

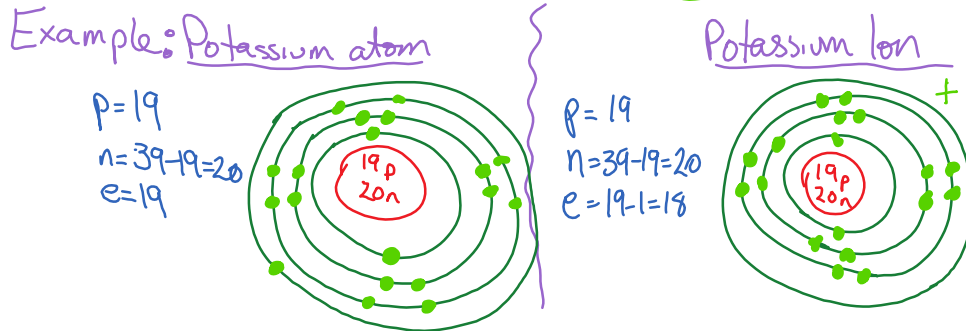
Chem Exam Review

Thursday, June 14, 2018 8:30 AM

Chemistry In Action

- Lab Safety Material:
 - Safe-lab practices
 - Lab safety scenarios
 - Situational, not the symbols
- Periodic Table
 - Group/Family Names and similarities
 - Coloured on your PT
 - (You can take your green PT in to the exam!)
 - Groups are the columns
 - Similarities: they react the same because they have the same number of valence electrons
 - Period numbers and similarities
 - The rows
 - They have the same number of electron shells/orbits
 - Be able to identify: proton number, electron number, neutron number, ion charge, combining capacity, valence electrons, etc.
 - Protons = atomic number
 - Electrons = protons (in neutral atom)
 - Neutrons = atomic mass subtract atomic number
 - Ion charge = combining capacity = top right corner
 - The charge the atom will be when it loses/gains electrons
 - Valence electrons = electrons on outermost electron shell
 - See the roman numerals, or count from left to right
- Subatomic particles
 - Know the differences between protons, electrons, and neutrons
 - Proton - positive, in nucleus, 1 amu (atomic mass unit)
 - Neutrons - neutral, in nucleus, 1 amu
 - Electrons - negative, around the nucleus, no mass
- Atom
 - Know the differences and be able to identify metals, metalloids, and non-metals
 - Metals - left side of staircase
 - Shiny, malleable, conductors
 - Metalloid - directly above and below the staircase (exception: aluminum)
 - Non-metals - to the right of the staircase (include the chalcogens, halogens, and noble gasses)
 - Dull, brittle, don't conduct
 - Be able to identify what type of ion an atom will become (cation or anion)
 - Cation - positive ions
 - Lost electrons
 - Metals (on the left) become cations because it's easier to lose one or two or three electrons than gain more
 - "cats have paws"
 - Anion - negative ions

- Gained electrons
 - Non-metals (on the right) become anion because it's easier to gain one or two or three than to lose more.
 - "anion looks like onions which make you cry (bad)"
 - Be able to draw Bohr Diagrams and Electron Dot Diagrams of atoms
 - Bohr:
 - Step 1: determine number of protons, neutrons, electrons
 - Step 2: draw nucleus and put protons and neutrons in
 - Step 3: look at period number to determine number of electron shells
 - Step 4: place the correct number of electrons on each shell (2, 8, 8 unless it's an ion...then add charge if ion)



- Electron dot diagram
 - Step 1: write symbol
 - Step 2: draw valence electrons around
 - Be on the 4 sides (like a square) and you need one on each side before doubling



• Bonding

- Know the differences and similarities between ionic and covalent bonds
 - See past venn diagram
 - **Ionic bonds** (need ions)
 - Between metal and a non-metal (cation and anion)
 - Transfer (give/take) of electrons to get ion charges
 - Opposite charges attract and hold elements together
 - **Covalent bonds**
 - Between two or more non-metals
 - Sharing electrons to gain a full valence shell
 - Sharing that holds the elements together
 - Similarities between the two:
 - The goal of elements is a full valence shell (octet rule)
 - Both form compounds

• Compounds

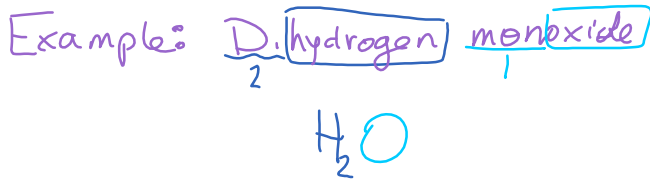
- Be able to identify whether a compound is ionic or covalent
 - Metal and non-metal = ionic

- 2 non-metals = covalent
- Know the differences and similarities between ionic and covalent compounds
 - See above for general
 - Naming and writing formulas are different...see below
- Be able to write the formula for a compound based on its name
 - Ionic compounds
 - CRISS-CROSS method!
 - Step 1: write the ions with their charge
 - Step 2: cross the charges to be opposite subscripts
 - Step 3: reduce if necessary

Examples → aluminum oxide



- Covalent
 - Look at the prefixes in name, and add as subscripts to corresponding elements



- Be able to write the name of a compound based on its formula
 - Ionic

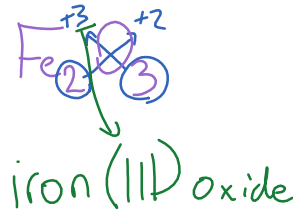
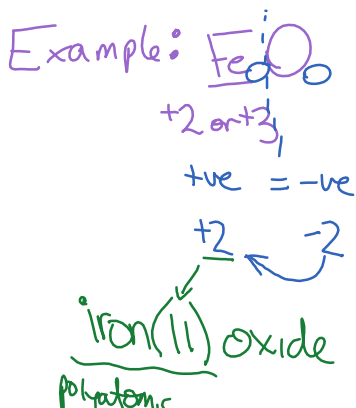
- Step 1: write the name of the metal first
- Step 2: write the name of the non-metal, but change the ending to "-ide"



*if other endings are use, see polyatomic ion sheet!

Sodium sulfur → sodium sulfide

- Multi-valent metals
 - More than one charge possible for metal



Iron(II) oxide
polyatomic ion sheet

- Polyatomic ion
 - Go to polyatomic ion sheet if we notice more than one non-metal or if we have a name not ending in "-ide"

Example: NaOH
Sodium hydroxide
more than one non-metal *look at polyatomic ion sheet

- Covalent
 - Simply write the prefix to show the subscripts
 - **do not write mono on the first one

Example's CO₂
Carbon dioxide
no mono

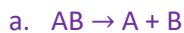
• Chemical reactions

- Describe and identify the 5 different chemical reactions

1. Synthesis



2. Decomposition



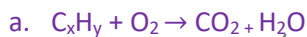
3. Single Replacement/Displacement



4. Double Replacement/Displacement



5. Combustion



hydrocarbon (any number of C & H)
oxygen carbon dioxide water

} usually with ionic compounds

- Be able to balance chemical equations

- Step 1: count the atoms on each side of the equation
- Step 2: Find a problem (element not balanced)
- Step 3: Fix the problem with a coefficient
- Step 4: Recount, and repeat Steps 2-4 until there is no more problems.
**the coefficients should be in lowest terms (the smallest possible multiples)

• Acids and bases

- Know all the differences between acids and bases

<u>Acid</u>	<u>Base</u>
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Sour taste	Bitter taste
Corrosive	Corrosive
Low pH (7-1)	High pH (7-14)
Electrical current passes through	Electrical current passes through
Reacts with metals	Don't react with metals
Neutralizes bases	Neutralizes acids
Turns litmus paper red	Turn litmus blue (Base = blue)
	Slippery
Release H ⁺ ions	Release OH ⁻ ions
Examples: lemon juice, vinegar, hydrochloric acid	Examples: bleach, ammonia, cleaning products

- Know different ways in which you could identify any
 - Indicators
 - Litmus paper: acid is red, base is blue.
 - Red litmus: stays red with acid, turns blue with base
 - Blue litmus: stays blue with base, turns red with acid
 - ***what happens if both red litmus and blue litmus maintain their colour? (blue stays blue, red stays red)
 - ◆ Neutral substances won't cause a change in either
 - Phenothalein
 - Colourless liquid
 - ◆ Colourless with acid
 - ◆ Pink with base
- Neutralization reactions:
 - Acid + base → salt + water
 - The acid cancels out the bases properties, vice versa