Unit 9 – Weekly Agenda – Week 5 Quarter 3

Foundations Physical Science **Your Name:**_____

Weekly Learning Outcomes
-I can… 1. Identify what determines at atom's identity, charge, and mass. 2. Describe the development of the atomic model. 3. Distinguish between elements on the periodic table by their subatomic particles.

Date	*Activities*	*What's Due*
Monday 2/19	No School – President's Day	
	-Homework:	
Tuesday 2/20	-Review Atomic Theory Quiz -Coloring the Periodic Table (separate) -TAG Sheets (p. 1-4)	*- Week 4 work*
	Homework: Periodic Table coloring Questions (p. 5-6)	
Wednesday 2/21	- Bohr Model / Electron Cloud Notes (p. 7-9) -Writing electron configurations (p. 10-12)	*- Periodic Table coloring Questions* (p. 5-6)
	Homework: Electron configurations WS (p. 10-12)	
Thursday 2/22	-Review Electron configurations -Flame Test Lab (p. 13-15) *No conferences*	*-Electron Configuration Worksheet* (p. 10-12)
	Homework: TAG Sheets (p. 1-4)	
Friday 2/23	Quiz on Electron Configuration/Periodic Table -Finish TAG Sheets -Periodic Trends vocab (p. 16)	*-TAG Sheets* (p. 1-4)
	Homework: Flex	

TEST NEXT FRIDAY!

FPS - T.A.G. Sheet - Chapter 5

Name_____ Period_____

I can...
Describe how the periodic table is organized.

Section 5.1 - page 126-129	
Title of the Section _____ _____	Describe any image in the section.

1. How many elements had scientists discovered by 1750?

   _____

2. How did Mendeleev arrange the elements?

_____

_____

_____

_____

3. How did the discovery of new elements provide evidence for Mendeleev's table?

_____

_____

4. In general, how can a scientist test the usefulness of a model?

_____

_____

FPS - T.A.G. Sheet - Chapter 5

Name_____ Period_____

I can…

Section 5.2 – page 130-138	
Title of the Section _____ _____	Describe any image in the section.

5. What are the differences between periods and groups?

   _____

   _____

6. How many periods are there? How many groups?

   periods _____ *groups* _____

7. See page 132. How can you tell is an element is solid, liquid, or gas at room temperature?

_____

_____

8. How do you know if an element is not found in nature?

   _____

   _____

9. What is an atomic mass unit?

_____

_____

10. Atomic masses are averages. Describe a weighted average.

    _____

    _____

11. What are the three classifications of elements?

_____

_____

12. Give at least three properties of metals and two examples.

_____

_____

_____

13. Give at least three properties of nonmetals and two examples.

_____

_____

_____

14. What are metalloids and why do we call them that?

_____

_____

15. What changes across a period (from left to right)?

_____

_____

FPS - T.A.G. Sheet - Chapter 5

Name_____ Period_____

I can...
Consider scenarios when an atom gains or loses energy. *Discuss elements using their electron configurations.*

Section 5.3 – page 139-145	
Title of the Section _____ _____	Describe any image in the section.

16. What is a valence electron?

17. Describe the alkali metals and give one example.

18. Describe the alkaline-earth metals and give one example.

19. Discuss Carbon and its importance.

20. Discuss Oxygen and its importance.

21. Describe the halogens and give one example.

22. Describe the Noble gases and give one example.

Periodic Table Questions

Name_____ **Period**_____

Directions: Answer the questions with the proper information using your notes, book, and the periodic table.

1. Define a family. _____
2. What is a period? _____
3. What is the symbol for the following elements.
   a. Magnesium _____ b. Potassium _____
   c. Iron _____ d. Copper _____
4. What are the names of the following elements.
   a. C _____ b. Cl _____
   c. Au _____ d. Sr _____
5. What period are the following elements in?
   a. He _____ b. Ge _____
   c. Rb _____ d. I _____
6. What group are the following elements?
   a. Sulfur _____ b. Ca _____
   c. Iodine _____ d. Fe _____
7. Give me an atom with the following characteristics.
   a. Halogen _____ b. Nonmetal _____
   c. Alkali metal _____ d. Metalloid _____
   e. Lanthanide series _____ f. Alkaline Earth metal _____
   g. Transition metal _____ h. Noble gas _____

Periodic Table Questions

Name_____ **Period**_____

Directions: Use your Periodic table to complete the worksheet.

1. What is the atomic symbol for silver?

2. What is the atomic mass of mercury?

3. Ni is the symbol for what element?

4. The element that has the atomic number 17 is?

5. List the symbols for two transition metals.

6. Cu, Ag, and Au are all in what group #

7. Name two noble gases

8. Give the symbol for two halogens.

9. What is the symbol for element with atomic number 74?

10. What is the average atomic mass of copper?

11. What is the last element in period 4?

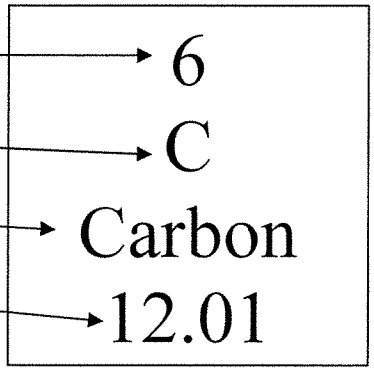
For questions 12 - 15, label the following Key box as it should appear on your periodic table

12. _____

13. _____

14. _____

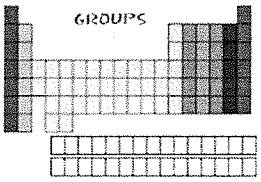
15. _____

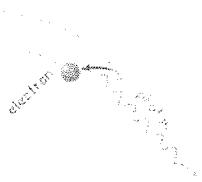


FPS – Electron Configuration Notes

Name_____ Period_____

I can…
Construct and interpret electron configuration.

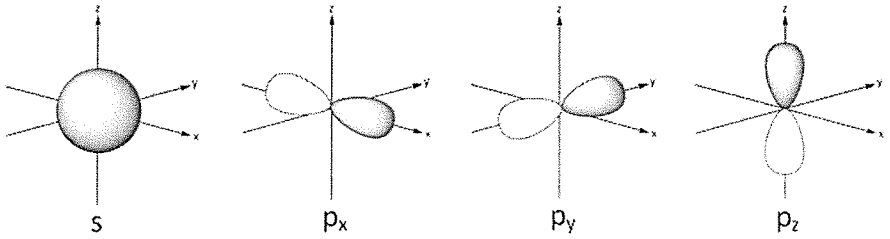
Bellwork Questions – Complete quietly on your own first!	
What do elements in groups or families have in common? 	

Notes
Remind me… • How is the periodic table organized? _____ • What is the ***period***? What does it tell you? _____
1. Electrons are found on _____. According to _____, they are not _____ levels.  2. To move to higher energy levels, electrons can _____-energy.
3. Electrons can _____ energy and _____ of light to move to _____energy levels. 
4. Instead of the Bohr the model, we now believe electrons are found in _____. We might call them _____.

5. _____ electrons can occupy each orbital. Each electron in the orbital _____ the opposite way.

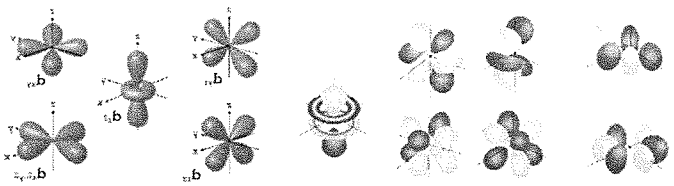
6. a. The simplest orbital is the _____. It can only hold _____. There is only ___ *s*-orbital per energy level.

   b. The second type is the _____. There are _____ *p*-orbitals per energy level, so they can hold _____.



   c. The next orbital is the _____. It can only hold ____. There are _____ *d*-orbitals per energy level, so they can hold _____.

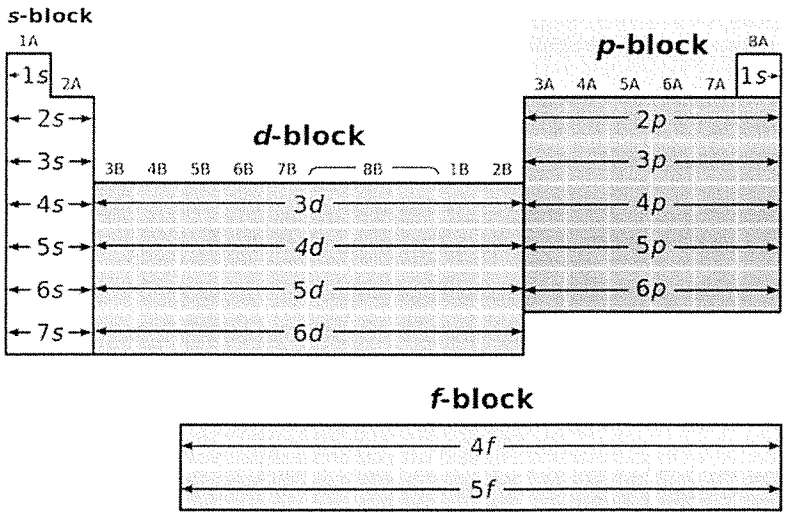
   d. The next orbital is the _____. There are ___ *f*-orbitals per energy level, so they can hold _____.



7. *Using the Periodic Table*

Horizontal rows – number of _____

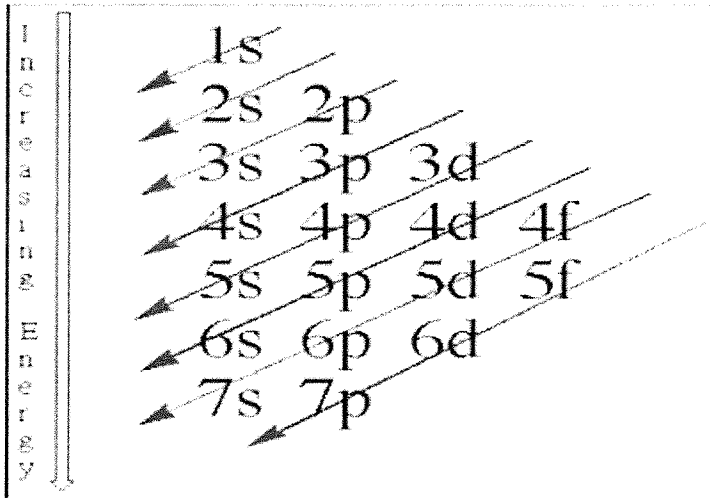
The "block" the element is in determines the _____ of the electron configuration



8. Let's try the first notation – spectroscopic notation!

9. Let's try the next notation – orbital diagrams!

10. This diagram might help.



11. Let's try…

Beryllium

Carbon

Neon

Potassium

Phosphorus

Which is $1s^2 2s^2 2p^6 3s^2 3p^6$?

1. When an electron falls from a higher energy level to a lower energy level, how is the energy released?

2. The further the electron is from the nucleus, the _____ energy the electron has.

3. A(n) _____ is often thought of as a region of space in which there is a high probability of finding an electron.

4. How are s orbitals different from p orbitals? _____

5. How many electrons can each of the following orbitals hold?
   a. 2s = _____ d. 6d = _____
   b. 3p = _____ e. 4p = _____
   c. 5f = _____ f. 3d = _____

6. How many "p" orbitals can there be in any energy level? _____

7. How many electrons are in each of the following orbitals?
   a. 4*p* _____ c. 4*f* _____
   b. 3*d* _____ d. 2*s* _____

8. Fill in the electron configurations for the elements given in the table. Use the orbital filling diagrams to complete the table.

Electron Configurations for Some Selected Elements

Element	Orbital filling: 1s	2s	$2p_x$	$2p_y$	$2p_z$	3s	Electron configuration
	↑						$1s^1$
He	↑↓						
	↑↓	↑					$1s^2 2s^1$
C	↑↓	↑↓	↑	↑			
	↑↓	↑↓	↑	↑	↑		$1s^2 2s^2 2p^3$
O	↑↓	↑↓	↑↓	↑	↑		
	↑↓	↑↓	↑↓	↑↓	↑		$1s^2 2s^2 2p^5$
Ne	↑↓	↑↓	↑↓	↑↓	↑↓		
	↑↓	↑↓	↑↓	↑↓	↑↓	↑	$1s^2 2s^2 2p^6 3s^1$

9. Which element has the following orbital diagram?

	1s	2s	2p	3s	3p	4s	3d	element (answer)
a	↑↓	↑↓	↑↓ ↑ ↑	↑↓				
b	↑↓	↑↓	↑↓ ↑↓ ↑	↑↓	↑			
c	↑↓	↑↓	↑↓ ↑↓ ↑↓	↑↓	↑↓ ↑ ↑	↑↓	↑	

10. Using arrows, show how the following orbitals will fill with electrons.

	Electron Configuration	1s	2s	2p			3s	3p			4s	3d				
Mg	$1s^2 2s^2 2p^6 3s^2$															
Cl	$1s^2 2s^2 2p^6 3s^2 3p^5$															
Si	$1s^2 2s^2 2p^6 3s^2 3p^2$															
Ti	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$															

11. Write the complete electron configuration for each atom on the blank line.

a. Lithium _____

b. Fluorine _____

c. Carbon _____

d. Argon _____

e. Sulfur _____

12. What elements are represented by each of the following electron configurations?

a. $1s^2\ 2s^2\ 2p^5$ _____

b. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$ _____

13. a. What are valence electrons?

_____

b. Explain how an atom's valence electron configuration determines its place on the periodic table.

c. List the number of valence electrons for the following atoms:

potassium = _____ magnesium = _____ carbon = _____ nitrogen = _____

14. Identify each element as a **metal**, **metalloid**, or **nonmetal**.

a. fluorine _____ d. phosphorus _____

b. germanium _____ e. lithium _____

c. zinc _____ f. oxygen _____

15. a. **Circle** the transition metals below.

magnesium titanium chromium mercury aluminum

b. Which block (s, p, d, or f) are the transition metals found? _____

16. Give **two** examples of elements for each category.

a. Noble gases _____

b. Halogens _____

c. Alkali metals _____

d. Alkaline earth metals _____

12

Flame Test Lab

Introduction:

The normal electron configuration of atoms or ions of an element is known as the "_____ _____." In this most stable energy state, all electrons are in the _____ energy levels available. When atoms or ions in the "ground state" are heated to high temperatures, some electrons may absorb enough energy to allow them to "jump" to higher energy levels. The element is then said to be in the "_____ state." This excited configuration is _____, and the electrons "fall" back to their normal positions of lower energy (ground state). As the electrons return to their normal levels, the energy that was absorbed is emitted in the form of _____ energy. Some of this energy may be in the form of visible light. The _____ of this light can be used as a means of identifying the elements involved. Such analysis is known as a flame test.

To do a flame test on a metallic element, the metal is first dissolved in a solution and the solution is then held in the hot, blue flame of a Bunsen burner. This test works well for metal ions, and was perfected by Robert Bunsen (1811 - 1899). Many metallic ions exhibit characteristic colors when vaporized in the burner flame.

Purpose:

The purpose is to observe the characteristic colors produced by certain metallic ions when vaporized in a flame and then to identify an unknown metallic ion by means of its flame test.

Materials:

Set of metal chloride solutions ($NaCl$, $CuCl_2$, KCl, $CaCl_2$, $SrCl_2$, $LiCl$, $CoCl_2$, $BaCl_2$)
Bunsen Burner
8 - 10 Wire rod
2 Unknown solutions (for each student)
Cobalt glass plates

Safety: Be sure to wear goggles and an apron at all times

Procedure:

1. Light the Bunsen burner and adjust it so that it has a hot blue flame. (This is already done for you. DO NOT REACH OVER THE BURNER. Do not reach ACROSS the table. The flame can reach 1,500 °C!!!!!)
2. Using a clean wire rod, dip it into one of the solutions until it is saturated and then hold the wire in the hottest part of the burner flame. Observe the color of the flame.

Carefully record your observations in the data table. ***Be accurate and detailed here*** - your description of the color must be accurate enough to distinguish this metal ion from the other ions tested. Some colors will appear similar to each other. Be observant.

3. Using a different wire rod for each of the other solutions, check the color of their flame tests. These will be at each station. Record your observations for each solution. When you examine the sodium and potassium ions, first look at their color alone, then test them again, looking through a ***Cobalt glass plate.***
4. When you have tested all the known solutions and can distinguish the color of each metal ion, go to the unknown solutions and determine which metal ions are present by performing a flame test and comparing this data to your previous data.

Name _____

Hour _____ Lab Station # _____

Data table:

Metal ion	Color of Flame
sodium	
lithium	
strontium	
calcium	
barium	
potassium	
copper	
cobalt	
Unknown # ____	
Unknown # ____	

Based on your observations, identify the two unknowns you examined:

Unknown # _____ is _____

Unknown # _____ is _____

Questions: *Use complete sentences to answer each of the following*:

1. State at least three problems that may be involved when using flame tests for identification purposes.

2. Which ions produce similar colors in the flame tests?

3. What purpose did the cobalt glass serve?

4. Explain **how** the colors observed in the flame tests are produced.

5. Draw Bohr models of Lithium, Sodium, Potassium, and Calcium.

6. Using your Bohr models to justify your conclusion, WHY do you think they differed in color?

Periodic Trends vocabulary

1. *Atomic Radius* →

   Examples:

2. *Ionization energy* →

   Examples:

3. *Electronegativity* →

   Examples:

4. *Reactivity* →

   Examples:

5. *Metallic character* →

   Examples: