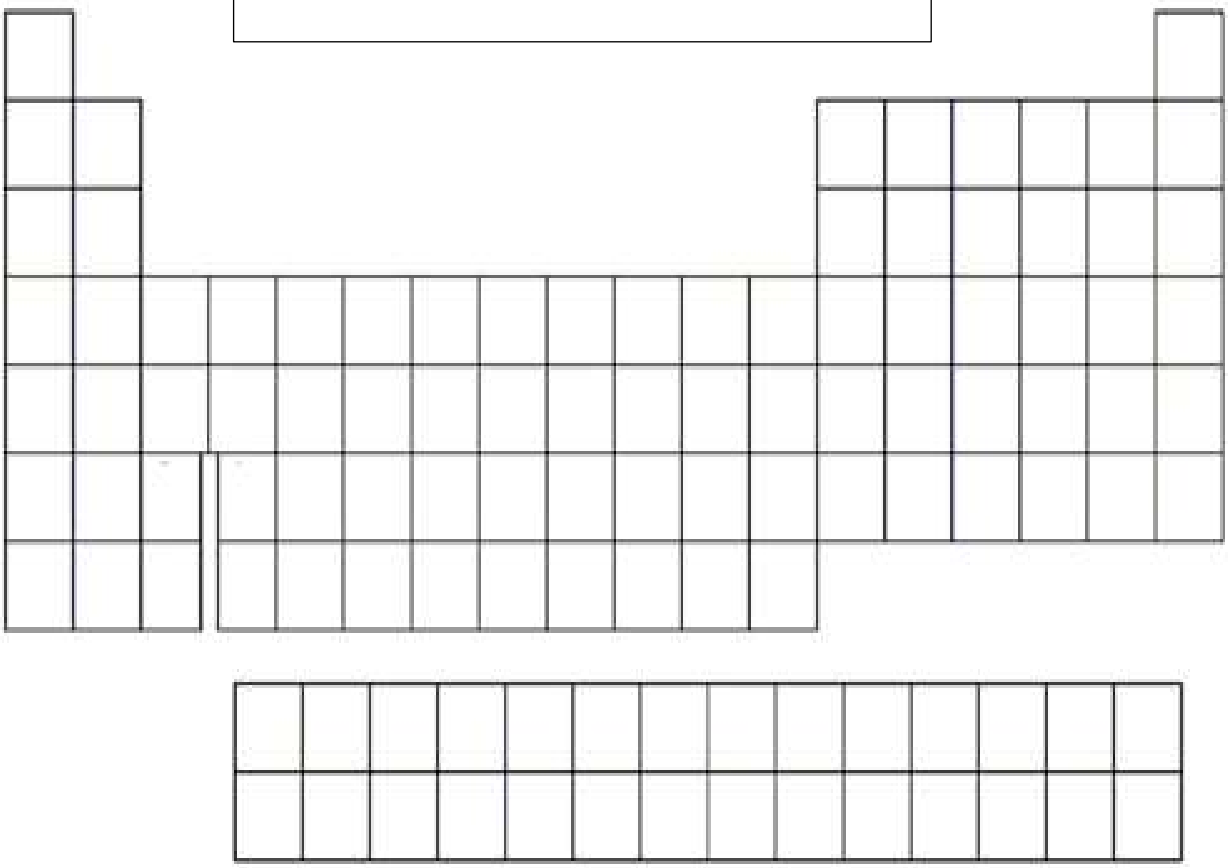
Assignments I.1.1 to I.1.11 are provided herewith

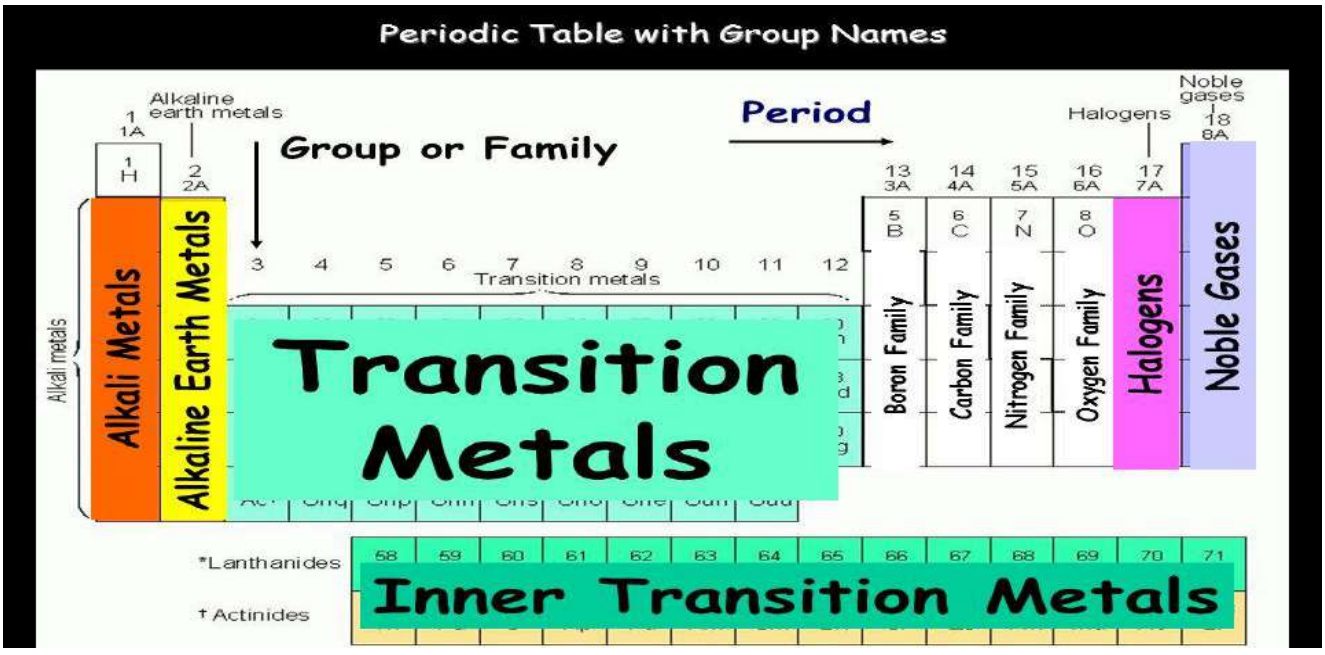
Note: For assignments I.1.1 to I.1.11, copy the given notes for each diagram on a sticky note and glue it on top of the diagram you are drawing.

I.1.1. Create Blocks Periodic Table: See Model below



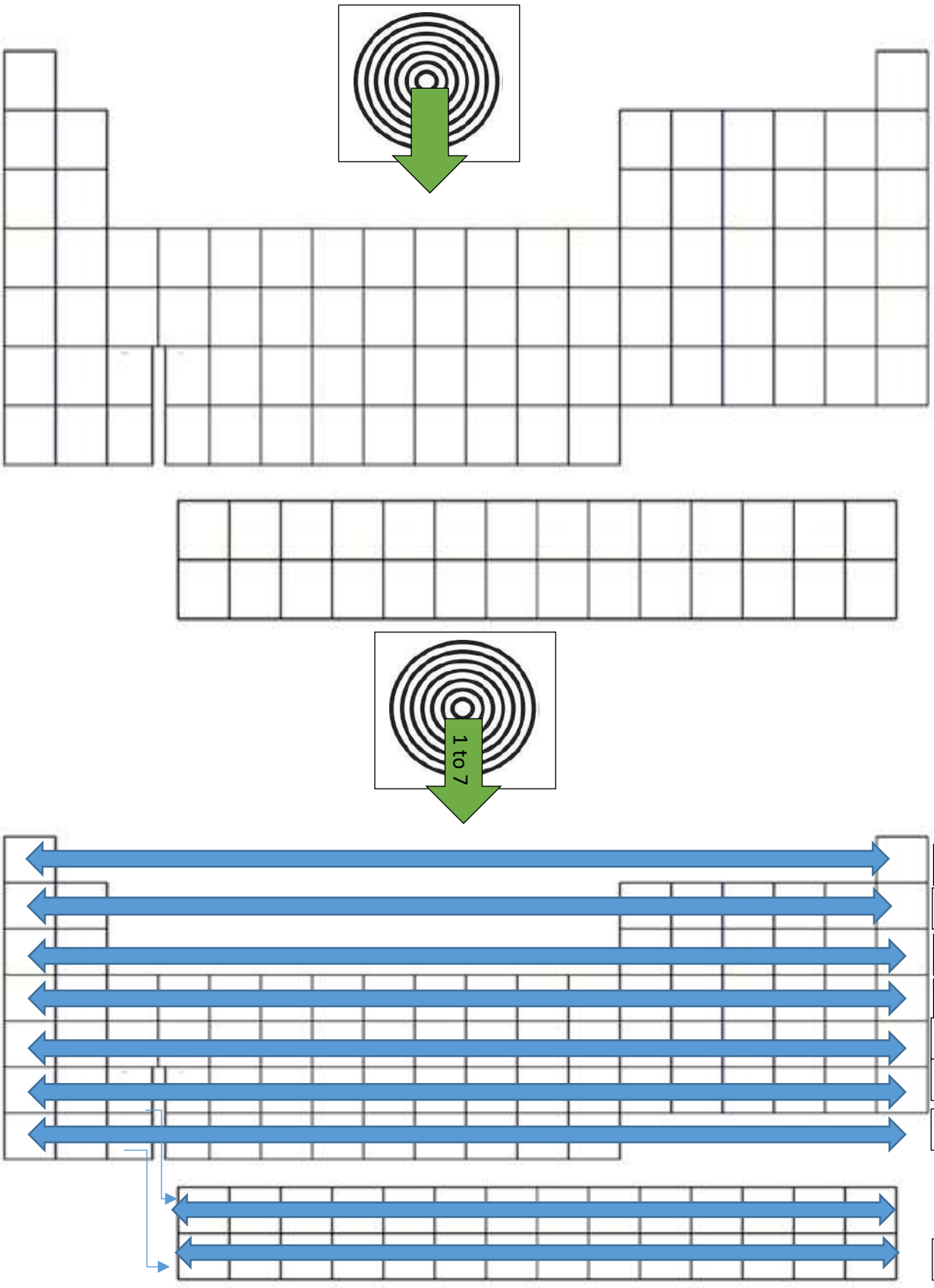
I.1.2. Create Groups Periodic Table: See Model below



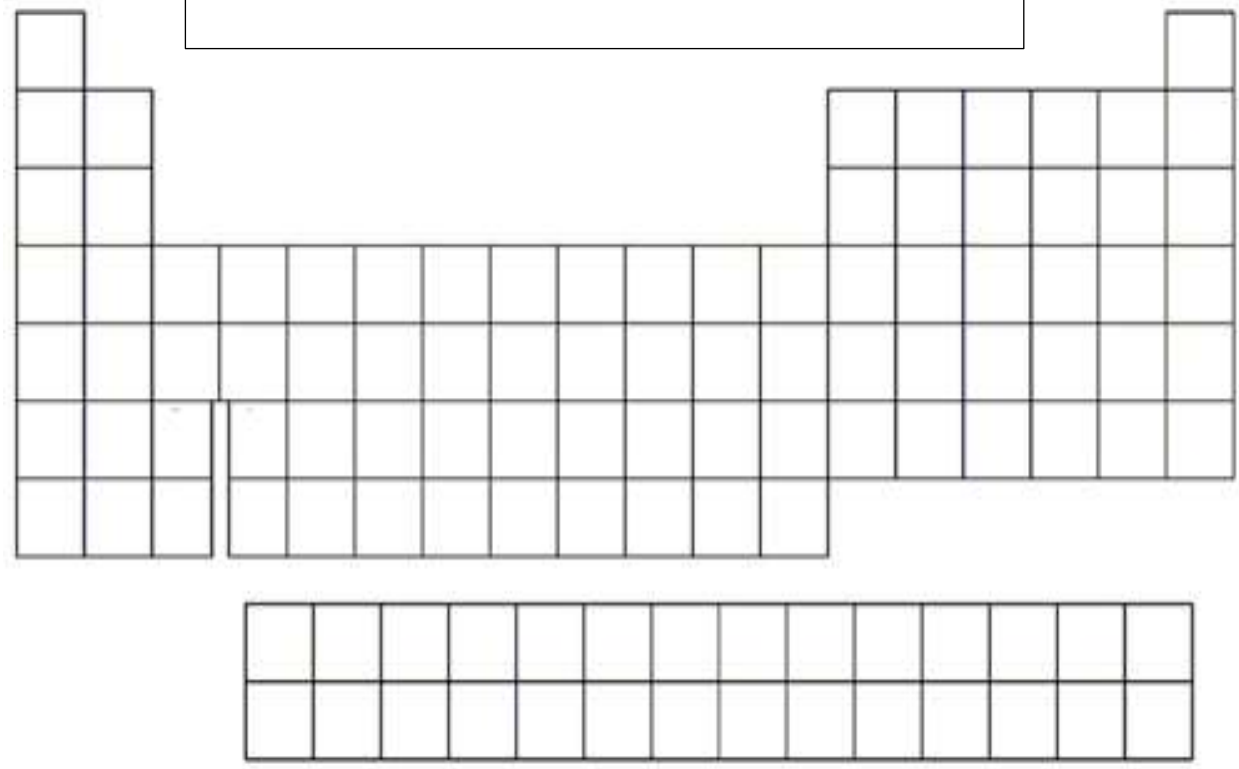


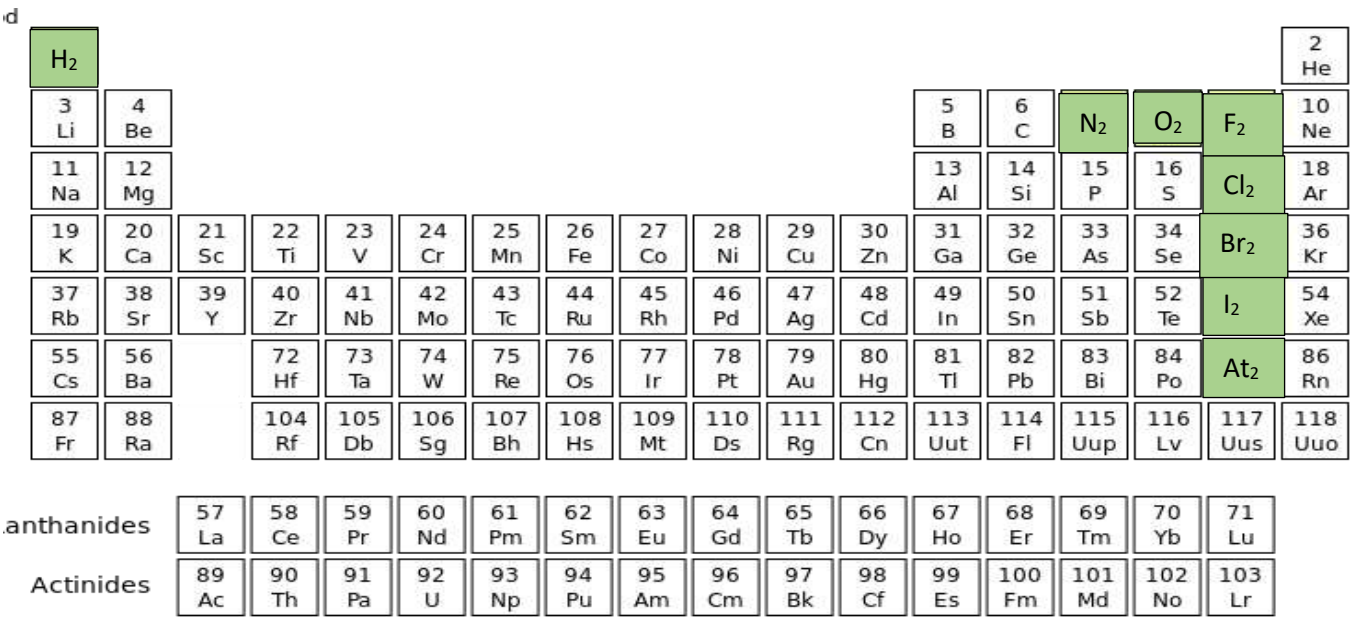
Note: Inner Transition Metals are also called Rare Earths. Lanthanides are also known as Lanthanide Series. Actinides are also called Actinide Series.

I.1.3. Create Periods Periodic Table: See Model below



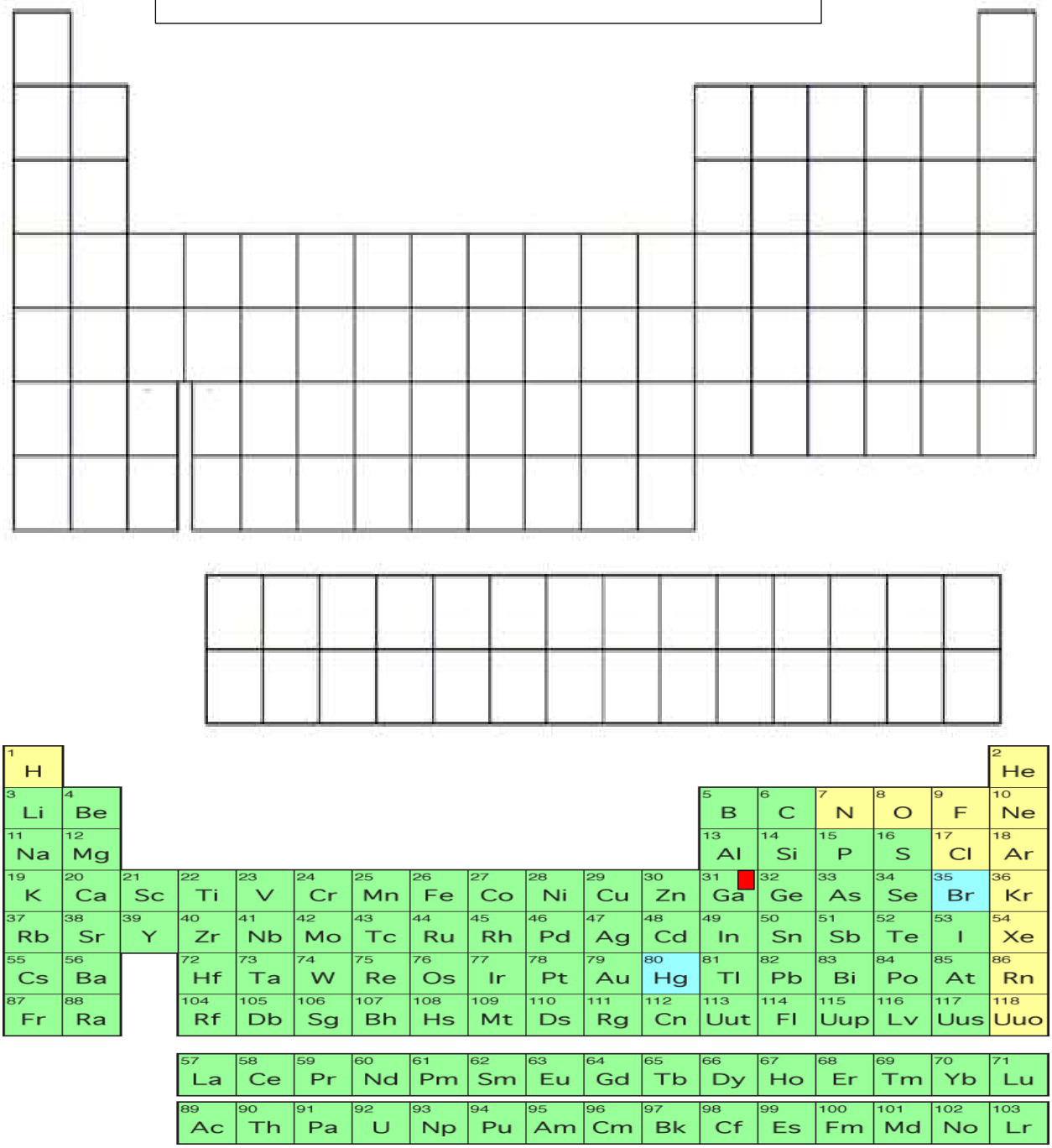
I.1.4. Create Diatomic Elements Periodic Table: See Model below





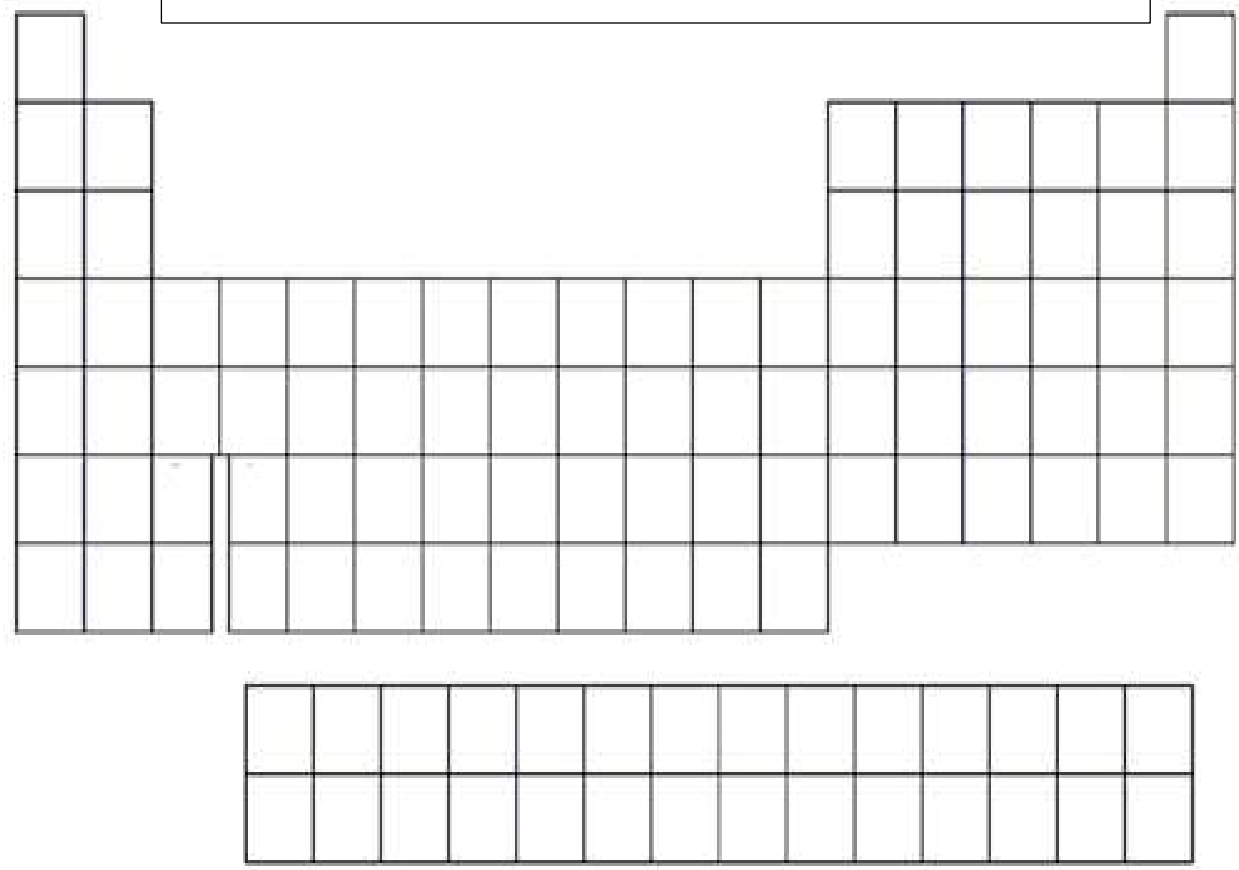
There are Eight Diatomic Elements: Hydrogen, Nitrogen, Oxygen, Fluorine, Chlorine, Bromine, Iodine, and Astatine. Note that these elements have a symbol without the subscript 2 but have a molecular formula with a subscript 2; the 2 in the subscript shows that they are diatomic.

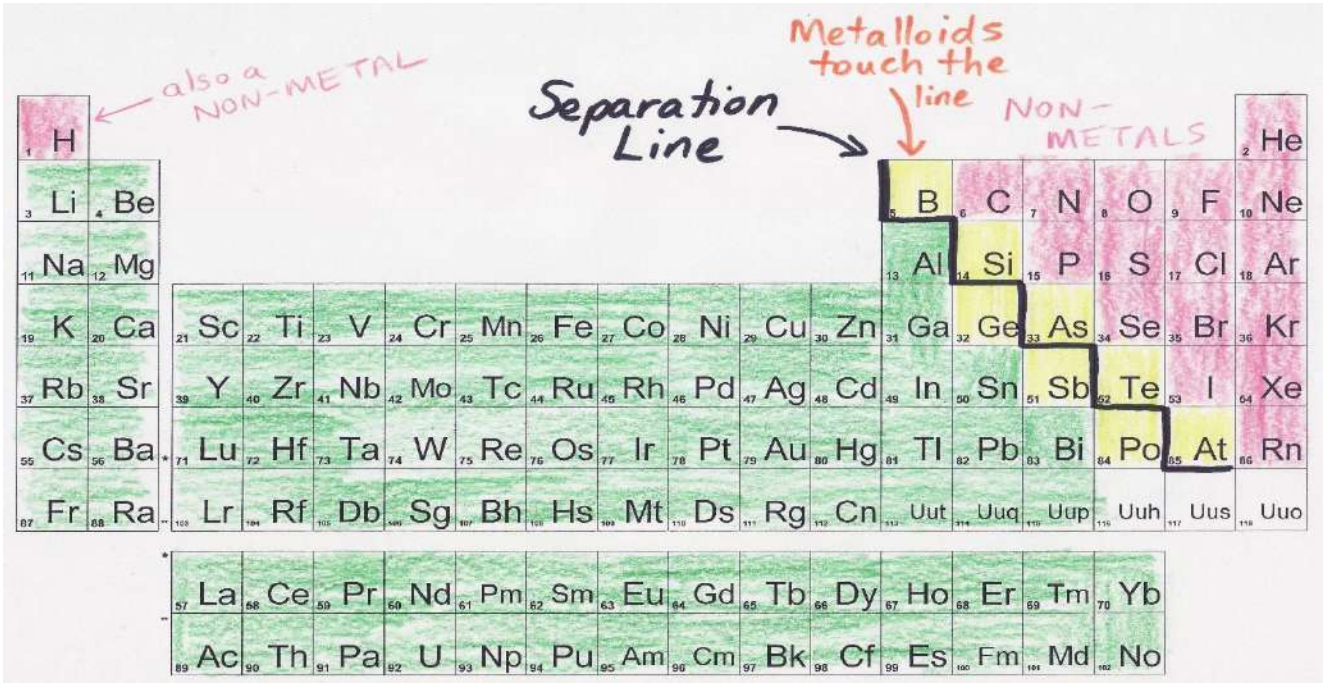
I.1.5. Create Physical Phase Periodic Table: See Model below



Yellow: Gases (12 Elements: Hydrogen (H_2), Nitrogen (N_2), Oxygen (O_2), Fluorine (F_2), Chlorine (Cl_2), Helium (He), Neon (Ne), Argon (Ar), Krypton (Kr), Xenon (Xe), Radon (Rn).
Blue: Liquids (2 Elements: Mercury (Hg) and Bromine (Br_2)
Green: Solids
Red: Gallium is a low melting solid – melts even slightly above room temperature – melts even on your palm!

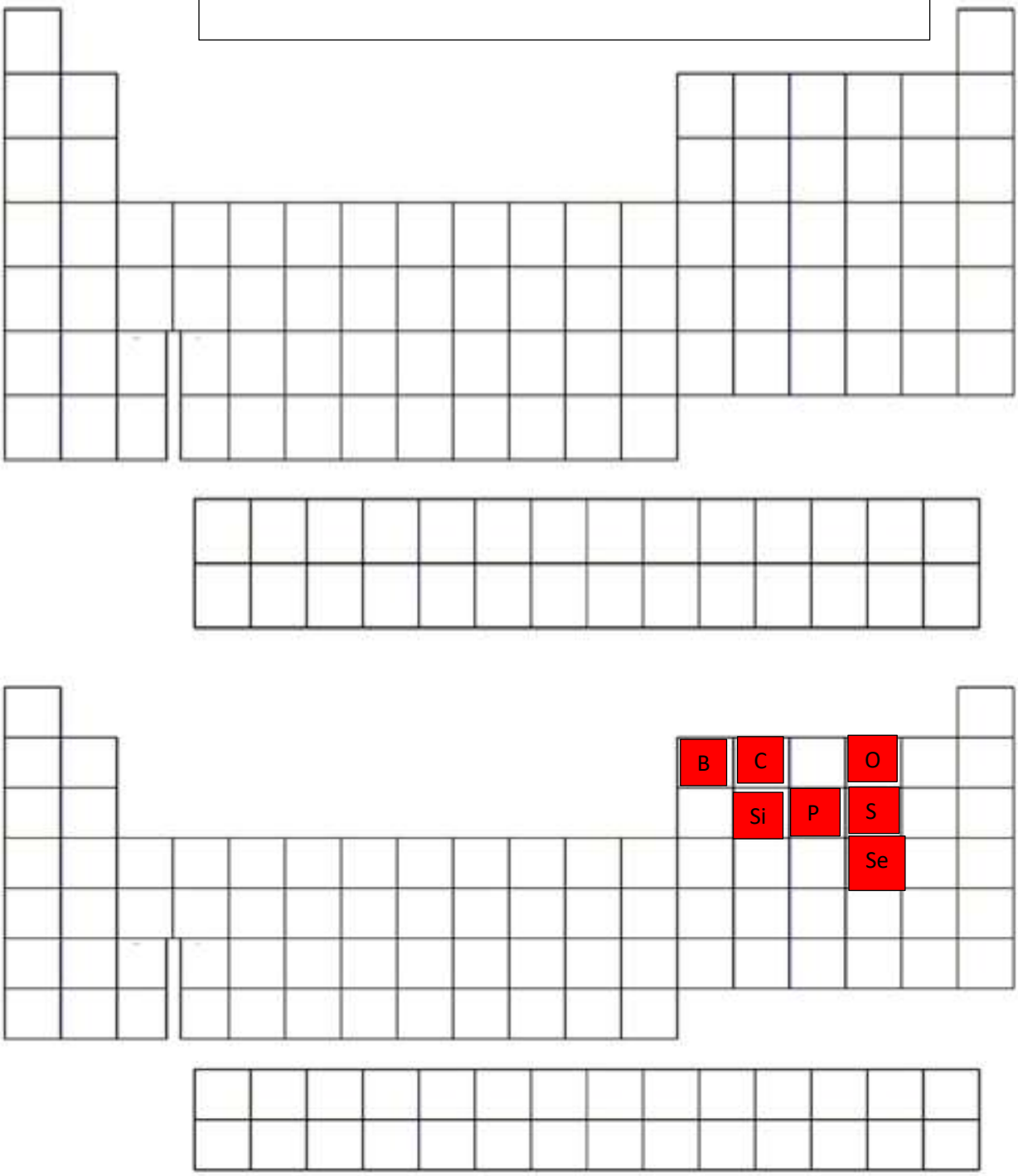
I.1.6. Create Metals, Non-Metals, Metalloids Periodic Table: See Model below





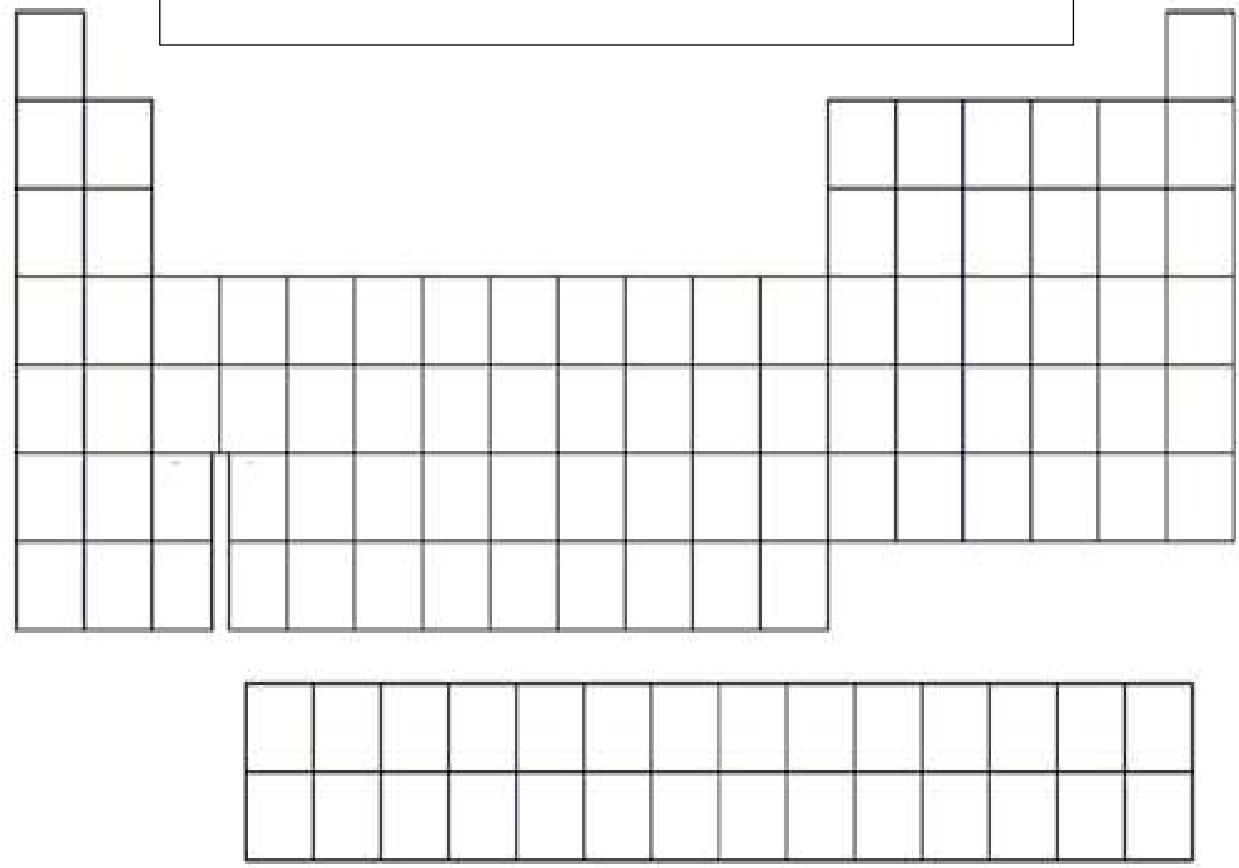
Note: The other name for Metalloids is “Semi-metals.”

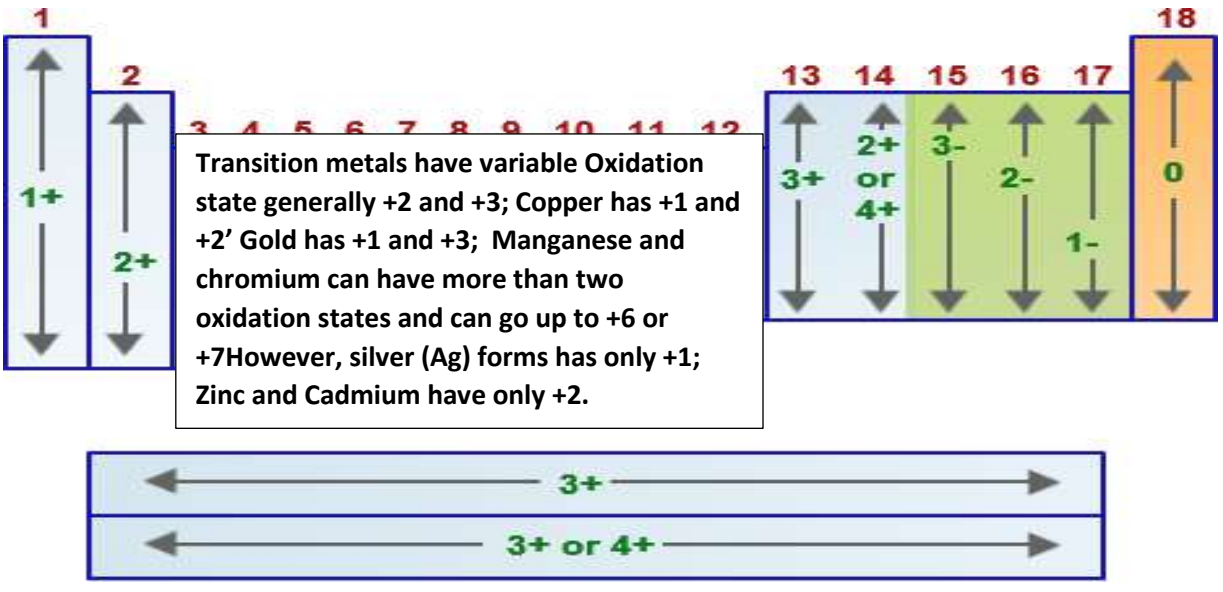
I.1.7. Create Allotropic Elements Periodic Table: See Model below



Note: Allotropes are different physical modifications of the same element. Allotropes have the same symbol but different molecular formula, this is because their atoms combine in different counts to form molecules of different atomicity. We need to remember that most common allotrope of Phosphorus is the White Phosphorus (P_4),that of Sulfur is the Orthorhombic Sulfur (S_8); Carbon exists in different allotropes: Charcoal, Graphite, Diamond, Fullerene, and Carbon nanotubes). Ozone (O_3) is the allotrope of Oxygen.

I.1.8. Create Valency (Oxidation State) iodic Table: See Model below

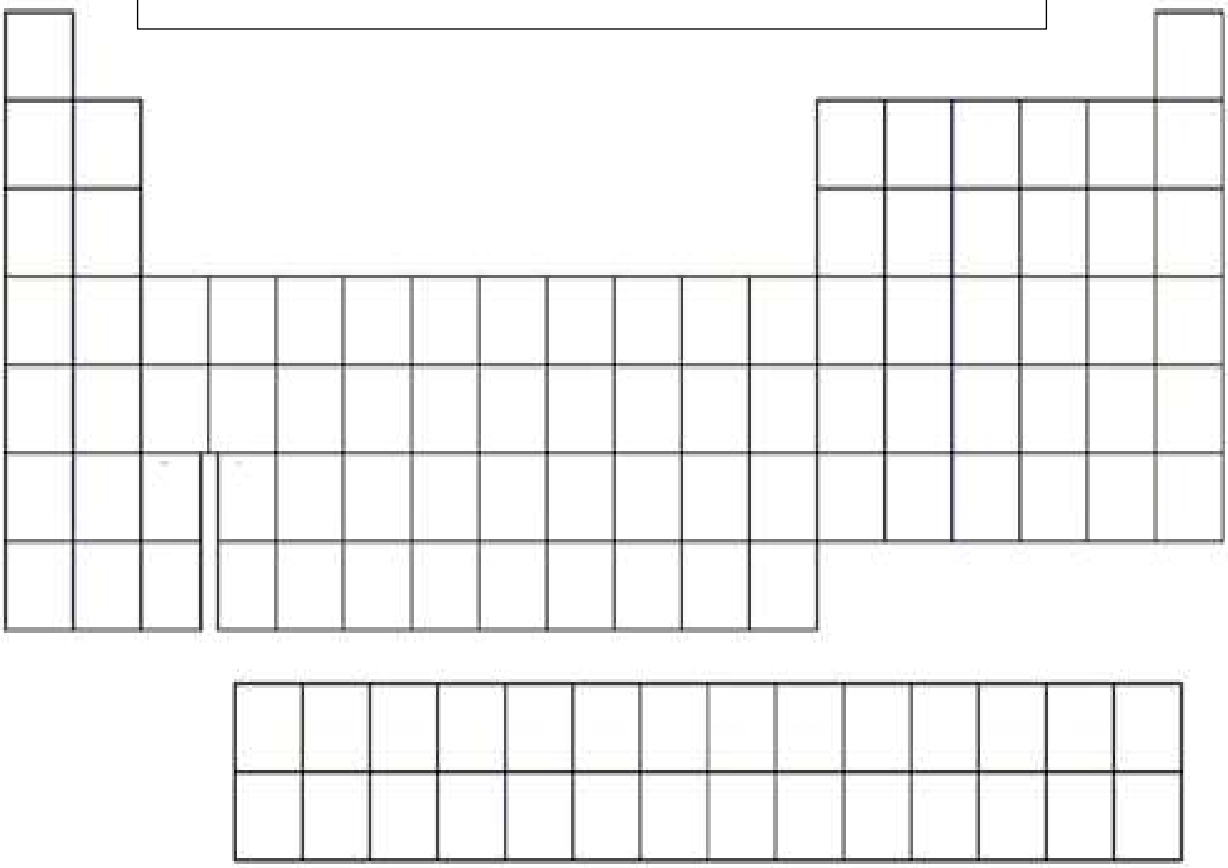




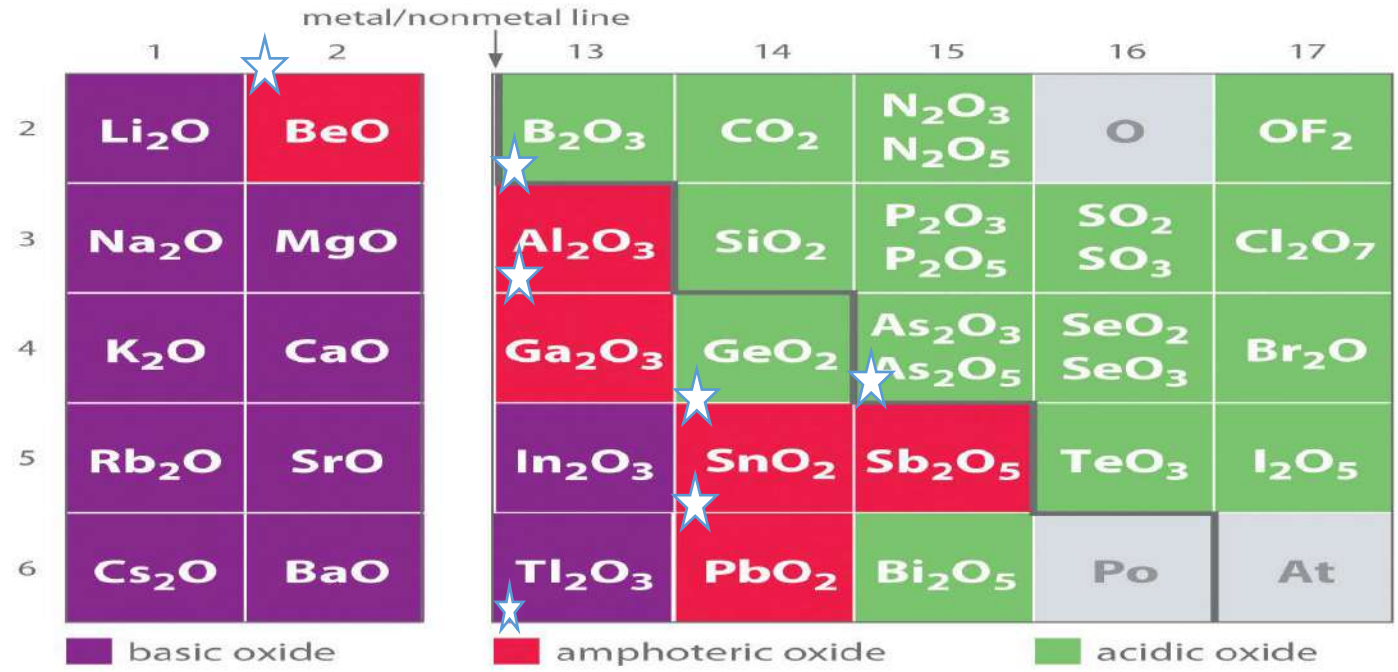
Transition metals have variable Oxidation state generally +2 and +3; Copper has +1 and +2' Gold has +1 and +3; Manganese and chromium can have more than two oxidation states and can go up to +6 or +7However, silver (Ag) forms has only +1; Zinc and Cadmium have only +2.

Note: Valency is the combining capacity of atoms. It indicates the number electrons that an atom of an element will lose or gain in order to attain the nearest noble gas electronic configuration. Valency is also known as Oxidation State or Oxidation Number.

I.1.9. Create Oxides Periodic Table: See Model below

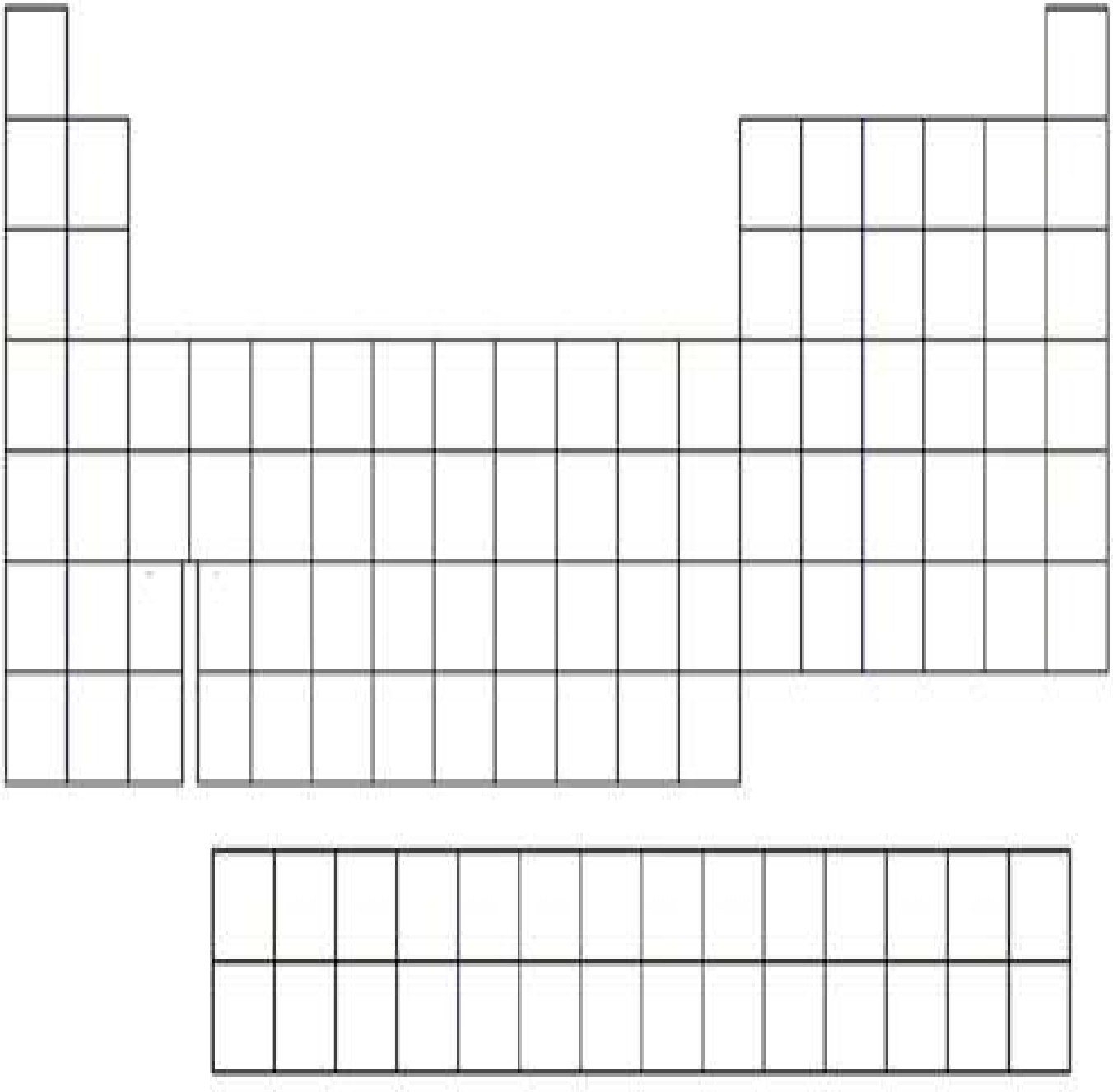


44

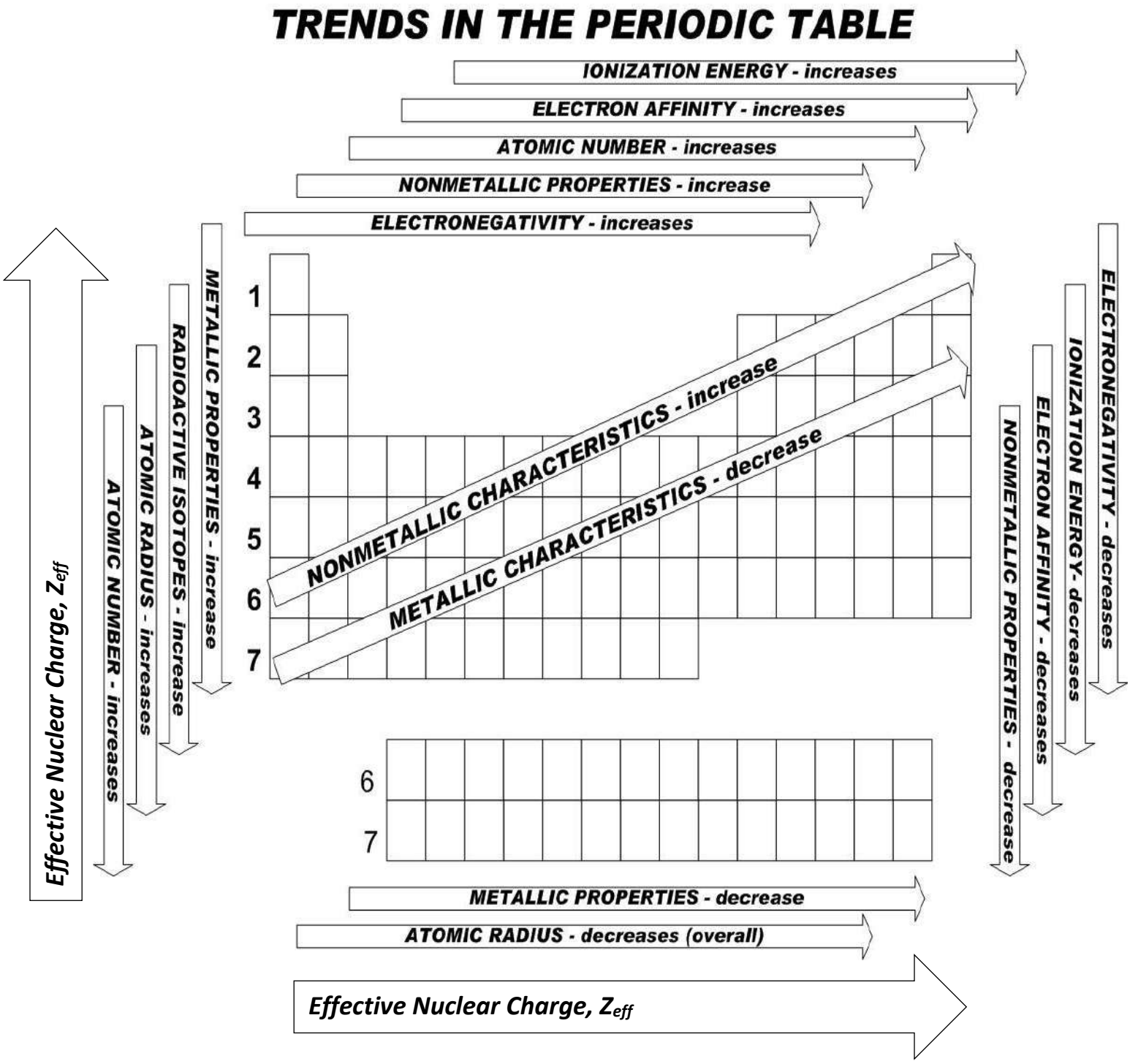


Note: Oxides of Transition Metals and Inner Transition Metals are generally basic but those close to non-metals have a tendency to have more acidity. Amphoteric oxides have both acidic and basic qualities.

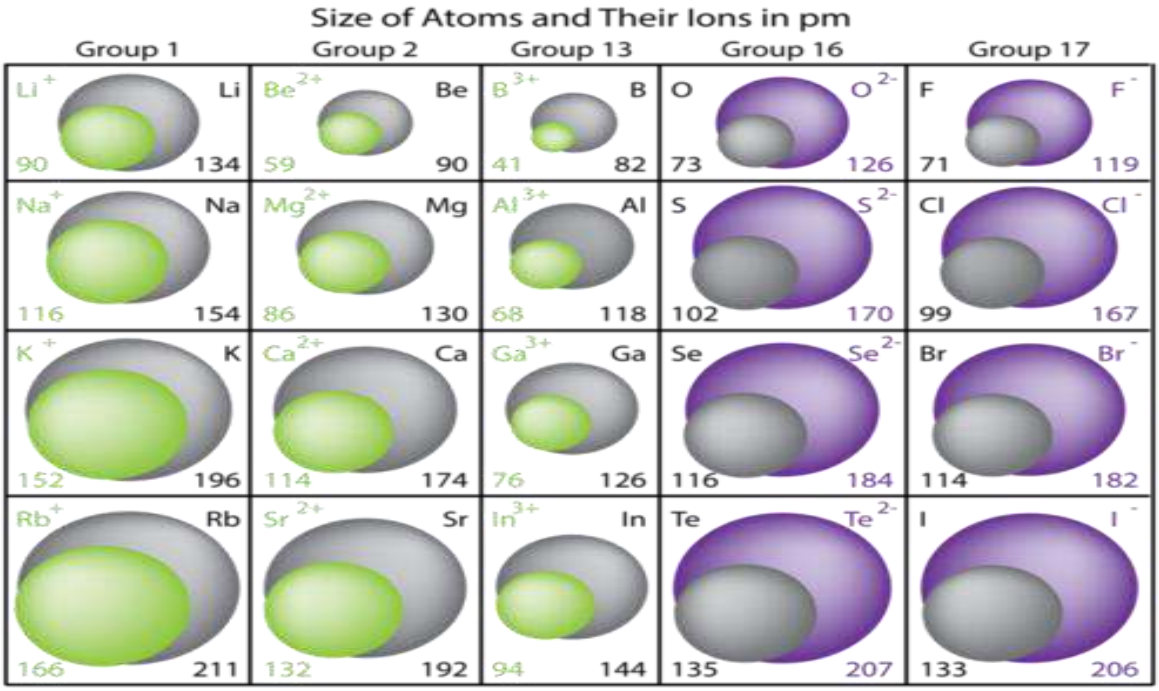
I.1.10. Create Periodic Trend Periodic Table: See Model below



Draw the following Scheme on the Blank Periodic Table given above



I.1.11. Create the Pattern of Ionic Radius Variation in the Periodic Table. See the model below.



Assignment Set-I.2

Carry out the following three sets of labs under Reaction Zones

(a) Reactivity Trends in Group 1

(b) Reactivity Series of Metals

(c) Reactivity Series of Halogens

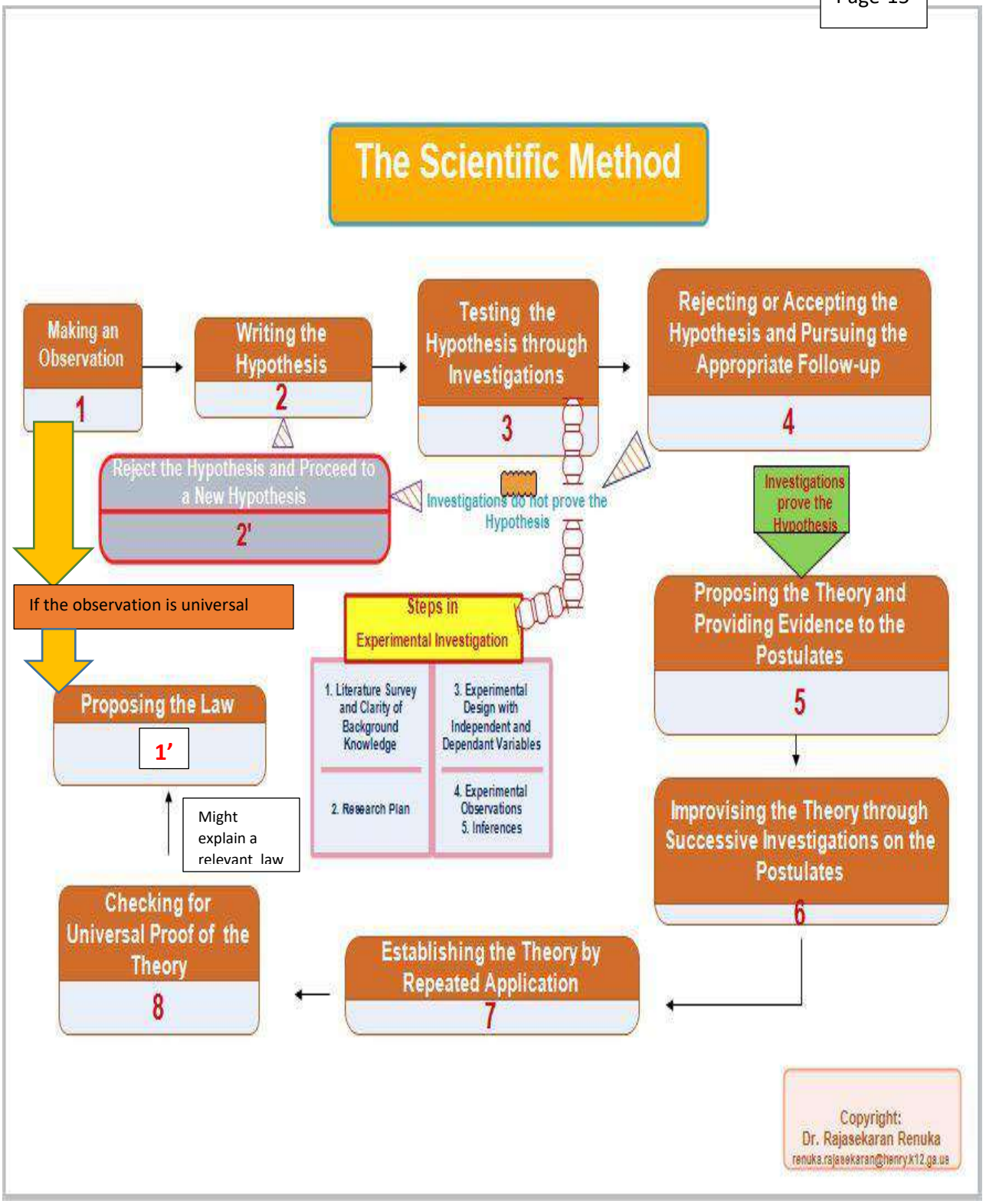
Take notes on the virtual lab you are doing along with chemical equations, you can turn in a hard copy or email me.

at the following website:

http://www.syngentaperiodictable.co.uk/reaction-zone.php

Assignment II-1

Model the Scientific Method Flow Chart by Reproducing the given Flow Chart in the space below or on a Copy Paper or a Construction Paper. (See Page15 for the Flowchart)


The Scientific Method
Making an Observation
1
Writing the Hypothesis
2
Testing the Hypothesis through Investigations
3
Rejecting or Accepting the Hypothesis and Pursuing the Appropriate Follow-up
4
Reject the Hypothesis and Proceed to a New Hypothesis
2'
Investigations do not prove the Hypothesis
Investigations prove the Hypothesis
If the observation is universal
Steps in Experimental Investigation
1. Literature Survey and Clarity of Background Knowledge
2. Research Plan
3. Experimental Design with Independent and Dependant Variables
4. Experimental Observations
5. Inferences
Proposing the Theory and Providing Evidence to the Postulates
5
Proposing the Law
1'
Might explain a relevant law
Improvising the Theory through Successive Investigations on the Postulates
6
Checking for Universal Proof of the Theory
8
Establishing the Theory by Repeated Application
7
Copyright:
Dr. Rajasekaran Renuka
renuka.rajasekaran@henryk12.ga.us

Assignment II-2

Apply the Scientific Method by making observations of free fall of objects of different masses and shape – proceed through the steps of the Scientific Method and arrive at the law. Document the following:

Hypothesis
Theory
Improvised Theory
Law

Shapes include: circular, spherical, cuboids, conical, cylinder, sharp edge cylinders such as a sharpened pencil; Examples of light weight object you may try are: feather, coffee filter, plastic paper, copy paper, table tennis ball, etc. You may turn this in as a hard copy or you could email to me.

Part II: Strengthening the Foundations in Atomic Structure

Assignment III-1

Watch the Following youtube videos
https://www.youtube.com/watch?v=FxDpZ8wGgZ8
https://www.youtube.com/watch?v=zUtIrO3fUgg
https://www.youtube.com/watch?v=LA9juHlyhKw

and then take the following three quizzes:

(1) Subatomic Particles Quiz at
http://www.softschools.com/quizzes/chemistry/atomic_structure/quiz319.html

(2) Atomic Theory I Quiz at
http://www.softschools.com/quizzes/chemistry/atomic_heory/quiz666.html

(3) Atomic Theory II Quiz at
http://www.softschools.com/quizzes/chemistry/early_models_of_the_atom/quiz672.html

~~**Assignment III-2**~~ **This task is deleted – you do not have to do this**
~~Do the Virtual Lab at~~
~~http://www.glencoe.com/sites/common_assets/science/virtual_labs/E20/E20.html~~
~~Your task in this lab is to construct the Bohr atomic model for Hydrogen, Carbon, Oxygen, and Aluminum~~

Scoring Rubric for Summer Assignment

Blocks Periodic Table – 2 Pts
Groups Periodic Table – 5 Pts
Periods Periodic Table – 2 Pts
Diatomic Periodic Table – 2 Pts
Physical States Periodic Table – 5 Pts
Metals, Metalloids, and Nonmetals Periodic Table – 4 Pts
Allotropes Periodic Table – 2 Pts
Valency Periodic Table – 5 Pts
Oxides Periodic Table – 5 Pts
Trends Periodic Table - 5 Pts
Scientific Method Flow Chart – 5 Pts
Scientific Method Lab (Task II-2) – 10 Pts
Quizzes – 12 Pts
Virtual Lab Notes – 10 Pts
Assignment III-2 – 6 Pts
Total Points: 80
Note: Since the task III-2 is omitted, the total points is 74 and not 80.