Name:_____Period:_____Date:_____
Ms. Randall
Unit 4: Periodic Table Unit Workbook

The **bold, underlined** words are **important vocabulary words** that you should be able to define and use properly in explanations. This is a study guide for what you will be tested on throughout the year. The objectives are divided into categories of "**Knowledge**" (**what you have to *know***) and "**Application**" (**what you have to be able to *do***).

THE PERIODIC TABLE		
	Knowledge	**Application**
1.	○ The placement or location of an element on the Periodic Table gives an indication of **physical** and **chemical properties** of that element. ○ The elements on the Periodic Table are arranged in order of increasing **atomic number**.	○ Explain the placement of an unknown element in the periodic table based on its properties
2.	○ The number of protons in an atom (**atomic number**) identifies the element. This goes at the bottom left corner of the symbol for that element. ○ The sum of the protons and neutrons in an atom (**mass number**) identifies an ***isotope***. The mass number is placed at the top left corner of the symbol for an element OR is placed after the element symbol or name and a dash. *Ex: Three different ways to write carbon with a mass number of 14:* *C, carbon-14, or C-14*	○ Interpret and write isotopic notations. *Ex:* *C-12, C-13, and C-14 are isotopes of the element carbon*
3.	○ Elements are classified by their properties, and located on the periodic table as **metals**, **metalloids**, **nonmetals**, or **noble gases**.	○ Identify the properties of metals, metalloids, nonmetals and noble gases ○ Classify elements as metals, metalloids, nonmetals, or noble gases by their properties ○
4.	○ An element's **atomic radius**, **first ionization energy**, and **electronegativity** determine its physical and chemical properties	
5.	○ **Substances can be differentiated by their physical properties.** ○ Physical properties of substances include **melting point, boiling point, density**, **conductivity**, **malleability**, **solubility**, and **hardness**.	○ Identify and give examples of physical properties ○ Describe the states of the elements at STP (solid, liquid, or gas). *(Table S)*
6.	○ **Substances can be differentiated by chemical properties.** ○ Chemical properties describe how an element behaves during a chemical reaction and include reactivity, flammability, and toxicity.	○ Identify and give examples of chemical properties ○ Describe the difference between physical and chemical properties of substances
7.	○ Some elements exist as two or more forms in the same phase. These forms differ in their molecular or crystal structure and therefore in their properties. The word to describe this phenomenon is **ALLOTROPE**.	

	○ Ozone and oxygen gases are allotropes of each other. Ozone is O_3 and it is very dangerous to our health. Oxygen gas is O_2 and we need it to survive. ○ Diamonds and graphite (better known as pencil lead) are both forms of the element carbon. They have different molecular structures and very different properties.	
8.	○ For **Groups** (also called **families**) 1, 2, and 13-18 on the Periodic Table, elements within the same group have the same number of valence electrons (helium is the exception) and therefore similar chemical properties. ○ Elements in the same **Period** (row) have the same number of **principal energy levels (shells)** which contain electrons.	○ Determine the group of an element, given the chemical formula of a compound *Ex: A compound has the formula XCl_2, element X is in Group 2* ○ Determine the number of energy levels containing electrons given an element's Period and vice versa
9.	○ The succession of elements within the same GROUP (top to bottom) demonstrates characteristic **trends**: differences in **atomic radius**, **ionic radius**, **electronegativity**, **first ionization energy**, and **metallic/nonmetallic properties**.	○ Compare and contrast properties of elements within a group or a period for groups 1, 2, and 13-18 on the periodic table
10.	○ The succession of elements across the same PERIOD (left to right) demonstrates characteristic **trends**: differences in **atomic radius**, **ionic radius**, **electronegativity**, **first ionization energy**, and **metallic/nonmetallic properties**.	○ Understand and be able to explain the trends in terms of **nuclear charge and electron shielding**

VOCABULARY

For each word, provide a short but specific definition from YOUR OWN BRAIN! No boring textbook definitions. Write something to help you remember the word. Explain the word as if you were explaining it to an elementary school student. Give an example if you can. Don't use the words given in your definition!

Periodic Law: _____

Period: _____

Group: _____

Metal:_____

Nonmetal: _____

Metalloid/semimetal: _____

Alkali metal: _____

Alkaline earth metal: _____

Transition metal: _____

Halogen: _____

Noble gas: _____

Octet: _____

Atomic radius: _____

Ionic radius: _____

Ionization energy: _____

Electronegativity: _____

<u>Introduction to the Periodic Table</u>:

Color Coding Activity

The Periodic Table is a list of all the known elements. It is organized by increasing atomic number. There are two main groups on the periodic table: metals and nonmetals. The left side of the table contains elements with the greatest metallic properties. As you move from the left to the right, the elements become less metallic with the far right side of the table consisting of nonmetals. A small group of elements, whose members touch the zigzag line, are called metalloids because they have both metallic and nonmetallic properties. Identify the *zig zag* line and make it more bold using a black crayon.

The table is also arranged in vertical columns called "groups" or "families" and horizontal rows called "periods." Each arrangement is significant. The elements in each vertical column or group have similar properties. There are a number of major groups with similar properties. They are as follows:

<u>Hydrogen</u>: This element does not match the properties of any other group so it stands alone. It is placed above group 1 but it is not part of that group. It is a very reactive, colorless, odorless gas at room temperature. (1 outer level electron) Outline Hydrogen in red.

<u>Group 1</u>: Alkali Metals – These metals are extremely reactive and are never found in nature in their pure form. They are silver colored and shiny. Their density is extremely low so that they are soft enough to be cut with a knife. (1 outer level electron) Color the alkali metals in red.

<u>Group 2</u>: Alkaline-earth Metals – Slightly less reactive than alkali metals. They are silver colored and more dense than alkali metals. (2 outer level electrons) Color the alkaline earth metals in orange.

<u>Groups 3 – 12</u>: Transition Metals – These metals have a moderate range of reactivity and a wide range of properties. In general, they are shiny and good conductors of heat and electricity. They also have higher densities and melting points than groups 1 & 2. (1 or 2 outer level electrons) Color the transition metals in pink.

<u>Lanthanides and Actinides</u>: These are also transition metals that were taken out and placed at the bottom of the table so the table wouldn't be so wide. The elements in each of these two periods share many properties. The lanthanides are shiny and reactive. The actinides are all radioactive and are therefore unstable. Elements 95 through 103 do not exist in nature but have been manufactured in the lab. Color the lanthanides and actinides brown.

<u>Group 13</u>: Boron Group – Contains one metalloid and 4 metals. Reactive. Aluminum is in this group. It is also the most abundant metal in the earth's crust. (3 outer level electrons) Color group 13 yellow.

<u>Group 14</u>: Carbon Group – Contains on nonmetal, two metalloids, and two metals. Varied reactivity. (4 outer level electrons) Color group 14 light green.
<u>Group 15</u>: Nitrogen Group – Contains two nonmetals, two metalloids, and one metal. Varied reactivity. (5 outer level electrons) Color group 15 dark green.

<u>Group 16:</u> Oxygen Group – Contains three nonmetals, one metalloid, and one metal. Reactive group. (6 outer level electrons) Color group 16 light blue.

Group 17: Halogens – All nonmetals. Very reactive. Poor conductors of heat and electricity. Tend to form salts with metals. Ex. NaCl: sodium chloride also known as "table salt". (7 outer level electrons) Color group 17 dark blue.

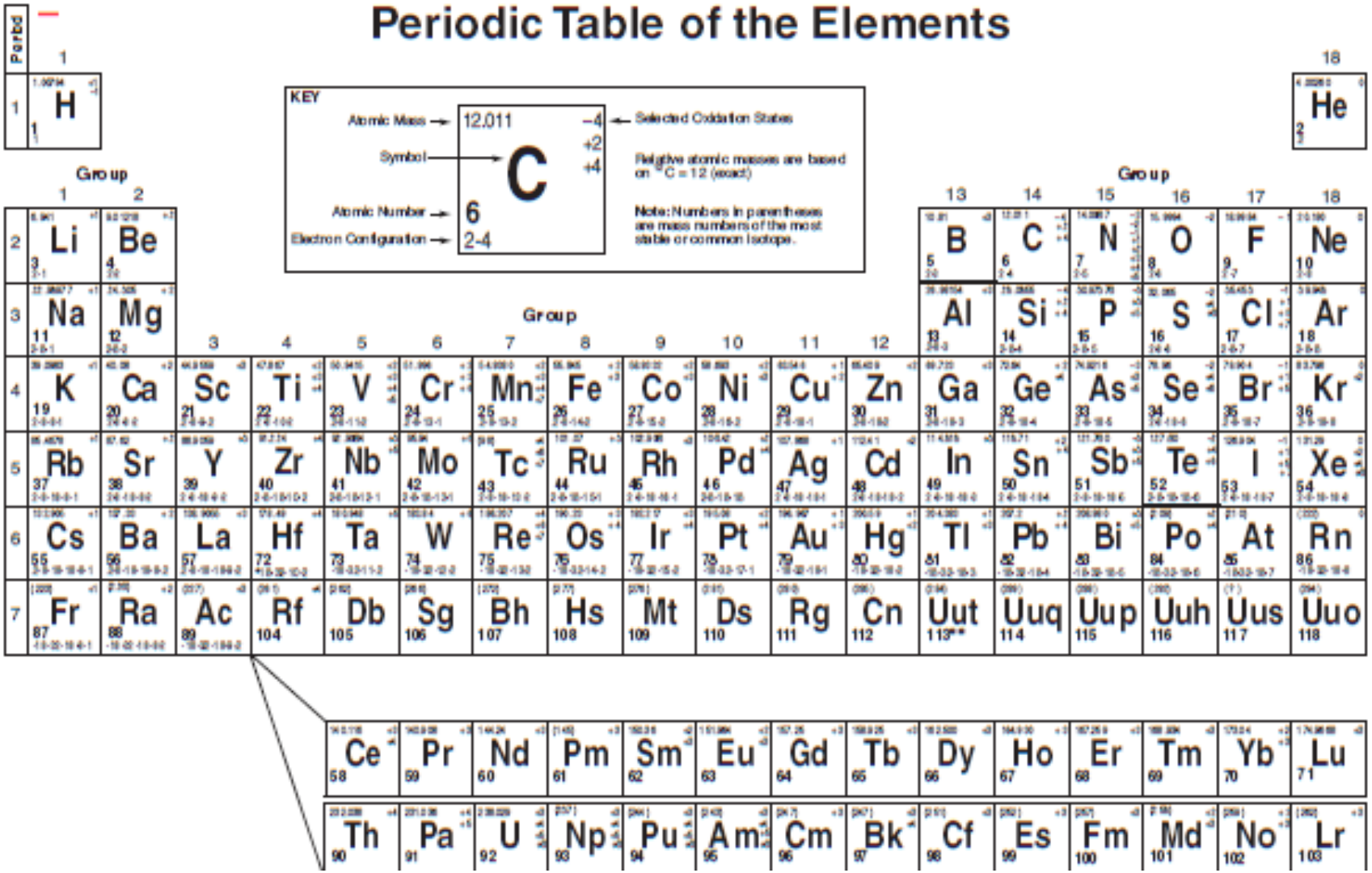
Group 18: Noble Gases – Unreactive nonmetals. All are colorless, odorless gases at room temperature. All found in earth's atmosphere in small amounts. (8 outer level electrons) Color group 18 Purple.

Analysis:

1. The vertical columns on the periodic table are called _____.
2. The horizontal rows on the periodic table are called _____.
3. Most of the elements in the periodic table are classified as _____.
4. The elements that touch the zigzag line are classified as _____.
5. The elements in the far upper right corner are classified as_____.
6. Elements in the first group have one outer shell electron and are extremely reactive. They are called

7. Elements in the second group have 2 outer shell electrons and are also very reactive. They are called

8. Elements in groups 3 through 12 have many useful properties and are called _____.
9. Elements in group 17 are known as "salt formers". They are called _____.
10. Elements in group 18 are very unreactive. They are said to be "inert". We call these the _____.
11. The elements at the bottom of the table were pulled out to keep the table from becoming too long. The first period at the bottom called the _____.
12. The second period at the bottom of the table is called the _____.



http://msrandallscience.weebly.com/

Inquiry Activity 1: Introduction to Periods and Groups

Look at the periodic table of elements.

1. Periods represent the (vertical/horizontal) rows on the table.
2. Draw Bohr diagrams for Carbon, Boron and Oxygen, all in period 2.

3. Based on your diagrams in question 2, elements in the same period have the same number of _____.
4. Groups represent the (vertical/horizontal) columns on the table.
5. Draw Bohr diagrams for Lithium, Sodium, and Potassium, all in group 1.

6. Based upon your diagrams in question 5, elements in the same group have the same number of _____.

RULES: Group 1 are known as Alkali Metals. Group 2 are Alkaline earth metals. Groups 3-12 are Transition metals. Group 17 are Halogens. Group 18 are Noble gases. All other groups do not have names.

Element	# of Valence electrons	# of energy levels	Group Name	Lewis Diagram	Element	# of Valence electrons	# of energy levels	Group Name	Lewis Diagram
Li					**Na**				
Mg					**Ca**				
Al					**Ga**				
Ge					**Sn**				
N					**P**				
Se					**Te**				
Cl					**I**				
Kr					**Rn**				

Periods and Groups Summary

Look at the periodic table of elements.

1. How many periods are on the periodic table of elements?

2. Write out electron configurations for any three elements in period 3.

3. What do elements in the same period have in common?

4. How many groups are on the periodic table of elements?

5. Write out Lewis dot diagrams for any three elements in group 18.

6. Write out the most probable charges of elements in group:

   a. One___ b. Two___ c. Seventeen____ d. Eighteen___

7. What do elements in the same group have in common?

8. Do elements in the same period have more or less in common than elements in the same group?

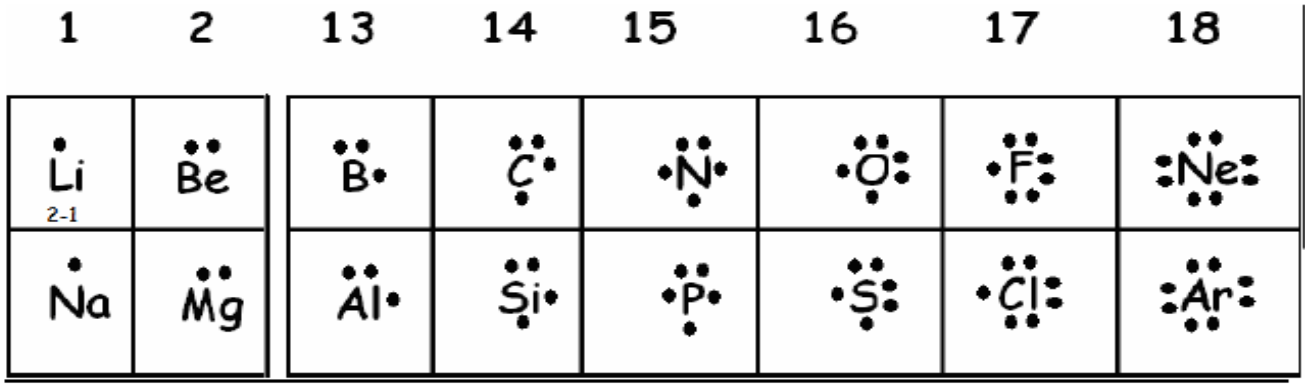
Lesson 1: The History of the Table and Chemical Periodicity **Date:**_____

Objective:

- ***Explain how the periodic table was developed***
- ***Identify the differences between periods and groups***

Check your understanding:

Model: An Electron Dot Diagram of the Elements



Task:
Below the symbol for each element, write an electron configuration for the elements in the model. Lithium has been done for you.

Questions:

1.) How are the members of the same column (group) similar in terms of the number of valence electrons?

2.) Which group contains the least number of valence electrons?

3.) Which group contains the largest number of valence electrons?

4.) Which row (period) contains three occupied shells?

5.) How are the members of the same period similar in terms of the number of energy levels (shells)?

6.) Are atoms with a larger radius more likely to be found at the top or bottom of a group (column)? Explain your answer.

7.) Which group would be considered non-reactive? Why?

Practice:

1. Who developed the periodic Table? How was it organized?

2. In what order are the elements on the periodic table arranged today?

3. What do the groups have in common?

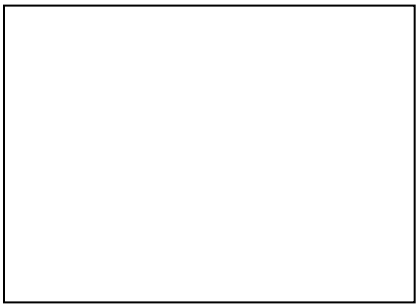
4. What do the periods have in common?

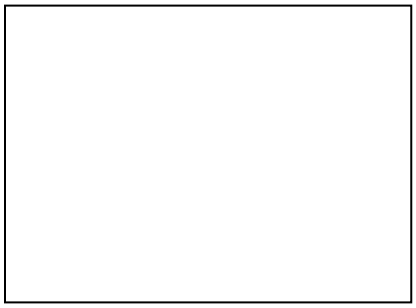
5. Explain how the number of valence electrons affects the reactivity of elements?

6. Which metals are most reactive and why?

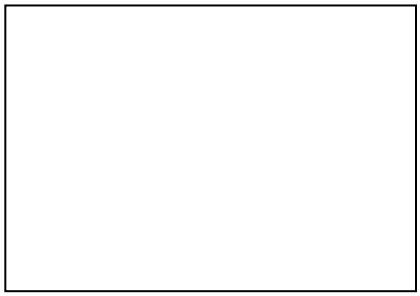
7. Which nonmetals are most reactive and why?

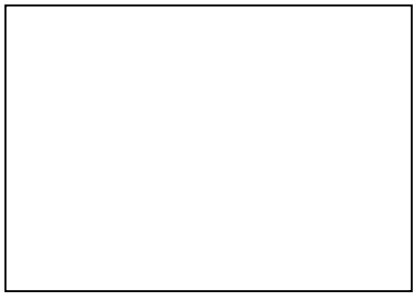
8. Draw the Bohr diagrams for Neon and Helium and explain why they do not bond:



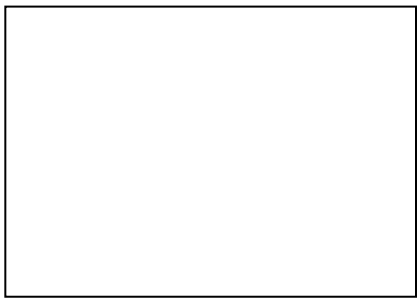


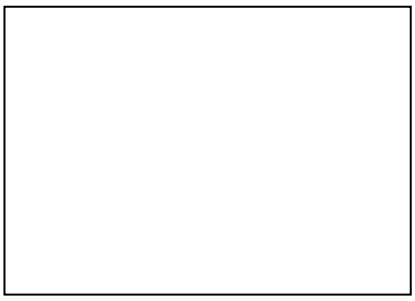
9. Draw the Bohr diagrams for Sodium and Calcium and explain why **metals lose electrons**:





10. Draw the Bohr diagrams for Fluorine and Sulfur and explain why **nonmetals gain electrons**:





_____
_____
_____
_____
_____
_____
_____

ASSESS YOURSELF ON THIS LESSON: _____/10

If you missed more than 1, do the Additional Practice.

ADDITIONAL PRACTICE LESSON 1

1. In terms of valence electrons, why do Na and Li have similar properties?

2. What two elements have similar reactivity and why? Ca, Sr, Ti, Zr.

3. If sodium reacts with water, would you expect potassium to react with water as well? Why or why not.

ASSESS YOURSELF ON THIS ADDITIONAL PRACTICE: _____/3

If you missed any questions you should see me for extra help and/or re-read the lesson.

Lesson 2: Key to the Periodic Table **Date: _____**

Objective:

- ***Differentiate between the different groups of elements***
- ***Identify the properties specific to each category of element***

Check your understanding:

Directions: Use the word bank below to fill in the blanks in the passage that follows.

Actinide series	Group	Nonmetal
Alkali metal	Halogen	Period
Alkaline earth metal	Lanthanide series	Periodic law
Atomic mass	Metal	Periodic table
Atomic number	Metalloid	Transition element
Family	Noble gas	

Dmitri Mendeleev developed a chart-like arrangement of the elements called the _____. He arranged the elements in order of increasing _____, but what he discovered were many gaps. The chart was not that organized and easy to use. The arrangement used today differs from that of Mendeleev in that the elements are arranged in order of increasing _____. He called this the _____of the elements. Each horizontal row of elements is called a(n) _____. Each vertical column is called a(n) _____, or because of the resemblance between elements in the same column, a(n) _____.

In rows 4 through 7, there is a wide central section containing elements, each of which is called a(n) _____. Rows 6 and 7 also contain two other sets of elements that are listed below the main chart. These are called the _____
and the _____, respectively. Each of these elements, as well as those in the first two columns at the left end of the chart, is classified as a(n) _____. Each of the elements at the right side of the chart is classified as a(n) _____. Each of the elements between these two main types, having some properties like one type and other properties like the other type, is called a(n) _____.

Each of the elements in Group 1 is called a(n) _____. Each of the elements in Group 2 is called a(n) _____. Each of the elements in Group 17 is called a(n) _____. Each of the elements in Group 18 is called a(n) _____.

Practice:

1. Write in the space, “Group 1 metals”, “Group 2 metals”, “transition metals”, “halogens”, or “noble gases” to indicate which group each statement is describing.

a.		Can form Colored solutions
b.		Full valence shell
c.		Most active metals
d.		Most active nonmetals
e.		Monatomic gases
f.		Diatomic elements
g.		Stable and unreactive
h.		7 valence electrons
i.		2 valence electrons
j.		Form ions with a +1 charge

2. . Write in the space, “metals”, “metalloids”, or “nonmetals” to indicate which type of element each statement is describing.

a.		Located on the left side of the P.T.
b.		Located on the right side of the P.T.
c.		Solids are brittle
d.		Majority of the elements
e.		Gain electrons to form negative ions
f.		Located along the “staircase”
g.		Have luster
h.		Malleable
i.		Lose electrons to form positive ions
j.		Ductile
k.		Excellent conductors of heat & electricity
l.		Poor electrical & heat conductors
m.		Ions are larger than their atoms
n.		Ions are smaller than their atoms

ASSESS YOURSELF ON THIS LESSON: _____/42

If you missed more than 5, do the Additional Practice.

ADDITIONAL PRACTICE LESSON 2

Use Table S to fill in the names and states of each element below. Then, check all the boxes which describe the element.

	Name	Physical Properties				
		State at STP (s, l, or g)	Brittle	Malleable /ductile	Conductor	
					Good	Poor
C						
Ag						
I						
S						
Au						
Fe						
Br						
Ar						
H						
Hg						

ASSESS YOURSELF ON THIS ADDITIONAL PRACTICE: _____/10

If you missed more than 1 you should see me for extra help and/or re-read the lesson.

INQUIRY ACTIVITY: PERIODIC TRENDS

ATOMIC RADIUS

Period Trend:

1. Draw the Bohr diagrams for Lithium and Fluorine. Create a nucleus with a *diameter* of 2.0 cm. Create a first energy level with a *radius* of 2.0 cm (measure from center of nucleus. The second energy level will have a *radius* close to 4.0cm. **Recall, positive charges attract negative charges. Therefore, protons will attract the electrons in the energy levels. The more protons an atom has, the stronger the pull on electrons.** Draw the second energy level in considering these statements.

Li	F

2. Using table S, record the radius of Lithium and Fluorine: _____ and _____.

3. Provide a rule that explains the trend of Atomic Radius in a period with respect to the number of protons, electrons, and energy levels in the atom.

Group Trend:

4. Draw the Bohr diagram for Beryllium and Magnesium. Create a nucleus with a *diameter* of 2.0 cm. Create a first energy level with a *radius* of 2.0 cm (measure from center of nucleus). Each additional energy level will add 1.0cm to the *radius*.

Be	Mg

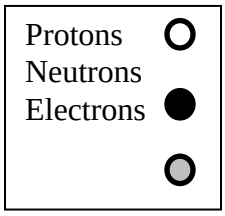
5. Using table S, record the radius of Beryllium and Magnesium: _____ and _____.

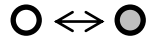
6. Provide a rule to explain the trend of Atomic radius in a group with respect to the number of protons, electrons, and energy levels in the atom.

IONIZATION ENERGY

Period Trend:

1. Draw the Bohr diagrams of Lithium and Fluorine using the key:



2. On your diagrams above, use an arrow to show the attraction of protons to electrons in the structure. For example: 
3. Which atom, lithium or fluorine, feels the most pull on its valence shell? Explain your answer.

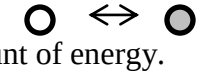
> Ionization Energy is defined as the energy needed to remove the most loosely bound valence electron from an atom.

4. For which atom, Lithium or fluorine, is it harder to remove its most loosely bound valence electron? Explain your answer.

5. Using table S, record the Ionization energies of Lithium and Fluorine: _____ and _____.
6. Describe the trend of ionization energies with in a period in terms of protons, electrons, and energy levels.

Group Trend:

7. Draw the Bohr diagrams of Beryllium and Magnesium using the key above.

8. On your diagrams above, use an arrow to show the attraction of protons to electrons in the structure. For example:  Use the same size arrows to denote that the pull of each proton is the same amount of energy.
9. Which atom, beryllium or magnesium, feels the most pull on its valence shell? Explain your answer.

10. For which atom, beryllium or magnesium, is it harder to remove its most loosely bound valence electron? Explain your answer.

11. Using table S, record the Ionization Energies of Beryllium and Magnesium: _____ and _____.

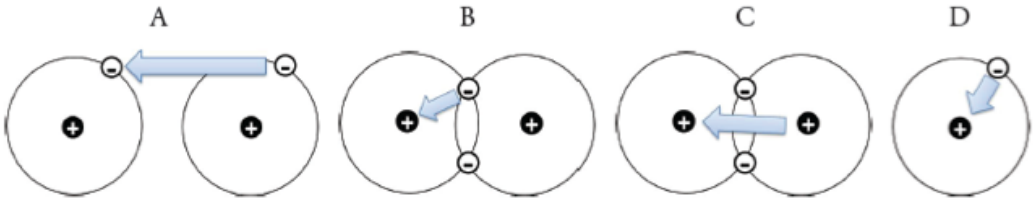
Describe the trend of ionization energies with in a group in terms of protons, electrons, and energy levels.

ELECTRONEGATIVITY

Period Trend:

Electronegativity is a measure of the ability of a atom's nucleus to attract electrons form a different atom within a shared (covalent) bond. A larger electronegativity value correlates to a stronger pull on the electrons in a bond. This value is only theoretical and cannot be measured in a lab setting.

1. Using the definition in the box above, select the best representation for electronegativity. Explain your choice.



2. What particle in the nucleus is responsible for attracting the electrons of another atom as described above?

3. Finish the statement: Fluorine has (more/less) protons than lithium and a (larger/smaller) electronegativity value because fluorine's nucleus has a (stronger/weaker) pull on new electrons than lithium.
4. Using table S, record the electronegativity values of Lithium and Fluorine: _____ and _____.
5. Describe the trend of electronegativity with in a period in terms of protons, electrons and energy levels.

Group Trend:

6. Magnesium has more protons than beryllium but a weaker pull on electrons. Draw Be and Mg Bohr diagrams with arrows to denote the pull of protons on electrons of a new atom. Use the diagrams to determine what other factor might make Magnesium's nucleus not pull as strong.

7. Using table S, record the electronegativity values of Beryllium and Magnesium: _____ and _____
8. Describe the trend of electronegativity with in a group in terms of protons, electrons and energy levels.

9. Describe why fluorine would have the highest electronegativity of all elements in terms of protons, electrons and energy levels.

Explain a possible reason why noble gases have no published electronegativity values based on your knowledge of noble gas properties.

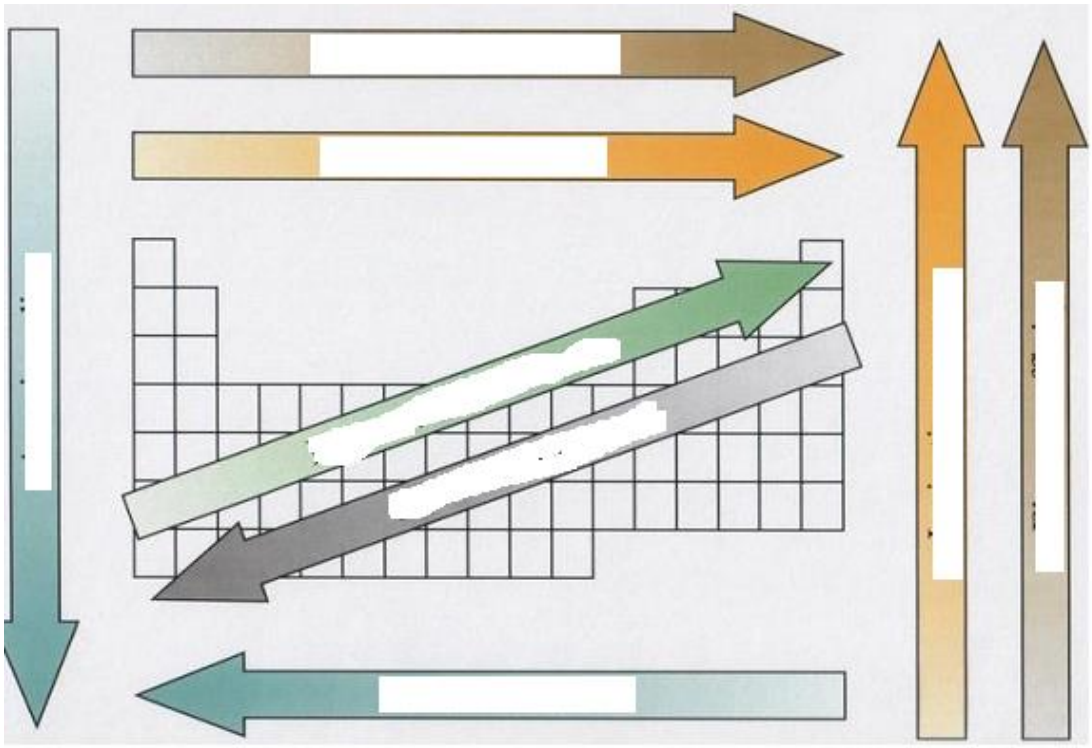
Lesson 3: Periodic Table Trends **Date:_____**

Objective:

- ***Describe the trend in atomic radius, ionization energy and electronegativity***
- ***Explain why this trend in atomic radius exists***

Check your understanding:

Fill in the trends



Practice

1. Complete the table below by checking the appropriate boxes.

	Across a Period →		**Down a Group ↓**	
	Increases	Decreases	Increases	Decreases
Atomic radius				
Metallic character				
Ionization energy				
Electronegativity				
Why?	**# of protons** (circle one) Increases or decreases		**# of electron shells** (circle one) Increases or decreases	

2. Complete the statements below by checking the correct ending.

		increases	**decreases**	**remains the same**
a.	**As the elements in a Period are considered from left to right, the number of valence electrons in each successive element…**			
b.	**As the elements in Group 17 are considered from top to bottom, the number of valence electrons in each successive element…**			
c.	**Going left to right across a Period, the number of electron shells…**			
d.	**As the elements in a Group are considered from top to bottom, the number of electron shells…**			
e.	**As the elements in Group 1 are considered from top to bottom, the reactivity of each successive element….**			
f.	**As the elements in Group 17 are considered from top to bottom, the reactivity of each successive element…**			

What you need to know……
Atomic Radius _____ across a period because
_____
Atomic Radius _____ down a group because
_____

What you need to know……
Ionization Energy _____ across a period because
_____
Ionization Energy _____ down a group because
_____

What you need to know……
Electronegativity _____ across a period because
_____
Electronegativity _____ down a group because
_____

ASSESS YOURSELF ON THIS LESSON: _____/14

If you missed more than 5, do the Additional Practice.

ADDITIONAL PRACTICE LESSON 3:

1. Using table S, record the radius of Lithium and Fluorine: _____ and _____.
2. As you go across a period the atomic radius _____ because there are more _____
3. Using table S, record the radius of Beryllium and Magnesium: _____ and _____.
4. As you go down a group the atomic radius _____ because there are more _____

Explain the following in terms of atomic structure:

1. Cesium has a *lower* first ionization energy than rubidium.

2. Bromine has a *lower* first ionization energy than chlorine.

3. Beryllium has a *higher* first ionization energy than lithium.

4. Calcium has a *higher* first ionization energy than potassium.

ASSESS YOURSELF ON THIS ADDITIONAL PRACTICE: _____/8

If you missed more than 1 you should see me for extra help and/or re-read the lesson

Lesson 4: Allotropes **Date:_____**

Objective:

- ***Describe allotropes***
- ***Explain how they are used in technology***

Check your understanding:

At STP, solid carbon can exist as graphite or as diamond. These two forms of carbon have

1. the same properties and the same crystal structures
2. the same properties and different crystal structures
3. different properties and the same crystal structures
4. different properties and different crystal structures

Practice:

Read the article "Tantalizing Tubes" from the June 2000 issue of *Scientific American*, and the table from the article "Nanotubes for Electronics" from the December 2000 issue of *Scientific American*. This will give you a good overview of carbon nanotubes, and a little information on their possible applications. When you are finished reading, think about, and then answer, the following questions using complete sentences on a separate piece of paper to be collected.

1. A report for *The Economist* stated, "The only industry the buckyball has really revolutionized is the generation of scientific papers." What did he mean by this statement?

2. Carbon nanotubes can either behave as metals (and conduct electricity) or as semi-conductors. What causes this difference in electrical conductivity?

3. What are two promising applications for carbon nanotubes that you find most interesting?

4. What are two limitations of the use of carbon nanotubes in technology and industry?

Unit Study Guide

Law, Theories, BIG ideas

Laws:

Theories:

BIG ideas:

Equations, Calculations, Reference Tables

Equation: (When to use & units)

Calculations (When to use)

Reference Table (Hints & tricks)

Helpful tips, sayings, shortcuts

Things I always forget…

Unit Project: Adopt an element **Due date:_____**

Requirements:

1) Complete an Adopt an Element information sheet. (60% of grade)
You may use a variety of reference sources. Possible ideas are encyclopedias (book or CD Rom), science encyclopedias, science catalogs, magazines, and/or Internet sites*. Information sheets must be neat, written in black ink, and contain all the information requested. You also need to provide a list of your sources on the back of your information sheet. A minimum of three sources are required.

2) Create an advertisement for your element. (40% of grade)
The advertisement must include the element's name, symbol, atomic number, atomic mass, cost, and an advertising slogan that describes one or more of its important uses. Advertisements must be neat, colorful, and contain all the information listed above. You may add pictures that relate to your advertisement theme.

Unit Review:

Periodic Table

Place a checkmark next to each item that you can do! If a sample problem is given, complete it as evidence.

_____1. I can still do everything from Unit 1.	
_____2. I can still do everything from Unit 2.	
_____3. I can still do everything from Unit 3.	
_____4. I can classify elements as metals, nonmetals, or metalloids based on their placement on the Periodic Table.	Classify each of the following elements as metals (M), nonmetals (NM), or metalloids (MTLD). _____B _____K _____Li _____C _____Ar _____Sb _____H _____Fe _____Au _____S _____F _____Si _____Fr _____He _____Rn _____Ge _____Al _____As _____Bi _____I
_____5. I can state the group names for elements in groups 1, 2, 17, and 18.	Group 1 is called the _____. Group 2 is called the _____. Group 17 is called the _____. Group 18 is called the _____.
_____6. I can explain why elements in the same group have similar chemical properties.	Elements in the same group have similar chemical properties because
_____7. I can explain why the elements in Group 18 don't usually react with other elements.	Elements in Group 18 don't usually react with other elements because
_____8. I can state the meaning of "STP" and the Reference Table on which it can be found.	STP stands for _____. The values can be found on Reference Table_____.
_____9. I can state the names/symbols for the two elements on the Periodic Table that are liquids at STP.	The two elements that are liquids at STP are: _____ and _____

_____10. I can state the names/symbols of the 11 elements that are gases at STP.	The 11 elements that are gases at STP are: _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, and _____
_____11. I can state how the elements on the Periodic Table are arranged.	The elements on the Periodic Table are arranged by increasing _____ _____.
_____12. I can list the 7 diatomic elements.	The seven diatomic elements are:
_____13. I can define electronegativity, first ionization energy, atomic radius, ionic radius, metallic character, and activity/reactivity.	**Definitions:** electronegativity first ionization energy atomic radius ionic radius metallic character activity/reactivity

_____14. I can state the periodic trend for electronegativity and explain why it occurs.	As one reads down a group from top to bottom, electronegativity _____ because _____ _____. As one reads across a period from left to right, electronegativity _____ because _____ _____.
_____17. I can state the periodic trend for first ionization energy and explain why it occurs.	As one reads down a group from top to bottom, first ionization energy _____ because _____ _____. As one reads across a period from left to right, , first ionization energy _____ because _____ _____.
_____15. I can state the periodic trend for atomic radius and explain why it occurs.	As one reads down a group from top to bottom, atomic radius _____ because _____ _____. As one reads across a period from left to right, atomic radius _____ because _____ _____.
_____16. I can state the periodic trend for metallic character and explain why it occurs.	As one reads down a group from top to bottom, metallic character _____ because _____ _____. As one reads across a period from left to right, metallic character _____ because _____ _____.

_____17. I can state the trend for melting points and boiling point for METALS as one reads down a group.	As one reads down a group from top to bottom, the melting points and boiling points for METALS _____.
_____18. I can state the trend for melting points and boiling point for NONMETALS as one reads down a group.	As one reads down a group from top to bottom, the melting points and boiling points for NONMETALS _____.
____19. I can state the trend for activity/reactivity for METALS as one reads down a group.	As one reads down a group from top to bottom, the activity/reactivity of METALS _____.
_____20. I can state the trend for activity/reactivity for NONMETALS as one reads down a group.	As one reads down a group from top to bottom, the activity/reactivity of NONMETALS _____.
_____21. I can explain how loss or gaining of electrons affects the radius of an element.	Metals tend to lose electrons (get oxidized). This loss of electrons causes cations to be _____ than the original atom. Nonmetals tend to gain electrons (get reduced). This gain of electrons causes anions to be _____ than the original atom.
_____22. I can list the properties of metals.	Properties of metals are:
_____23. I can list the properties of nonmetals.	Properties of nonmetals are: