

1 ☐ *ATOMIC STRUCTURE*

- SUBATOMATIC PARTS: PROTON, NEUTRON, ELECTRON

2 ☐ *Elements*

- Everything made of atoms
- Elements are made of only one kind of atom
- Combine through bonding
- Bond (attraction holds together)

3 ☐ *PROTON*

- + CHARGE
- ON NUCLEUS
- MASS = 1 AMU (ATOMIC MASS UNIT)
- ATOMIC NUMBER GIVES # OF PROTONS

4 ☐ *NEUTRONS*

- NO CHARGE
- ON NUCLEUS
- 1 AMU

5 ☐ *ELECTRONS*

- - CHARGE
- IN ELECTRON CLOUD AROUND NUCLEUS (ALSO CALLED SHELLS, ORBITALS, ENERGY LEVELS(very tiny)
– EACH LEVEL CAN HOLD FIXED AMOUNT

6 ☐ *ELECTRON LEVELS*

- **THE 2-8-8 Rule:**
- 1st level: 2 = full
- 2nd level: 8 = full
- 3rd level: 8 = full

- After element 18 3rd may change to 18
- Valence electrons: # in outermost level: determines bonding
- THE FULLER THE HAPPIER!

7 ☐ *VALENCE ELECTRONS*

8 ☐ *EXAMPLES*

9 ☐ *ATOMIC NUMBER*

- # OF PROTONS ON NUCLEUS
 - THIS DETERMINES ELEMENT
 - ISOTOPES: SAME ELEMENTS WITH DIFF. NEUTRONS

10 ☐ *Periodic Table*

- Columns: 18 families with similar but not identical properties (same # valence electrons)
- Rows: Periods (change greatly from left to right)
 - Less metallic
 - Greater atomic size
 - Less reactive (valence E)

11 ☐ *Chemical Bonding*

- Combining of elements to form new substances
- Atoms will gain, lose, or share valence electrons to bond (stable with full valence electron levels)

12 ☐ *Atoms are Neutral*

- No electric charge
- Remember: +protons on the nucleus attract and = the - electrons in the electron cloud.

13 ☐ *Ionic bonding*

- Ions - charged atoms due to gaining or losing electrons during bonding
- Ionic Bonding: when atoms are transferred (1 loses, 1 gains)

14 ☐ *Ionic Bonding Continued*

- Atoms gain electrons = -
- Atoms lose electrons = +

- Ionization energy: how much needed to remove

15 ☐ *Ionization Energy*

- # of valence electrons = I.E.

Which families would have low I.E.?

16 ☐ *Electron Affinity*

- Tendency of atoms to gain electrons during bonding.
- Which groups or families would have high electron affinity?

17 ☐ *Ionic Compounds*

- Are neutral
- Form crystal lattice
- Strong regularly repeating pattern
- Definite crystal shapes

18 ☐ *Ionic Bonding*

19 ☐ *Covalent Bonding*

- Between atoms with high ionization energy and high electron affinity
- Don't lose easily so they SHARE electrons

20 ☐ *Covalent Bonds*

- Diatomic elements (2 like atoms such as O₂ and H₂)
- Form molecules
- Formulas show exact #atoms per molecule
- Electron Dot Diagrams

21 ☐ *Metallic Bonding*

- Sea of electrons
- Share electrons in a common bond forming freely flowing electrons surrounding the +nuclei
- High melting & boiling points, good conductors, malleable, ductile