

Name: _____ Period: _____ Date: _____

PERIODIC TABLE NOTES HONORS CHEMISTRY

Directions: This packet will serve as your notes for this chapter. Follow along with the PowerPoint presentation and fill in the missing information. Important terms / ideas are in all capitals and bolded!

- Organizing the Elements

-Chemists needed a way to _____ all the elements and those yet to be _____

-DOBEREINER (1829) grouped elements into _____, three _____ with similar _____

-NEWLANDS (1865) arranged elements in order of increasing _____ (properties repeated every _____ elements... "LAW OF OCTAVES")

- The First Periodic Table

- _____ (1869) published the first Periodic Table

-Arranged elements in order of _____ and similar _____

-Left spaces for _____ elements AND _____ the _____ using his table

***THE DISCOVERY OF _____ AND _____ HELPED CONVINCING SCIENTISTS OF THE _____ OF HIS TABLE... _____ PROPERTIES MATCHED THE _____ PROPERTIES!!**

- Problems with the Table

-Mendeleev thought some of the atomic masses were _____ so he broke his rules (placed _____ before _____ due to _____)

-Atomic _____ were not wrong... he just did not know yet that each element had a _____ number of _____!

- PERIODIC LAW:**

-MOSELEY (1913) developed the _____ Periodic Table

-Arranged elements in order of increasing _____

- Reading the Table

-PERIOD:

-GROUP:

*Three _____ of elements on the Periodic Table...

- **METALS:**

-About _____ of elements are in this class

-High _____ (shiny)

-Good _____ of heat and electricity

-Typically _____ at room temperature (except _____)

-DUCTILE:

-MALLEABLE:

-High _____ and _____

-Form _____ (+)

-Ex:

- **NONMETALS:**

-No _____

-_____ of heat and electricity

-Most (not all) are _____ at room temp

-Low _____ and _____

-_____ malleable or ductile

-_____

-Tend to form _____ (-)

-Ex:

- **METALLOIDS:**

-Have properties of both _____ and _____

-Ex:

-Ion formation depends on their _____

- Classifying the Elements

-Elements can be _____ into one of _____ different classifications:

- 1) **REPRESENTATIVE ELEMENTS** → Groups ____ to ____ (s and p orbitals are highest _____ but not _____)... Wide range of _____
- 2) **TRANSITION METALS** → _____ of table (electrons in ____ orbital)
- 3) **INNER TRANSITION METALS** → Two rows " _____ " (electrons in the ____ orbital)... **RARE EARTH METALS**
- 4) **NOBLE GASES** → Group ____ (p orbital and highest energy level _____)

- Representative Elements (Main Group Elements)

-**ALKALI METALS:**

-**ALKALINE EARTH METALS:**

-**Boron Group:**

-**Carbon Group:**

-**Nitrogen Group:**

-**Oxygen Group:**

-**HALOGENS:**

- Transition Metals

-Groups _____ / ____ sublevel

-Charges _____ (+)

- Inner Transition Metals

- _____ and _____ series / ____ sublevel

- " _____ "

- **NOBLE GASES:**

- Why Are Families Similar?

Each family has the _____ number of **VALENCE ELECTRONS** (_____) which determines an element's _____... All want _____ !!

- IONS:**

-Atoms in their elemental state are _____ (protons and electrons are _____)

-Atoms can _____ or _____ electrons giving them a _____

-Ions have _____ number of protons and electrons

- CATIONS:**

-Atoms that _____ electrons become cations (loss of _____ charged particles)

-Formed from _____

-_____ of electrons _____ determines the _____ (1+, 2+, etc.)

-Ex:

- ANIONS:**

-Atoms that _____ electrons become anions (more _____ charged particles)

-Formed from _____

-_____ of electrons _____ determines the _____ (1-, 2-, etc.)

-Ex:

- Charge Formation**

-Think of it like _____...

LOSING electrons is _____!

GAINING electrons is _____!

- What Determines the Charge?**

-_____ on the Periodic Table and _____!!

-Atoms want _____ electrons in their outer or highest energy level to be stable... They want to be like a _____! So they **GAIN** or **LOSE** electrons to accomplish this... Whichever is _____!!!!

H ¹																	He ²
Li ³	Be ⁴	<ul style="list-style-type: none"> ■ hydrogen ■ alkali metals ■ alkali earth metals ■ transition metals ■ poor metals ■ nonmetals ■ noble gases ■ rare earth metals 										B ⁵	C ⁶	N ⁷	O ⁸	F ⁹	Ne ¹⁰
Na ¹¹	Mg ¹²											Al ¹³	Si ¹⁴	P ¹⁵	S ¹⁶	Cl ¹⁷	Ar ¹⁸
K ¹⁹	Ca ²⁰	Sc ²¹	Ti ²²	V ²³	Cr ²⁴	Mn ²⁵	Fe ²⁶	Co ²⁷	Ni ²⁸	Cu ²⁹	Zn ³⁰	Ga ³¹	Ge ³²	As ³³	Se ³⁴	Br ³⁵	Kr ³⁶
Rb ³⁷	Sr ³⁸	Y ³⁹	Zr ⁴⁰	Nb ⁴¹	Mo ⁴²	Tc ⁴³	Ru ⁴⁴	Rh ⁴⁵	Pd ⁴⁶	Ag ⁴⁷	Cd ⁴⁸	In ⁴⁹	Sn ⁵⁰	Sb ⁵¹	Te ⁵²	I ⁵³	Xe ⁵⁴
Cs ⁵⁵	Ba ⁵⁶	La ⁵⁷	Hf ⁷²	Ta ⁷³	W ⁷⁴	Re ⁷⁵	Os ⁷⁶	Ir ⁷⁷	Pt ⁷⁸	Au ⁷⁹	Hg ⁸⁰	Tl ⁸¹	Pb ⁸²	Bi ⁸³	Po ⁸⁴	At ⁸⁵	Rn ⁸⁶
Fr ⁸⁷	Ra ⁸⁸	Ac ⁸⁹	Unq ¹⁰⁴	Unp ¹⁰⁵	Unh ¹⁰⁶	Uns ¹⁰⁷	Uno ¹⁰⁸	Une ¹⁰⁹	Uun ¹¹⁰								

- Practice

-Determine if each of the following is a **cation** or **anion** and give the charge it forms:

a) _____:

b) _____:

c) _____:

d) _____:

- Periodic Trends

-Since the Periodic Table groups elements by similar _____, certain _____ can also be seen when the table is analyzed

-These trends can have similarities as you go across a _____ or down a _____...

- Factors Influencing Trends

1) **Electron Energy Level:**

2) **Nuclear Charge:**

3) **SHIELDING EFFECT:**

- **ATOMIC RADIUS:**

-Trend: _____ down a column and _____ going across a row

-WHY DOES IT FOLLOW THIS TREND?

- Group: As you go down a column, the number of _____ and _____ increase... so the radius _____!
- Row: As you go across a row, all e- are in the same _____ and the nuclear charge gets _____, causing the outer e- to be held _____... so it _____!

- **IONIC RADIUS:**

-Trend: _____ down a column and _____ going across a row for cations and anions, but cations are _____ and anions are _____

- Group: As you go down a column, the number of _____ and _____ increase... so the radius _____!

- Row: Cations are _____ because as e- are _____ nuclear charge increases and holds tighter, while anions are _____ because as e- are _____ nuclear charge decreases and does not hold as tight... but each type still _____ as go across!

- **IONIZATION ENERGY:**

-Trend: _____ down a column and _____ going across a row

-WHY DOES IT FOLLOW THIS TREND?

- Group: As you go down a column, _____ energy levels are added and the valence e- are more " _____ " from the pull of the nucleus, making it _____ to remove an e-... so it _____!
- Row: As you go across a row, the nuclear charge gets _____ (holds e- tighter) and the orbital gets closer to being _____ which adds _____, making it _____ to remove an e-... so it _____!

-Watch for EXCEPTIONS like _____, _____, etc.... WHY do they occur?: (answer)

-To remove a second e-, even _____ energy is required (gets _____ to steal) so Ionization Energy _____ with each electron removed!

- **ELECTRONEGATIVITY:**

-Trend: _____ down a column and _____ going across a row

-WHY DOES IT FOLLOW THIS TREND?

- Group: As you go down a column, more _____ are added, making the valence e- _____ from the nucleus and not held as " _____ " due to shielding... so it _____!
- Row: As you go across a row, the nuclear charge _____, making it easier to attract e- to the atom... so it _____!

- **ELECTRON AFFINITY:**

-Trend: _____ down a column and _____ going across a row

-WHY DOES IT FOLLOW THIS TREND?

- Think in terms of _____... the _____ the attraction to an e-, the more _____ is released!

- Metallic / Reactivity

-As you go down a group of METALS, the metallic character and reactivity of the metals

-As you go down the HALOGENS, the reactivity _____! Therefore, the most reactive element in the halogen family is _____!!

- Practice

-Which has the **GREATER atomic size**?

-Which has a **LOWER ionization energy**?

-Which has a **HIGHER electronegativity**?

-Which has **LESS shielding**?

-Which is **MORE reactive**?

SUMMARY OF PERIODIC TRENDS

