Chemistry Skills You Should Have Already:

CHEMICAL AND PHYSICAL CHANGE (E7)

PART A: Determine whether the following changes are chemical (C) or physical (P).

_____ 1. Wax freezing

_____ 2. Sublimation of dry ice blocks

_____ 3. Healing of a wound

_____ 4. Burning paper

_____ 5. Melting butter

_____ 6. Precipitation of silver crystals

_____ 7. Dissolving of salt in water

_____ 8. Rusting of iron

_____ 9. Expansion of a metal rod held in a Bunsen burner

_____ 10. Calcium chloride undergoing a hygroscopic reaction with water in air

_____ 11. Formation of aluminum chloride from and aluminum and cupric chloride dihydrate

_____ 12. Solidification of para-dichlorobenzene

PART B: Identify the following as elements (E), compounds (C), or mixtures (M).

_____ 1. Oxygen, O_2 (g)

_____ 2. Silver nitrate, $AgNO_3$ (s)

_____ 3. Wax

_____ 4. Copper, Cu (s)

_____ 5. Salt water, H_2O (aq)

_____ 6. Wood

_____ 7. Glucose, $C_6H_{12}O_6$ (s)

_____ 8. Rust, Fe_2O_3 (s)

_____ 9. Steel

_____ 10. Nitrogen dioxide, NO_2 (g)

PART C: List the 4 indicators of a chemical change.

1. 2. 3. 4.

Chemistry Skills You Should Have Already:

MOLAR MASS & MOLE CONVERSIONS: (E14 & E16)

1. Find the molar mass of these compounds:

a. MnO	b. HgS
c. MgF_2	d. $CoCl_2$
e. $La(ClO_3)_3$	f. $Ga_2(SO_4)_3$
g. $BaI_2 \bullet 2H_2O$	h. $NaS_2O_3 \bullet 5H_2O$

2. Show set-up of all calculations. Use labels and significant figures. Remember one mole can equal 3 different things concurrently: 22.4 L of gas at STP, the molar mass of a substance in grams, 6.022×10^{23} particles (atoms, ions, or molecules). Be careful, because some of these problems will also involve a metric system conversion, as well as a mole conversion.

a) What is the volume of 0.500 g of Xe gas at STP?

b) How many moles are in 8.96 L of N_2 gas at STP?

c) What is the mass of 2.4×10^{24} atoms of Fe?

d) How many molecules are in 3.0 grams of $Al_2(SO_4)_3$?

e) What is the volume of 1.5×10^{22} molecules of CO_2 gas at STP?

f) How many molecules are in 25.0 mg of acetic acid, $HC_2H_3O_2$?

g) How many milliliters are in 1.35 moles of Cl_2 gas at STP?

h) What is the mass (in milligrams) of 1.49 L of H_2 gas at STP?

Chemistry Skills You Should Have Already:

BALANCING EQUATIONS: (E20)

Match the following terms with the correct definition:
decomposition, double replacement, single replacement, and synthesis

_____ A reaction that involves a single reactant breaking into 2 or more parts.

_____ A reaction that two or more parts of the reactants combine into 1 part.

_____ A reaction where 1 more reactive element replaces 1 less reactive element.

_____ A reaction where 2 elements switch places to form new products.

Balance the following equations using coefficients.

1. $Ca + O_2 \rightarrow CaO$
2. $ZnS + O_2 \rightarrow ZnO + SO_2$
3. $Sb + HCl \rightarrow SbCl_3 + H_2$
4. $KClO_3 \rightarrow KCl + O_2$
5. $P + H_2 \rightarrow PH_3$
6. $Zn(OH)_2 + H_3PO_4 \rightarrow Zn_3(PO_4)_2 + H_2O$
7. $Na + H_2O \rightarrow NaOH + H_2$
8. $HF + Al(OH)_3 + NaOH \rightarrow Na_3AlF_6 + H_2O$
9. $Fe + H_2O \rightarrow Fe_3O_4 + H_2$
10. $PCl_5 + H_2O \rightarrow H_3PO_4 + HCl$
11. $HNO_3 + Mg(OH)_2 \rightarrow Mg(NO_3)_2 + H_2O$
12. $C_6H_{10} + O_2 \rightarrow CO_2 + H_2O$
13. $NH_4ClO_4 \rightarrow N_2 + Cl_2 + O_2 + H_2O$
14. $SiO_2 + HF \rightarrow SiF_4 + H_2O$

Chemistry Skills You Should Have Already:

NUCLIDE SYMBOLS: (E27)

Name	Nuclide symbol	Mass #	Atomic #	Protons	Electrons	Neutrons
Carbon (C)		13			6	
Potassium (K) *ion*		39		19	18	
Oxygen (O)	$^{17}_{8}O$					
Aluminum *ion* (Al)				13	10	14
Chromium (Cr)		52			24	
Phosphide (P) *ion*	$^{31}_{15}P^{-3}$					
Silver (Ag)			47			61
Iodide *ion* (I)		127		53	54	
Barium (Ba)			56			81
Zirconium (Zr)	$^{91}_{40}Zr$					
Mercury (II) *ion*		201	80		78	
Tin (II) *ion*			50		48	68
Xenon (Xe)		131	54			
Arsenide (As) *ion*				33	36	42

NAMES OF IONS (E28) – You need to know all of the ions on the Oxidation number chart I handed out. These include all of the ones you learned in Chemistry 1, but also about 12 more. You might still have your flashcards from that test…

Chemistry Skills You Should Have Already:

NAMING/FORMULA WRITING FOR INORGANIC COMPOUNDS (E-29)

PART A: Ionic Compounds & hydrated ionic compounds Ex: calcium chloride = $CaCl_2$
(Final answers should NOT have charges on ions; there are no prefixes either)

Write the correct formula.	**Name the following compounds.**
1. zinc fluoride	1. $AgNO_3$
2. iron (III) acetate	2. SrF_2
3. calcium phosphate	3. $NiBr_2$
4. manganese (II) sulfide	4. Cu_2O
5. ammonium sulfite	5. $MnCl_2$
6. strontium nitrate	6. $Zn(OH)_2$
7. chromium (III) oxide	7. KI
8. lead (II) hydroxide	8. $SnCrO_4$
9. calcium bicarbonate	9. $Ni(ClO_3)_2$
10. silver (I) chlorate	10. $Ba(C_2H_3O_2)_2$
11. chromium (III) chloride trihydrate	11. $CuCl_2 \bullet 2\ H_2O$
12. nickel (II) nitrate heptahydrate	12. $Fe(NO_3)_3 \bullet 6\ H_2O$

PART B: Molecules Ex: diphosphorus pentoxide = P_2O_5 (There ARE prefixes used here.)

1. carbon dioxide	1. N_2O_5
2. dinitrogen monoxide	2. $SiCl_5$
3. tetranitrogen decasulfide	3. NF_3
4. xenon trioxide	4. P_4S_6
5. sulfur hexafluoride	5. NO

PART C: Acids Remember there are 2 kinds of acids – binary and oxyacids

1. hydroiodic acid	1. H_2CO_3
2. nitrous acid	2. HBr
3. sulfuric acid	3. HF
4. carbonous acid	4. H_2SO_3
5. hydrosulfuric acid	5. HNO_3