Periodic Table of Elements

PERIOD	GROUP 1 IA	2 IIA	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8	9 VIIIB	10	11 IB	12 IIB	13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA
1	hydrogen 1 H^{+} 1.00794[7]																hydrogen 1 H^{-} 1.00794 [7]	helium 2 He 4.002602[2]
2	lithium 3 Li^{+} 6.941[2]	beryllium 4 Be^{2+} 9.012182[3]											boron 5 B 10.811[7]	carbon 6 C 12.0107[8]	nitrogen 7 N^{3-} 14.00674[7]	oxygen 8 O^{2-} 15.9994[3]	fluorine 9 F^{-} 18.9984032[5]	neon 10 Ne 20.1797[6]
3	sodium 11 Na^{+} 22.989770[2]	magnesium 12 Mg^{2+} 24.3050[6]											aluminum 13 Al^{3+} 26.981538[2]	silicon 14 Si 28.0855[3]	phosphorus 15 P^{3-} 30.973761[2]	sulfur 16 S^{2-} 32.066[6]	chlorine 17 Cl^{-} 35.4527[9]	argon 18 Ar 39.948[1]
4	potassium 19 K^{+} 39.0983[1]	calcium 20 Ca^{2+} 40.078[4]	scandium 21 Sc^{3+} 44.955910[8]	titanium 22 Ti^{4+}_{3+} 47.867[1]	vanadium 23 V^{5+}_{4+} 50.9415[1]	chromium 24 Cr^{3+}_{2+} 51.9961[6]	manganese 25 Mn^{2+}_{4+} 54.938049[9]	iron 26 Fe^{3+}_{2+} 55.845[2]	cobalt 27 Co^{2+}_{3+} 58.933200[9]	nickel 28 Ni^{2+}_{3+} 58.6934[2]	copper 29 Cu^{2+}_{+} 63.546[3]	zinc 30 Zn^{2+} 65.39[2]	gallium 31 Ga^{3+} 69.723[1]	germanium 32 Ge^{4+} 72.61[2]	arsenic 33 As^{3-} 74.92160[2]	selenium 34 Se^{2-} 78.96[3]	bromine 35 Br^{-} 79.904[1]	krypton 36 Kr 83.80[1]
5	rubidium 37 Rb^{+} 85.4678[3]	strontium 38 Sr^{2+} 87.62[1]	yttrium 39 Y 88.90585[2]	zirconium 40 Zr 91.224[2]	niobium 41 Nb 92.90638[2]	molybdenum 42 Mo 95.94[1]	technetium 43 Tc [98.9063]	ruthenium 44 Ru 101.07[2]	rhodium 45 Rh 102.90550[2]	palladium 46 Pd^{2+}_{4+} 106.42[1]	silver 47 Ag^{+} 107.8682[2]	cadmium 48 Cd^{2+} 112.411[8]	indium 49 In^{3+} 114.818[3]	tin 50 Sn^{4+}_{2+} 118.710[7]	antimony 51 Sb^{3+}_{5+} 121.760[1]	tellurium 52 Te^{2-} 127.60[3]	iodine 53 I^{-} 126.90447[3]	xenon 54 Xe 131.29[2]
6	cesium 55 Cs^{+} 132.90545[2]	barium 56 Ba^{2+} 137.327[7]	57-70 *	lutetium 71 Lu^{3+} 174.967[1]	hafnium 72 Hf 178.49[2]	tantalum 73 Ta 180.9479[1]	tungsten 74 W 183.84[1]	rhenium 75 Re 186.207[1]	osmium 76 Os 190.23[3]	iridium 77 Ir 192.217[3]	platinum 78 Pt^{4+}_{2+} 195.078[2]	gold 79 Au^{3+}_{+} 196.96655[2]	thallium 81 Tl^{+}_{3+} 204.3833[2]	lead 82 Pb^{2+}_{4+} 207.2[1]	bismuth 83 Bi^{3+}_{5+} 208.98038[2]	polonium 84 Po^{2+}_{4+} [208.9824]	astatine 85 At^{-} [209.9871]	radon 86 Rn [222.0176]
7	francium 87 Fr^{+} [223.0197]	radium 88 Ra^{2+} [226.0254]	89-102 **	lawrencium 103 Lr [262.110]	rutherfordium 104 Rf [261.1089]	dubnium 105 Db [262.1144]	seaborgium 106 Sg [263.1186]	bohrium 107 Bh [264.12]	hassium 108 Hs [265.1306]	meitnerium 109 Mt [268]	ununnilium 110 Uun [269]	unununium 111 Uuu [272]	ununbium 112 Uub [277]	ununquadium 114 Uuq [289]		ununhexium 116 Uuh [289]		ununoctium 118 Uuo [293]

METALS

NONMETALS

NOBLE GASES

TRANSITION ELEMENTS

key:

element name
atomic number
element symbol ionic charge (top: most common)
atomic weight (mean relative mass)

blue = solid
black = gas
gray = liquid

RARE EARTH ELEMENTS

*lanthanoids	lanthanum 57 La 138.9055[2]	cerium 58 Ce^{3+} 140.116[1]	praseodymium 59 Pr^{3+} 140.90765[2]	neodymium 60 Nd^{3+} 144.24[3]	promethium 61 Pm^{3+} [144.9127]	samarium 62 Sm^{3+} 150.36[3]	europium 63 Eu^{3+}_{2+} 151.964[1]	gadolinium 64 Gd^{3+} 157.25[3]	terbium 65 Tb^{3+} 158.92534[2]	dysprosium 66 Dy^{3+} 162.50[3]	holmium 67 Ho^{3+} 164.93032[2]	erbium 68 Er^{3+} 167.26[3]	thulium 69 Tm^{3+} 168.93421[2]	ytterbium 70 Yb^{3+} 173.04[3]
**actinoids	actinium 89 Ac^{3+} [227.0277]	thorium 90 Th^{4+} 232.0381[1]	protactinium 91 Pa^{5+} 231.03588[2]	uranium 92 U^{6+}_{4+} 238.0289[1]	neptunium 93 Np^{5+} [237.0482]	plutonium 94 Pu^{4+}_{6+} [244.0642]	americium 95 Am^{3+} [243.0614]	curium 96 Cm^{3+} [247.0703]	berkelium 97 Bk^{3+} [247.0703]	californium 98 Cf^{3+} [251.0796]	einsteinium 99 Es [252.0830]	fermium 100 Fm [257.0951]	mendelevium 101 Md [258.0984]	nobelium 102 No [259.1011]

Notes: Names have not been assigned to elements 110-112, 114, 116, and 118, so those used are temporary. When the atomic weight is enclosed in brackets, the element's weight is represented by one of the element's more stable isotopes, and no mass data are available.

Phys. Sc. 20 Element Symbol Practice

Nitrogen_____ Lawrencium_____ Mg_____

Tin_____ Arsenic_____ Xe_____

Cesium_____ Mercury_____ Rn_____

Vanadium_____ Calcium_____ Ni_____

Cobalt_____ Ga_____ Ba_____

Potassium_____ Cs_____ Si_____

Chromium_____ Pb_____ He_____

Polonium_____ Ge_____ H_____

Iridium_____ F_____ Na_____

Francium_____ Mn_____ Os_____

Nitrogen_____ Lawrencium_____ Mg_____

Tin_____ Arsenic_____ Xe_____

Cesium_____ Mercury_____ Rn_____

Vanadium_____ Calcium_____ Ni_____

Cobalt_____ Ga_____ Ba_____

Potassium_____ Cs_____ Si_____

Chromium_____ Pb_____ He_____

Polonium_____ Ge_____ H_____

Iridium_____ F_____ Na_____

Francium_____ Mn_____ Os_____

Phys.Sc. 20 RCS

Name: _____

Naming Ions

Polyatomic Ions

Rule: Look up the name or symbol from your polyatomic ion sheet.

Example 1: ammonium ion _____

Example 2: NO_3^- _____

Example 3: NO_2^- _____

Monatomic Ions

- CATIONS

Rule A: If the atom always forms the same charge when forming an ion, (all group 1, group 2, and Zn^{2+}, Ag^+, Cd^{2+}, & Al^{3+}), take the name of the atom that the ion is formed from, and add "ion".

Example 4: Na^+ _____

Example 5: Mg^{2+} _____

Example 6: aluminum ion _____

Rule B: If the atom can form more than one charge when forming an ion, (any of the transition metals and any metals underneath the staircase), take the name of the atom that the ion is formed from, place the charge as a Roman numeral in parentheses, and then add "ion".

Example 7: Pb^{2+} _____

Example 8: Fe^{2+} _____

Example 9: copper(I) ion _____

Example 10: copper(II) ion _____

Try These:

11. Rb^+ _____

12. Ca^{2+} _____

13. Ni^+ _____

14. Ag^+ _____

15. Fe^{3+} _____

16. cobalt(II) ion _____

17. lithium ion _____

18. zinc ion _____

- ANIONS

Rule: Take the nonmetal atom name, remove the ending and add "-ide ion" to it.

Example 21: S^{2-} _____

Example 22: N^{3-} _____

Example 23: bromide ion _____

Example 24: telluride ion _____

YOU TRY IT!

25. iodide ion _____

26. selenide ion _____

27. F^- _____

28. O^{2-} _____

Let's Compare some ions:

N^{3-} _____

NO_2^- _____

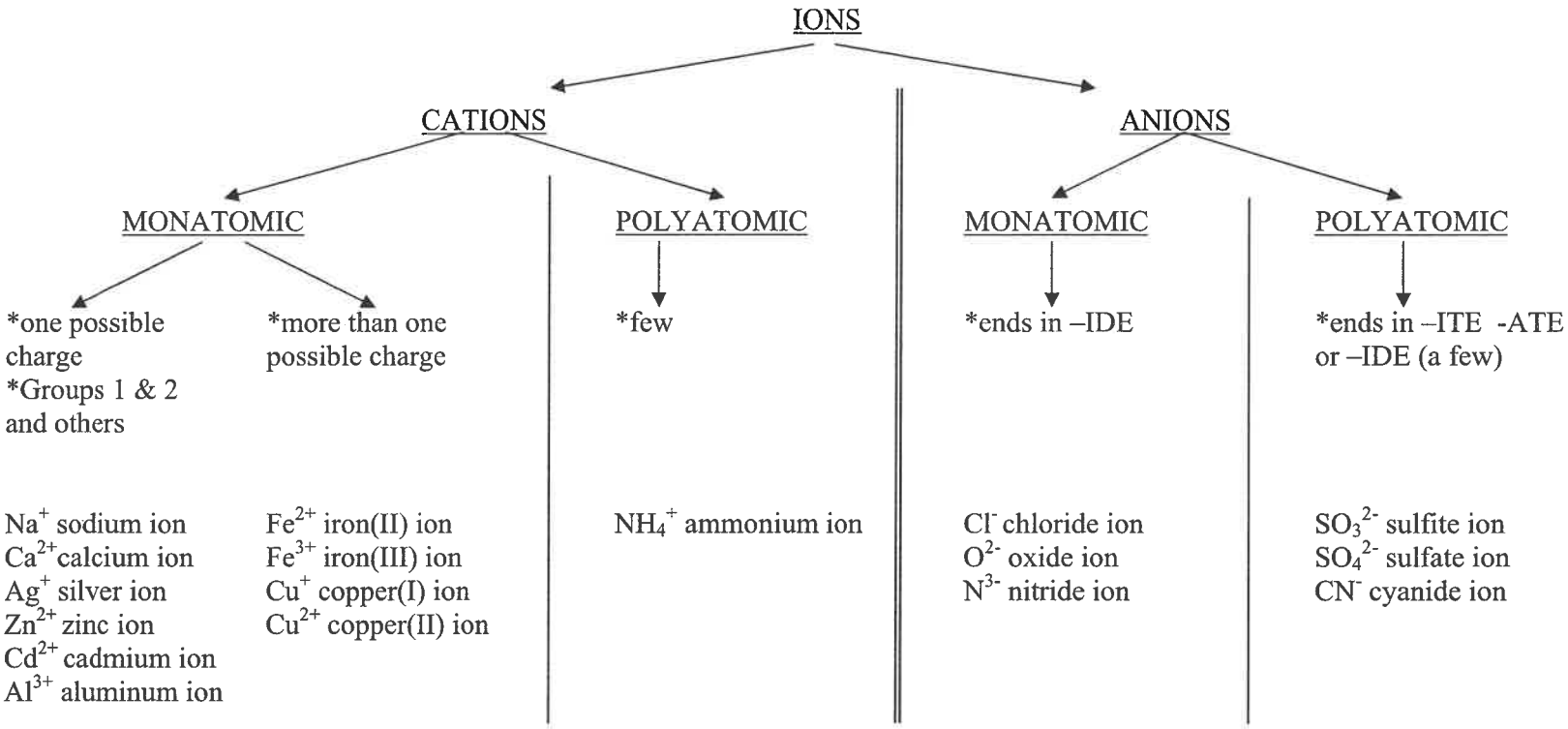
NO_3^- _____

sulfide ion _____

sulfite ion _____

sulfate ion _____

Understanding Ion Nomenclature



Monatomic cation with one possible charge – Name of atom and add "ion"
Monatomic cation with more than one possible charge – Name of atom, with charge as Roman numeral in parentheses, and add "ion"
Monatomic anion – Name of atom, remove ending, and add "-ide ion"
Polyatomic ions – no naming rules…just know them.

Ions - Worksheet

Name the following ions.

1. Ca^{2+} _____
2. O^{2-} _____
3. H^{+} _____
4. H^{-} _____
5. Cu^{+} _____
6. Fe^{3+} _____
7. CO_3^{2-} _____
8. NH_4^{+} _____
9. Zn^{2+} _____
10. N^{3-} _____

Write the formulas for the following ions.

11. acetate ion _____
12. phosphide ion _____
13. phosphate ion _____
14. iron(II) ion _____
15. strontium ion _____
16. nickel(II) ion _____
17. tin(II) ion _____
18. sulfate ion _____
19. sulfite ion _____
20. sulfide ion _____

Binary Ionic Compounds – Worksheet #1

A. Write the formulas for the compounds formed from these elements. Remember, the cation is always written first.

1. rubidium and iodine _____
2. barium and chlorine _____
3. lithium and selenium _____
4. nitrogen and magnesium _____
5. sulfur and sodium _____
6. aluminum and oxygen _____
7. silver and phosphorus _____
8. fluorine and zinc _____

B. Write the names for these binary ionic compounds.

9. Cs_2S _____
10. BaO _____
11. AlI_3 _____
12. MnO_2 _____
13. Tc_3P_4 _____
14. $CdBr_2$ _____
15. NaCl _____
16. FeF_3 _____
17. Mg_3N_2 _____
18. Ni_3P_2 _____
19. UO_2 _____
20. HF _____
21. CoN _____
22. K_2S _____

C. Write the formulas for these binary ionic compounds.

23. rubidium sulfide _____
24. mercury(II) oxide _____
25. calcium nitride _____
26. zinc bromide _____
27. uranium(VI) fluoride _____
28. silver phosphide _____
29. platinum(II) selenide _____
30. europium(II) nitride _____
31. cesium phosphide _____
32. lead(II) chloride _____
33. cadmium oxide _____
34. tin(IV) fluoride _____
35. iron(II) oxide _____
36. iron(III) oxide _____

Ternary Ionic Compounds - Worksheet

If the name of the compound is given, write the formula. If the formula of the compound is given, write the name.

1. calcium nitrite _____
2. $BaSO_4$ _____
3. silver acetate _____
4. $SrSO_3$ _____
5. nickel(II) phosphate _____
6. Na_2CO_3 _____
7. $LiHCO_3$ _____
8. ammonium phosphate _____
9. $Be(ClO)_2$ _____
10. aluminum oxalate _____
11. rubidium dichromate _____
12. $KHSO_3$ _____
13. calcium hydroxide _____
14. manganese(II) silicate _____
15. HCN _____
16. cesium hydrogen sulfate _____
17. $Ti(OH)_4$ _____
18. ammonium chloride _____
19. $Ca(ClO_3)_2$ _____
20. rubidium cyanate _____
21. copper(II) sulfate _____
22. CuCl _____
23. iron(II) arsenate _____
24. NH_4OH _____

Molecular Compound Nomenclature

Molecular compounds are composed of individually covalently bonded atoms. The simplest unit of a molecular compound is called a "molecule". These compounds are composed of all nonmetals. They are sometimes called *covalent* compounds.

One system for naming these compounds is based on the use of prefixes.

mono-	one
di-	two
tri-	three
tetra-	four
penta-	five
hexa-	six
hepta-	seven
octa-	eight
nona-	nine
deca-	ten

When naming the molecular compound, the prefix that indicates the number of each atom is placed before the atom in the name. All molecular compounds end in "-ide".

Example: N_2O IS dinitrogen monoxide

NOT dinitride monoxide (the first element does not end in "-ide")
NOT dinitrogen monoxygen (the second element should end in "-ide")
NOT dinitrogen monooxide (often the "o" is dropped before a vowel)

Also, mono is not used to indicate one atom if it applies to the first atom.

Example: CO IS carbon monoxide

NOT monocarbon monoxide (no mono necessary to indicate the first)
NOT carbon oxide (the mono is necessary to indicate the number of O)
NOT carbon monooxide (often the "o" is dropped before a vowel)

Molecular Compounds - Worksheet

If the name of the compound is given, write the formula. If the formula is given, write the name.

1. CF_4 _____
2. N_2O_5 _____
3. CS_2 _____
4. SO_3 _____
5. P_4O_8 _____
6. iodine tribromide _____
7. chlorine dioxide _____
8. sulfur hexafluoride _____
9. difluorine octachloride _____
10. tribromine nonatelluride _____
11. H_2O _____
12. P_2S_4 _____
13. N_2O_4 _____
14. XeF_4 _____
15. SI_4 _____
16. carbon dioxide _____
17. trinitrogen hexabromide _____
18. diiodine heptaselenide _____
19. CO _____
20. dicarbon octafluoride _____
21. P_4O_{10} _____
22. Si_3N_4 _____
23. Cl_2S_7 _____
24. NBr_5 _____
25. phosphorus trichloride _____
26. PI_3 _____
27. disulfur trioxide _____
28. PCl_5 _____
29. diiodine dichloride _____
30. dinitrogen monoxide _____
31. I_4O_9 _____
32. dihydrogen monoxide _____

Phys. Sc. 20 **Balancing equations** p.224-228

In a recipe, there are always amounts of each ingredient. A simple "skeleton" recipe might look like this:

Flour + eggs + salt + baking powder + butter + sugar + chocolate chips →cookies

But we know that there needs to be specific amounts of each ingredient. This is like balancing chemical equations.

As you have learned in Science 10, balancing chemical equations is simply making sure that there are the same numbers of atoms of each element on both sides of the equation. Check each element separately and be sure that each atom is accounted for. Steps and tips to balancing:

1. Only insert 'coefficients', never change 'subscripts' of properly written formulas, in order to change the numbers of atoms in a compound.
2. Balance metals in compounds first (Mg, Ca, K,...)
3. Balance entire polyatomic ions, instead of individual atoms within the compound.
4. Save lone elements for last (usually, O_2 or other elemental metals)
5. Double check that you have all atoms accounted for.

Don't worry about randomly adding more atoms when balancing. There are trillions of atoms available in the solution to write this balanced equation, just like if you needed more sugar, you have it in the big bag of sugar.

1. $Al + N_2 \rightarrow AlN$

2. $Fe + O_2 \rightarrow Fe_3O_4$

3. $CaCO_3 \rightarrow CaO + CO_2$

4. $NH_4NO_3 \rightarrow N_2O + H_2O$

23. $HClO_4 + P_4O_{10} \rightarrow H_3PO_4 + Cl_2O_7$

24. $C_6H_5Cl + SiCl_4 + Na \rightarrow (C_6H_5)_4Si + NaCl$

25. $Sb_2S_3 + HCl \rightarrow H_3SbCl_6 + H_2S$

1. Potassium reacts with water yielding potassium hydroxide and hydrogen

2. Chlorine reacts with potassium bromide yielding potassium chloride and bromine

Asn't Chem Text page 228 #1-12

Classifying Chemical Reactions p. 208 Merrill Chem text

Notes partially taken from http://misterguch.brinkster.net/6typesofchemicalrxn.html

p. 228 – 231 in Merrill Chemistry Textbook

All chemical reactions can be placed into one of six categories. Here they are, in no particular order:

1) **Combustion**: A combustion reaction is when oxygen combines with another compound to form water and carbon dioxide. These reactions are exothermic, meaning they produce heat. An example of this kind of reaction is the burning of napthalene:

$$C_{10}H_8 + 12\ O_2 \text{ ---> } 10\ CO_2 + 4\ H_2O$$

2) **Synthesis**: A synthesis reaction is when two or more simple compounds combine to form a more complicated one. These reactions come in the general form of:

$$A + B \text{ ---> } AB$$

One example of a synthesis reaction is the combination of iron and sulfur to form iron (II) sulfide:

$$8\ Fe + S_8 \text{ ---> } 8\ FeS$$

3) **Decomposition**: A decomposition reaction is the opposite of a synthesis reaction - a complex molecule breaks down to make simpler ones. These reactions come in the general form:

$$AB \text{ ---> } A + B$$

One example of a decomposition reaction is the electrolysis of water to make oxygen and hydrogen gas:

$$2\ H_2O \text{ ---> } 2\ H_2 + O_2$$

---

4) **Single displacement**: This is when one element trades places with another element in a compound. These reactions come in the general form of:

$$A + BC \text{ ---> } AC + B$$

One example of a single displacement reaction is when magnesium replaces hydrogen in water to make magnesium hydroxide and hydrogen gas:

$$Mg + 2\ H_2O \text{ ---> } Mg(OH)_2 + H_2$$

---

5) **Double displacement**: This is when the anions (negative ions) and cations (positive ions) of two different molecules switch places, forming two entirely different compounds. These reactions are in the general form:

$$AB + CD \text{ ---> } AD + CB$$

One example of a double displacement reaction is the reaction of lead (II) nitrate with potassium iodide to form lead (II) iodide and potassium nitrate:

$$Pb(NO_3)_2 + 2\ KI \text{ ---> } PbI_2 + 2\ KNO_3$$

---

6) **Acid-base**: This is a special kind of double displacement reaction that takes place when an acid and base react with each other (Also called a "neutralization reaction"). The H^+ ion in the acid reacts with the OH^- ion in the base, causing the formation of water. Generally, the product of this reaction is some ionic salt and water:

$$HA + BOH \text{ ---> } H_2O + BA$$

One example of an acid-base reaction is the reaction of hydrobromic acid (HBr) with sodium hydroxide:

$$HBr + NaOH \text{ ---> } NaBr + H_2O$$

Handy Checklist for figuring out what type of reaction is taking place:

Follow this series of questions. When you can answer "yes" to a question, then stop!

1) Does your reaction have oxygen as one of it's reactants and carbon dioxide and water as products? If yes, then it's a combustion reaction

2) Does your reaction have two (or more) chemicals combining to form one chemical? If yes, then it's a synthesis reaction

3) Does your reaction have one large molecule falling apart to make several small ones? If yes, then it's a decomposition reaction

4) Does your reaction have any molecules that contain only one element? If yes, then it's a single displacement reaction

5) Does your reaction have water as one of the products? If yes, then it's an acid-base reaction

6) If you haven't answered "yes" to any of the questions above, then you've got a double displacement reaction

List what type the following reactions are:

1) $NaOH + KNO_3 \rightarrow NaNO_3 + KOH$ _____
2) $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$ _____
3) $2\ Fe + 6\ NaBr \rightarrow 2\ FeBr_3 + 6\ Na$ _____
4) $CaSO_4 + Mg(OH)_2 \rightarrow Ca(OH)_2 + MgSO_4$ _____
5) $NH_4OH + HBr \rightarrow H_2O + NH_4Br$ _____
6) $Pb + O_2 \rightarrow PbO_2$ _____
7) $Na_2CO_3 \rightarrow Na_2O + CO_2$ _____

**read through p. 228-231 and complete questions #13-22

Forming Equations.

Another thing we can do is predict products of a certain type of reaction.

For Example, If you know that a reaction is a single displacement reaction and you are given that Mg^{2+} reacts with Copper (II) Nitrate, then you can predict the product as follows.

1. You know that one lone element will replace one similar ion from the compound (Mg replaces Cu)
2. Write the reactants on the left side of the equation (given), and the predicted products on the right side of the equation.
   a. $Mg^{2+} + Cu(NO_3) \rightarrow Cu^{2+} + Mg(NO_3)$
3. Make sure the equation does not add any new atoms.
4. Balance the equation

REACTION PREDICTION

If the word equation is complete, write and balance the chemical equation. If the word equation is incomplete, complete it and write the balanced chemical equation. Tell the type of reaction. Give reason(s) for the product(s)

- barium chloride + sodium sulfate →
- calcium + hydrochloric acid →
- sodium iodide + bromine →
- zinc + lead(II) acetate →
- lead (II) acetate + hydrogen sulfide →
- magnesium carbonate →

Physical Sc. 20 RCS (Vers. 2) Name: _____

CHEMISTRY EQUATIONS

BALANCING EQUATIONS: FORMULAS GIVEN Practice Sheet #1

Balance the following equations:

1. $Al + N_2 \rightarrow AlN$
2. $Fe + O_2 \rightarrow Fe_3O_4$
3. $CaCO_3 \rightarrow CaO + CO_2$
4. $NH_4NO_3 \rightarrow N_2O + H_2O$
5. $KI + Cl_2 \rightarrow KCl + I_2$
6. $Pb(NO_3)_2 + HCl \rightarrow PbCl_2 + HNO_3$
7. $BaO_2 \rightarrow BaO + O_2$
8. $Al + H_2SO_4 \rightarrow Al_2(SO_4)_3 + H_2$
9. $CH_4 + Cl_2 \rightarrow CHCl_3 + HCl$
10. $MgCl_2 + NaOH \rightarrow Mg(OH)_2 + NaCl$
11. $AgNO_3 + CuCl_2 \rightarrow AgCl + Cu(NO_3)_2$
12. $ZnS + O_2 \rightarrow ZnO + SO_2$
13. $Na + H_2O \rightarrow H_2 + NaOH$

CHEMISTRY EQUATIONS

BALANCING CHEMICAL EQUATIONS - NAMES GIVEN Practice Sheet #2

1. Potassium reacts with water yielding potassium hydroxide and hydrogen
2. Chlorine reacts with potassium bromide yielding potassium chloride and bromine
3. Zinc + hydrogen chloride yields zinc chloride and hydrogen
4. iron + water → Fe_3O_4 + hydrogen
5. zinc sulfide + oxygen → . zinc oxide + sulfur dioxide
6. $C_{10}H_{16} + Cl_2 \rightarrow C + HCl$
7. Aluminum + sodium hydroxide → Na_3AlO_3 + hydrogen
8. $C_2H_2 + O_2 \rightarrow CO_2 + H_2O$

EQUATIONS – PREDICTING BY TYPE OF REACTION

Part I: Complete the word equation and write the balanced chemical equation. Give the reason for the product(s) in each case. Consult the activity series and the solubility tables.

Composition reactions:

1. sodium + iodine →
2. calcium + oxygen →
3. hydrogen + chlorine →
4. calcium oxide + water →
5. dinitrogen pentoxide + water →

Decomposition reactions:

6. nickel(II) chlorate →
7. barium carbonate →
8. zince hydroxide →
9. mercury(II) oxide →
10. copper (II) carbonate →

Replacement reactions:

11. aluminum + sulfuric acid →
12. potassium iodide + chlorine→
13. iron + copper (II) nitrate →
14. zinc + hydrochloric acid →
15. magnesium + silver nitrate →

Double Replacement (ionic reactions)

16. silver nitrate + zinc chloride →
17. copper(II) hydroxide + acetic acid →
18. iron(II) sulfate + ammonium sulfide →
19. ammonium chloride + sodium hydroxide →
20. hydrochloric acid + potassium hydroxide →

REACTION PREDICTION (Set #1)

If the word equation is complete, write and balance the chemical equation. If the word equation is incomplete, complete it and write the balanced chemical equation. Tell the type of reaction. Give reason(s) for the product(s)

1. barium chloride + sodium sulfate →
2. calcium + hydrochloric acid →
3. iron(II) sulfide + hydrochloric acid → hydrogen sulfide (g) +
4. zinc chloride + ammonium sulfide →
5. ammonia + oxygen → nitric acid + water
6. magnesium + nitric acid →
7. potassium + water →
8. sodium iodide + bromine →
9. silver + sulfur→
10. sodium chlorate →

CHEMISTRY EQUATIONS

REACTION PREDICTION (Set #2)

In each of the following examples:

a. State what type of reaction is expected.
b. Write the balanced equation for those reaction that do take place.

1. aluminum plus hydrochloric acid
2. calcium hydroxide plus nitric acid
3. magnesium plus zinc nitrate
4. mercury plus oxygen
5. zinc chloride plus hydrogen sulfide
6. dinitrogen pentoxide plus water
7. sodium chlorate heated to high temperature
8. barium nitrate plus sodium chromate
9. sodium bromide plus silver nitrate
10. zinc carbonate strongly heated
11. potassium plus fluorine
12. potassium nitrate plus zinc phosphate

REACTION PREDICTION (Set #3)

Write a balanced chemical equation for each of the following reacions. Classify the reation type.

1. iron(III) oxide + hydrogen →
2. bismuth(V) oxide →
3. Manganeese (II) chlorate + potassium phosphate →
4. Lead (II) acetate + sodium chromate →
5. potassium + iodine →
6. ammonium sulfate + barium nitrate →
7. zinc oxide →
8. gold(III) chloride + sodium sulfide →
9. magnesium + hydrochloric acid →
10. calcium hydroxide + iron (II) nitrate →

REACTION PREDICTION (Set #4)

Write a balanced chemical equation for each of the following reacions. Classify the reation type.

1. zinc chloride + ammonium sulfide →
2. zinc + copper (II) sulfate →
3. magnesium bromide + chlorine →
4. aluminum oxide →
5. silver nitrate + sodium chloride →
6. magnesium + copper (II) nitrate →
7. sodium hydroxide + sulfuric acid →
8. lead (II) nitrate + potassium bromide →
9. copper + tin (IV) chloride →
10. $C_{10}H_{22} + O_2 \rightarrow$

Chemistry 20 ***MOLE CONVERSION*** worksheet Name: _____

A. Convert to moles

1. 18.3 grams of aluminum sulfate

2. 5.4 grams of copper (II) nitrite

3. 181.7 grams pf zinc acetate

4. 49.5 grams of potassium chlorate

5. 100.0 grams of iron metal

6. 231.0 grams of chlorine gas

7. 1.26×10^{25} molecules of water

8. 5.2×10^{12} atoms of Sodium

9. 3.01×10^{23} formula units of rubidium oxide

10. 8.05×10^{28} iodide ions

B. Convert to grams

11. 3 moles of oxygen

12. 1.4 moles of lithium hydroxide

13. 5.8 moles of potassium chloride

14. 2.5 moles of water

(Convert to grams cont'd)

15. 0.70 moles of zinc

16. 6.3 mole of sulfuric acid

17. 1.006 x10^{25} molecules of P_2O_5

18. 4.5 x10^{16} atoms of Osmium

19. 4.05 x10^{88} formula units of Fr_2S

20. 5.22 x10^{46} ions of strontium

C. Convert to representative particles

21. 300.0 grams of NaI

22. 0.73 grams of Cu

23. 8.41 grams of $Pb(NO_2)_2$

24. 8.13 grams of Na_2SO_4

25. 10.3 moles of NaCl

26. 8.9 moles of CO_2

27. 3.1 moles of P_2O_5

28. 0.0006 moles of Hs

the end