**FPS – Reactions Chapter 7 - Unit 11 Review**

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period\_\_\_\_\_\_\_\_\_\_

1. ***Definiti***
2. Define and give the “formulaic” pattern for each type of reaction.
	1. Synthesis
	2. Decomposition

* 1. Single displacement
	2. Double displacement
	3. Combustion
1. Describe many observations that can be made when a chemical reaction is occurring.

1. What is a precipitate?
2. List AND define the parts of a chemical equation.
3. Define the Law of conservation of mass.
4. Why do we balance chemical equations?
5. Why can’t you change the subscripts of a chemical equation when balancing?
6. What is the rate of a reaction? What are the four factors that can affect the rate of a reaction?
7. What is activation energy?
8. Why doesn’t a reaction last forever and constantly increase its rate?
9. How and WHY does temperature affect the rate of reaction?
10. How and WHY does increased surface area speed up the rate of reaction?
11. How and WHY does increased concentration speed up the rate of reaction?
12. How and WHY does using a catalyst speed up the rate of reaction?
13. What three catalysts are commonly used in industry? Why are catalysts important?
14. What is the difference between endothermic and exothermic reactions? How can we tell in the lab?
15. ***Application***
16. How is the modern periodic table of element arranged?
Increasing atomic number
17. Assuming the atom is neutral, what does the atomic number tell you?
Number of protons and (if neutral) number of electrons
18. Label the following periodic table square for argon.


element name

atomic number

chemical symbol

average atomic mass

1. What is a period? What does a period on the periodic table indicate about an element?
Period = row (horizontal). Tells us the number of energy levels
2. What is a group/family? What does a group/family on the periodic table indicate about an element?
Group/family = column (vertical) Tells the number of valence electrons (excluding the transition metals)
3. What do valence electrons indicate about an element?
Properties, Reactivity and Bonding
4. What is an ion? What do we call a positive and negative ion?
An ion is an atom that has become charged due to a transfer of valence electrons to become stable. Cation = “paws”itive and anion= negative
5. What is the octet rule? What are the exceptions?
States that in order to most stable, an atom must have 8 valence electrons in the outer shell. Hydrogen and helium are the exceptions.
6. What does the mass number tell you? What are isotopes?
Mass number = number of protons + number of neutrons

Isotopes are atoms that has differing number of neutrons

1. In nuclear notation, write the isotopes magnesium-24, magnesium-25, and magnesium-26.


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1. What is the average atomic mass of Boron if it exists as 19.90% 10B and 80.10% 11B?
= 10.801 amu
2. Magnesium has three naturally occurring isotopes. 78.70% of Magnesium atoms exist as
Magnesium-24, 10.03% exist as Magnesium-25 and 11.17% exist as Magnesium-26. What is the average atomic mass of Magnesium?
=24.2997 amu
3. ***Element Categories***
4. Describe properties of the alkali metals and give an example.
Highly reactive, do not occur in nature, one valence electron. Ex: Li, Na
5. Describe properties of the alkaline-earth metals and give an example.
Highly reactive, do not occur in nature, two valence electrons Ex: Mg, Be
6. Describe properties of the transition metals and give an example.
Metallic properties (shiny, malleable) and do not fill inner shells consistently Ex: Cu, Co, Au
7. Describe properties of the metalloids and give an example.
Sometimes conductive at very high temperatures due to some metallic and nonmetallic properties. Ex: Si, B
8. Describe properties of the halogens and give an example.
Highly reactive, vary in state of matter, 7 valence electrons Ex: F, Cl
9. Describe properties of the noble gases and give an example.
Very unreactive (inert) with 8 valence electrons. all in gaseous states Ex.: Ne, He, Ar
10. What happens to metallic properties as you move from left to right on the periodic table?
Become less metallic, solid to gas
11. What happens to reactivity as you down a group on the periodic table?
Typically increases
12. WHY do the alkali metals become more reactive down the group?
valence electron becomes further away due to atomic size and can be lost easier
13. WHY do the halogens become more reactive up the group?

Valence electrons are closer to the nucleus at the top of the group (ex.: F) and therefore can more easily and violently attract another electron. Due to the Law of Charges

1. ***Electron Configurations***
2. What are the 4 types of orbitals? How many electrons can each of them hold?
s, p, d, f

s = 2 electrons p= with 3 at each energy level, holds 6 electrons total
d= with 5 at each energy level, holds 10 electrons total
f= with 7 at each energy level, holds 14 electrons total

1. Write the complete electron configuration for the following elements:
	1. Potassium \_\_\_\_1s22s22p63s23p64s1
	2. Lithium \_\_\_\_\_\_\_1s22s1\_\_\_\_\_\_\_\_\_\_\_\_
	3. Aluminum \_\_\_\_\_\_1s22s22p63s23p1\_\_\_\_\_\_\_\_\_\_\_
	4. Carbon \_\_\_\_\_\_\_1s22s22p2\_\_\_\_\_\_\_
	5. Nitrogen \_\_\_\_\_\_\_1s22s22p3\_\_\_\_\_\_\_\_\_\_\_\_
	6. Argon \_\_\_\_\_\_\_\_\_1s22s22p63s23p6\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Write the electron configurations for the following ***ions.*** Remember, if an ion is positive, it has lost electrons. If an ion is negative, it has gained electrons.
	1. Be2+ \_\_\_\_\_\_\_1s2\_\_\_\_\_\_\_\_\_\_
	2. B3+ \_\_\_\_\_\_\_1s2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. Cl1= \_\_\_\_\_\_1s22s22p63s23p6\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	4. O2= \_\_\_\_1s22s22p6\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Identify the errors in the following electron configurations. If there is no error, write “none”.
	1. 1s22s32p2 \_s orbitals only hold 2 electrons
	2. 1s22s22p63s24s1 \_\_\_\_\_\_3p orbitals were not filled before moving to 4s\_\_\_\_\_\_\_\_
	3. 1s22s22p83s1 \_\_\_\_\_\_\_p orbitals only hold 6 electrons\_\_\_\_\_\_\_\_\_
4. Write the electron configuration for the following orbital diagrams. Then, identify the element.
	1. 1s22s22p63s23p4  ; sulfur
	2. 1s22s22p6 ; neon
	3. 1s22s22p1 ; Boron

Use your periodic table and the images and formulas below as reference.

  