Chemistry 11

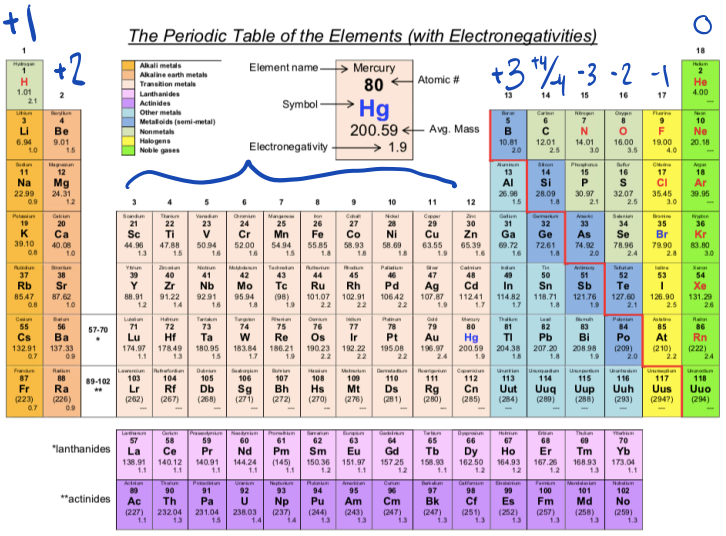
Science 10 Review Notes

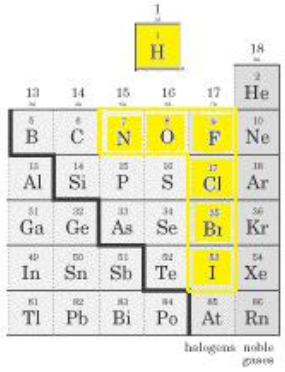
Name:
Date:
Block:

Periodic Table Tips!

Charges for…

- Group 1 (Alkali Metals): +1
- Group 2 (Alkaline Earth Metals): +2
- Groups 3-12 (Transition Metals): Most of these are Multivalent.
  You can tell what the charge is by looking at the name or formula of the compound.
- Group 13: +3
- Group 14: +4 or -4
- Group 15: -3
- Group 16: -2
- Group 17 (Halogens): -1
- Group 18 (Noble Gases): 0





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Diatomic Molecules

- "H-7 Rule" or "Rule of 7"
  (H_2, N_2, O_2, F_2, Cl_2, Br_2, I_2)
- Also: P_4, S_8

Naming…

1. **Ionic Compounds (metal & non-metal)**
   - Write the name of the Metal first
   - Write the name of the non-metal second and change the ending to -ide
   - If the metal has more than one charge (ie. transition metals), include a roman numeral to indicate which one it is
   - When naming ionic compounds with polyatomic ions, pretend the polyatomic ion is just one atom and following the same rules Don't change the ending
   - Examples:
     - MgF_2 Magnesium fluoride
     - $CuCl_2$ Copper (II) chloride (transition metal!)
     - K_3PO_4 potassium phosphate (Polyatomic)

Cu +2 Cl -1
Cl -1
+2 -2
0

2. **Covalent Compounds (2 non-metals)**
   - Write the name of the first non-metal
   - Write the name of the second non-metal and change the ending to -ide
   - Use numerical prefixes to express how many of each non-metal are present
     - goes before the name
     - You do not use a prefix when there is only one of the first non-metal
   - Examples:
     - SO_2 — do not use "mono" — sulfur dioxide
     - Si_3N_4 — trisilicon tetranitride

1	mono
2	di
3	tri
4	tetra
5	penta
6	hexa
7	hepta
8	octa
9	nona
10	deca

Formulas…

1. **Ionic Compounds**
   - Add subscripts so that the positive charges balance the negative charges ("drop and swap" or "criss-cross")
   - If the metal has more than one charge, the charge will be indicated by the roman numeral
   - When writing formulas of ionic compounds with polyatomic ions, pretend the polyatomic ion is just one atom and follow the same rules
   - Examples:
     - Magnesium phosphide — Mg^{2+} P^{3-} → Mg_3P_2
     - Iron (III) sulfide — Fe^{3+} S^{2-} → Fe_2S_3
     - Calcium carbonate — Ca^{2+} CO_3^{2-} → $Ca(CO_3)_2$ → $CaCO_3$

2. **Covalent Compounds**
   - The prefixes indicate how many of each non-metal are present
   - Examples:
     - Phosphorus trioxide — PO_3
     - Dinitrogen pentacarbide — N_2C_5

Acids, Bases & Salts

- Acids:
  - Formulas usually start with ___H -___
  - Example: HCl , HF , CH_3COOH
- Bases
  - Formulas usually end with ___- OH___
  - Example: NaOH , $Mg(OH)_2$
- Salts
  - Salts are ionic compounds (metal and non-metal)
  - Example: NaCl , LiBr

Types of Reactions

Type	General Formula	Example
1. Synthesis	A + B → AB	$2Na + Cl_2 \rightarrow 2NaCl$
2. Decomposition	AB → A + B	$2H_2O \rightarrow 2H_2 + O_2$
3. Single Replacement	A + BC → B + AC ↳ metal replaces metal nonmetal replaces nonmetal	$Br_2 + 2NaCl \rightarrow Cl_2 + 2NaBr$
4. Double Replacement	AB + CD → AD + CB	$2KI + Pb(NO_3)_2 \rightarrow 2KNO_3 + PbI_2$
5. Neutralization	acid + base → water + salt H-◯ ◯-OH → H_2O ◯	$HCl + NaOH \rightarrow H_2O + NaCl$
6. Combustion	hydrocarbon + O_2 → CO_2 + H_2O	$CH_4 + 2O_2 \rightarrow 2CO_2 + H_2O$

<u>Practice: Science 10 Review Worksheet</u>

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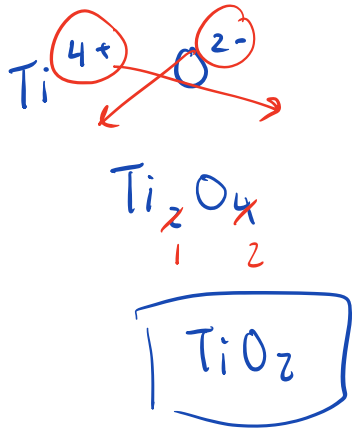
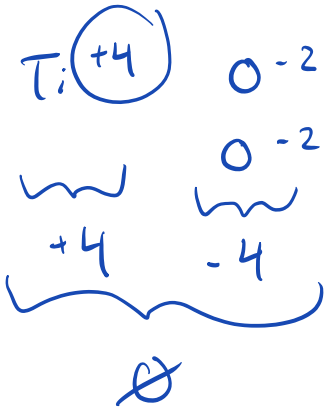
Write the formula for the following compounds:

1. Barium nitride
2. Lithium oxide
3. Aluminum sulphide
4. Copper(II)oxide
5. Zinc(II) fluoride
6. Chromium(III) nitride
7. Silver oxalate
8. Chromium(II) acetate
9. Gold (III) chromate

Write the name for the following compounds:

1. GaAs
2. KCl
3. Ni_3P_2
4. TiO_2 — Titanium (IV) oxide
5. Au_2Se
6. $Ag_2C_2O_4$
7. Na_2CrO_4
8. $Cr(NO_3)_2$





Classify each of the following as an acid, base, or salt.

1. Potassium hydroxide _____
2. Has a pH of 3 _____
3. NaCl _____
4. Magnesium carbonate _____
5. HF _____
6. LiOH _____
7. Tastes bitter _____
8. Calcium nitrate _____
9. H_3PO_4 _____
10. $Sr(OH)_2$ _____

Balance the following reaction and classify the type of chemical reaction:

___ CH_4 + ___ O_2 → ___ CO_2 + ___ H_2O _____

___ B + ___ Cl_2 → ___ BCl_3 _____

___ Ca + ___ HCl → ___ H_2 + ___ $CaCl_2$ _____

___ HClO + ___ O_2 → ___ $HClO_4$ _____

___ $C_{25}H_{52}$ + ___ O_2 → ___ CO_2 + ___ H_2O _____

___ Hg_2SO_3 → ___ Hg + ___ S + ___ O_2 _____

___ CH_3COOH + ___ $Ti(OH)_3$ → ___ $Ti(CH_3COO)_3$ + ___ H_2O _____

Write the complete balanced chemical reactions for the following:

a) Potassium hydroxide and hydrogen are produced when potassium metal reacts with water.

b) The reaction between magnesium metal and copper(II) sulphate.

c) Decomposition of mercury(II) oxide to its elements.