Name: _____ Date: _____ Period: _____

Unit 3 : Atomic Structure and Periodic Properties Practice

Metals, Nonmetals, and Metalloids: Know where they are found on the periodic table

Type of Atom	Characteristics
Metal	
Nonmetal	
Metalloid	

THROWBACK TO UNIT 2: Complete the table below regarding states of matter.

States of Matter Characteristics				
	Particle Diagram (What it looks like)	**Motion (Relative Speed)**	**Shape and Volume**	**Density (High, Medium, Low)**
Solid				
Liquid				
Gas				

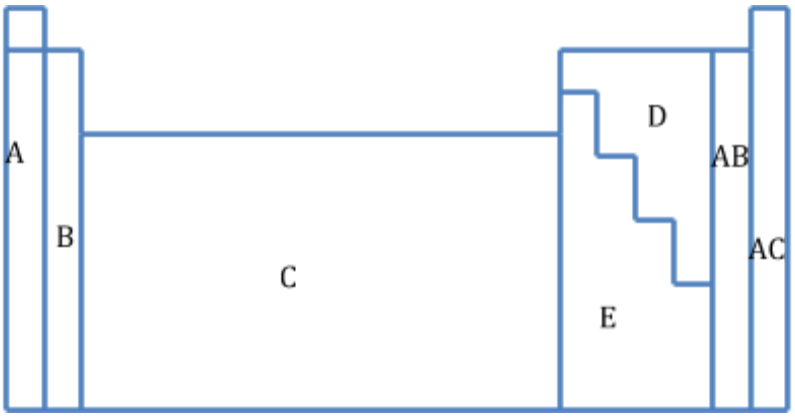
- In general, how are electrons arranged around the nucleus of an atom?

- What causes an atom to be **neutral**?

- **Convert**: 450 nm to meters

Using the table to the right, answer the questions below:

Which group has a predicted charge of 0?



An element from which group gains 1 electron when it forms its common ion?

Which group possesses the most reactive metals?

Which group(s) has/have metals that can form multiple charges?

How many **valence electrons** do the following elements have?

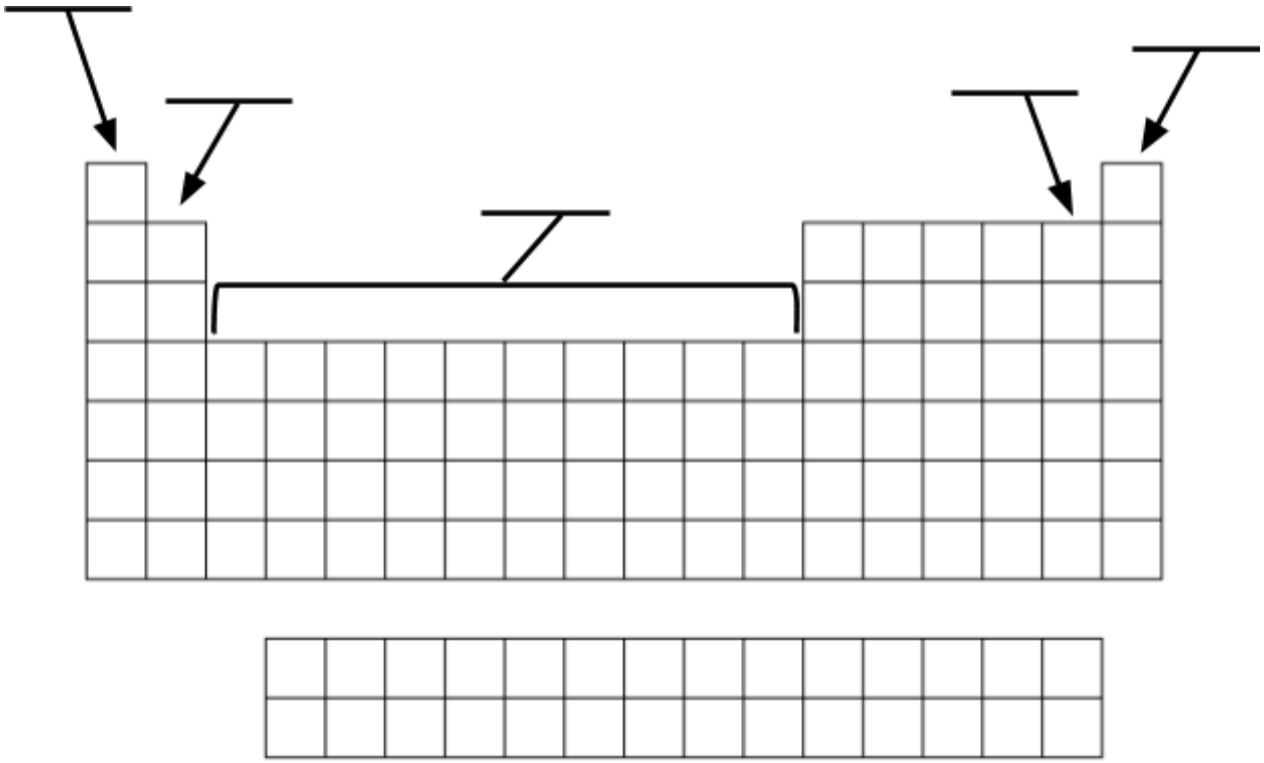
a. Oxygen (O) _____
b. Carbon (C) _____
c. Sodium (Na) _____
d. Bromine (Br) _____

Match the group of elements with the correct description of its **properties**:

1. Alkali Metals
2. Noble Gases
3. Alkaline Earth Metals
4. Halogens
5. Transition Metals

_____ Colorless gases; completely unreactive; 8 valence electrons
_____ Harder than Group 1 elements; very reactive; 2 valence electrons
_____ HIGHLY reactive; soft metals; 1 valence electron
_____ HIGHLY reactive; three gases, a liquid, and a solid; 7 valence electrons

Using the **answer choices in the question** above (1-5), label the **groups** of the periodic table below:



Parts of an Atom

1. Complete the table below.

Subatomic Particle	Charge	Relative Mass	Location in the Atom

2. Which subatomic particles are responsible for giving an atom its **mass**? Where are these particles located?

3. Look at how the periodic table is arranged. What **number** is used to determine the order of the elements? (What is it CALLED, not where is it located)

Atoms, Ions, and Isotopes

4. How does an atom become an **ion**?

5. Circle the correct choice to complete the sentences below.

   a. Sulfur must **(gain/lose)** electrons to become S^{-2}. S^{-2} is an example of a **(cation/anion)**.

   b. Calcium must **(gain/lose)** electrons to become Ca^{+2}. Ca^{+2} is an example of a **(cation/anion)**.

   c. If an two atoms of the same element have different masses, then they are called **(isotopes/ ions/atoms)** and they have different numbers of **(protons/neutrons/electrons)**.

6. Determine the **mass number** of an atom with 9 protons, 12 neutrons, and 9 electrons. Write the **isotopic symbol** for this atom.

7. Explain the difference between **mass number** and **average atomic mass**.

8. Identify each number in the **isotope symbol** below. How many protons, neutrons, and electrons are present?

$$^{36}_{17}Cl^{1-}$$

13. In the flame test lab, what determined the **color** of the flame?

14. Why don't elements in group 18 form ions?

9. Predict the **charge** **(you will NOT have your colored periodic table on the test)** of each ion and complete the table below.

Element	Symbol	# Protons	# Electrons	# Valence Electrons	Charge of Common Ion Formed	Cation/Anion?
Lithium						
Chlorine						
Phosphorus						
Calcium						
Aluminum						

15. Draw and label an atom undergoing **absorption** and **emission** of energy and display what can happen to one of its electrons as this happens. Label the **ground** and **excited** states of the electron. Then, list each of the steps in chronological order.

16. A student hypothesizes that feeding an adult goldfish more than once a day will make it grow larger. He keeps three adult goldfish in separate 40-liter tanks at 20°C for four weeks. He feeds the first goldfish once a day, the second goldfish twice a day, and the third goldfish three times a day.

    In this experiment:

    - What was the **independent** variable? _____
    - What was the **dependent** variable? _____
    - What is one variable that was kept **constant**? _____
    - If the data at the end of his experiment were graphed, would you use a bar graph or a line graph? Explain why:

17. Why might noble gases be used in reaction chambers where chemicals could combust (burn)?

18. What is the ONLY situation where an atom could change its atomic number (number of protons)?