

Household Hazards

Name _____ Period _____ Date _____

Directions: Research the commonly found household substances listed below using your phone or PC using valid sources from the web. Describe their use, the active chemical (main chemical that is used in the substance). Then find the chemical formula for that active ingredient. Finally, look to see if there are any health risks associated with their use.

Household Chemical	Household Uses	Active Chemical	Chemical Formula	Health Risks and Hazards
1 Epsom Salt	Laxative, Bathing Agent for sore muscles	Magnesium Sulfate	MgSO ₄	Hypermagnesemia: increased level magnesium in the blood. Symptoms include weakness, confusion, decreased breathing rate, and cardiac arrest.
2 Drain Cleaner				
3 Chewable Antacid				
4 Vinegar				
5 Glass Cleaner				
6				

Table Salt				
7 Shampoo / Body Wash				
8 Baking Soda				
9 Hydrogen Peroxide 2%				
10 Fingernail Polish Remover				
11 Clorox Liquid Bleach				

12 Weed Killer				
13 Antiperspirant				
14 Aspirin				
15 Mosquito Repellant				

Assessment Questions:

1. What compounds above are used in the kitchen for cooking. Do any pose a health risk if over consumed?
2. What chemicals above are used in cleaning and what are their associated health risks?
3. List three other commonly used chemicals at home that you may think are dangerous. Research them and see what health risks are associated with them.
4. Magnesium sulfate heptahydrate is the active component in _____ What is a hydrate and what are some other common hydrates used in everyday life? Do they pose any risk to your health?
5. When reading the ingredients of household compounds what significance is the order in which they are listed?

6. The detergent used in shampoo is _____ is there a potential health risk associated with washing your hair?

7. What health problem may be associated with the chemical aluminum zirconium tetrachlorohydroxyglycolate is there a household product that a person would use that has this active ingredient?

8. Which substance in the chart above is the most dangerous?

9. What occurs if ammonia and bleach are mixed? Would it be a good idea to mix cleaning chemicals why or why not?

10. Are any of the substances in the chart above also have any medicinal value (used as a medicine)?

Honors Chemistry
Project – Chemical Reactions Analogies

We have learned about the five different chemical reactions:

- Synthesis
- Decomposition
- Single Replacement
- Double Replacement
- Combustion (complete and incomplete)

Can you make these understandable to someone who has no or a limited chemistry background? Let's pretend that the audience is a class of middle schoolers. Using only materials that you have at home, what physical items can use to depict the following:

- A synthesis reaction
- A decomposition reaction
- A single replacement reaction (including that some occur and others do not)
- A double replacement reaction

You may choose to include combustion but it is not necessary.

Note: Please use items that you have at home. Try to be as creative as possible. You may not use stock images from the internet. The goal is to create something completely new.

The Final Product:

- Video
- Google Slides
- Something else that I have not thought of. You must request approval no later than 5 pm on Friday, March 20.

Assessment:

Each reaction will be worth 10 points. The 10 points will be based on accuracy of the analogy, clarity, neatness, and spelling. Remember – this could potentially be used by a middle school teacher to help their students understand the concepts. I know that you can make something amazing.

Significant Figures & Rounding # 1

_____ Score

_____ Name(print)

ENGLISH TO METRIC EQUIVALENTS

Length: 1 m = 1.094 yd 2.54 cm = 1 in

Volume: 1 L = 1.06 qt 1 ft³ = 28.3 L

Mass: 1 kg = 2.205 lb 453.6 g = 1 lb

Other Useful Equivalents

1 lb = 16 oz	12 in = 1 ft	3 ft = 1 yd	2 pt = 1 qt
60 sec = 1 min	60 min = 1 hr	24 hr = 1 day	4 qt = 1 gal
1 oz = 28.3 g	365.24 day = 1 yr	1 cm ³ = 1 mL	
1 in = 2.54 cm	1 mi = 1760 yd		

1. How many significant figures are in each of the following?

- A. 456126
- B. 5.03
- C. 0.009994
- D. 8.6050
- E. 10.0254

2. Round the following to 3 significant figures.

- A. 4.56789
- B. 8.6423
- C. 5.5555
- D. 6.6499
- E. 0.097652

Chem 100
Significant Figures & Rounding # 2

_____ Score

_____ Name(print)

ENGLISH TO METRIC EQUIVALENTS

Length: 1 m = 1.094 yd 2.54 cm = 1 in

Volume: 1 L = 1.06 qt 1 ft³ = 28.3 L

Mass: 1 kg = 2.205 lb 453.6 g = 1 lb

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1 oz = 28.3 g	365.24 day = 1 yr	1 cm ³ = 1 mL	
1 in = 2.54 cm	1 mi = 1760 yd		

1. How many significant figures are in each of the following?

- A. 0.05687
- B. 6.022×10^{23}
- C. 176.80
- D. 981890
- E. 400.591

2. Round the following to 4 significant figures.

- A. 1.00794
- B. 4.00260
- C. 9.01218
- D. 10.811
- E. 12.011

Problem Solving Skills #2

_____ Score

_____ Name(print)

For each of the following, determine the appropriate conversion factor. (10 points each)

1. Hours to minutes
2. Days to hours
3. Minutes to seconds
4. Years to days
5. Centuries to years
6. Minutes to hours
7. Hours to seconds
8. Hours to days
9. Years to decades
10. Days to fortnights

Problem Solving Skills #4

_____ Score

_____ Name(print)

For each of the following, determine the result of the conversion using the equalities in the table to the right. (10 points each)

1. 2 miles to kilometers

2. 19 kilometers to furlongs

3. 3.5 meters to inches

4. 90 yards to centimeters

5. 100 fathoms to meters

6. 52 feet to furlongs

7. 3 miles to fathoms

8. 982 meters to yards

9. 1 mile to centimeters

10. 854 furlongs to kilometers

Equalities
1 mile = 5280 feet
1 foot = 12 inches
1 yard = 3 feet
1 fathom = 2 yards
1 inch = 2.54 centimeters
1 furlong = 220 yards
1 meter = 100 centimeters
1 kilometer = 1000 meters

Problem Solving Skills Setup #1

_____ Score

_____ Name(print)

Solve the following **using the equalities in the table**. Show setup only (10 points each unless otherwise noted)

1. Convert 9.45 quarts to pints.

2. Convert 7.11×10^4 microliters to liters.

3. Convert 9.27 quarts to liters.

4. Convert 2011 quarts to gallons.

5. Convert 55.4 liters to milliliters

6. Convert 1.25×10^5 gallons to pints (20 points)

7. Convert 1.84×10^{12} microliters to pints. (30 points)

Equivalents
2 pt = 1 qt
4 qt = 1 gal
1.06 qt = 1 L
10^{-3} L = mL
10^{-6} L = μ L

Problem Solving Skills #5

_____Score

_____Name(print)

For each of the following, determine the appropriate conversion factor using the equalities in the table to the right. (20 points each)

1. 21 dynes to cogs

2. 28 cogs to gits

3. 95 gits to ergs

4. 3 cogs to sprockets

5. 10 ergs to gits

Equalities
2 ergs = 5 gits
3 gits = 4 cogs
1 cog = 17 sprockets
5 cogs = 7 dynes

Scientific Measurements # 5

_____ Score

_____ Name(print)

ENGLISH TO METRIC EQUIVALENTS

Length:	1 m = 1.094 yd	2.54 cm = 1 in
Volume:	1 L = 1.06 qt	1 ft ³ = 28.3 L
Mass:	1 kg = 2.205 lb	453.6 g = 1 lb

Other Useful Equivalents

1 lb = 16 oz	12 in = 1 ft	3 ft = 1 yd	2 pt = 1 qt
60 sec = 1 min	60 min = 1 hr	24 hr = 1 day	4 qt = 1 gal
1 oz = 28.3 g	365.24 day = 1 yr	1 cm ³ = 1 mL	
1 in = 2.54 cm	1 mi = 1760 yd		

Answer the following (20 points each) (no calculator)

Consider the following measurement to answer the questions on this quiz: **6.28×10^{-2} km.**

1. What physical quantity is being measured?
2. Which system is being referenced? English or SI
3. What multiple for the prefix k?
4. Write the measurement in normal notation.
5. Convert the measurement to ft. (show setup only)

Scientific Measurements #11

_____ Score

_____ Name(print)

ENGLISH TO METRIC EQUIVALENTS

Length: 1 m = 1.094 yd 2.54 cm = 1 in

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Mass: 1 kg = 2.205 lb 453.6 g = 1 lb

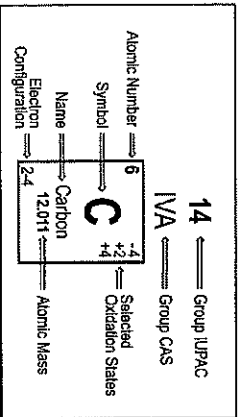
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1 oz = 28.3 g	365.24 day = 1 yr	1 cm ³ = 1 mL	
1 in = 2.54 cm	1 mi = 1760 yd		

Answer the following (25 points each)

1. Show the setup only to convert 3.85×10^5 quarts to gallons
2. Show the setup only to convert 6.52×10^{-8} lbs to oz
3. Show the setup only to convert 8.76×10^5 miles to Gm
4. Show the setup only to convert 1.23×10^{18} ns to years

PERIODIC TABLE OF THE ELEMENTS



1 IA	2 IIA	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8 VIII	9 VIII	10 VIII	11 IB	12 IIB	13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA
1 H 1.0079	2 He 4.0026	3 Li 6.941	4 Be 9.0122	5 B 10.811	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.179	11 Na 22.989	12 Mg 24.305	13 Al 26.982	14 Si 28.086	15 P 30.974	16 S 32.065	17 Cl 35.453	18 Ar 39.948
19 K 39.098	20 Ca 40.078	21 Sc 44.956	22 Ti 47.867	23 V 50.942	24 Cr 51.996	25 Mn 54.938	26 Fe 55.845	27 Co 58.933	28 Ni 58.693	29 Cu 63.546	30 Zn 65.39	31 Ga 69.723	32 Ge 72.64	33 As 74.922	34 Se 78.96	35 Br 79.904	36 Kr 83.80
37 Rb 85.468	38 Sr 87.62	39 Y 88.906	40 Zr 91.224	41 Nb 92.906	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.6	53 I 126.90	54 Xe 131.29
55 Cs 132.91	56 Ba 137.33	57 La 138.905	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97	
87 Fr (223)	88 Ra (226)	89 Ac (227)	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np 237	94 Pu 244	95 Am 243	96 Cm 247	97 Bk 247	98 Cf 251	99 Es 252	100 Fm 257	101 Md 289	102 No 289	103 Lr 262	

Electron Shells

Shell	K	L	M	N	O	P	Q	R
1	2							
2	2	8						
3	2	8	18					
4	2	8	18	32				
5	2	8	18	32	48			
6	2	8	18	32	48	72		
7	2	8	18	32	48	72	98	
8	2	8	18	32	48	72	98	126

Lanthanide

Element	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Atomic Number	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
Electron Configuration	[Xe] 5d ¹ 6s ²	[Xe] 4f ¹ 5d ¹ 6s ²	[Xe] 4f ³ 6s ²	[Xe] 4f ⁴ 6s ²	[Xe] 4f ⁵ 6s ²	[Xe] 4f ⁶ 6s ²	[Xe] 4f ⁷ 6s ²	[Xe] 4f ⁷ 5d ¹ 6s ²	[Xe] 4f ⁷ 6s ²	[Xe] 4f ⁹ 6s ²	[Xe] 4f ¹⁰ 6s ²	[Xe] 4f ¹¹ 6s ²	[Xe] 4f ¹² 6s ²	[Xe] 4f ¹³ 6s ²	[Xe] 4f ¹⁴ 6s ²

Activity Series of Metals (and Hydrogen)

Listed in order of decreasing activity.

- lithium
- potassium
- barium
- strontium
- calcium
- sodium
- cesium
- beryllium
- magnesium
- aluminum
- zinc
- chromium
- gallium
- iron
- cobalt
- nickel
- tin
- lead
- hydrogen
- copper
- mercury
- silver

Activity Series of Non-Metals
Listed in order of decreasing activity.

- fluorine
- chlorine
- bromine
- iodine

Polyatomic Ions

Charge of +1
 Ammonium

Charge of -1
 Acetate

Bisulfide
 HS⁻¹

Bromate
 BrO₃⁻¹

Chlorate
 ClO₃⁻¹

Chlorite
 ClO₂⁻¹

Cyanide
 CN⁻¹

Cyanate
 CNO⁻¹

Dihydrogen Phosphate
 H₂PO₄⁻¹

Dihydrogen Phosphate
 H₂PO₃⁻¹

Hydrogen Carbonate
 HCO₃⁻¹

Hydrogen Sulfate
 HSO₄⁻¹

Hydrogen Sulfite
 HSO₃⁻¹

Hypochlorite
 ClO⁻¹

Hydroxide
 OH⁻¹

Iodate
 IO₃⁻¹

Iodite
 IO₂⁻¹

Nitrate
 NO₃⁻¹

Nitrite
 NO₂⁻¹

Perchlorate
 ClO₄⁻¹

Permanganate
 MnO₄⁻¹

Thiocyanate
 SCN⁻¹

Charge of -2

Carbonate

Chromate

Dichromate

Oxalate

Peroxide

Hydrogen Phosphate

Hydrogen Phosphite

Silicate

Sulfite

Sulfate

Thiosulfate

Charge of -3

Arsenate

Phosphite

NH₄⁺¹

C₂H₃O₂⁻¹

HS⁻¹

BrO₃⁻¹

ClO₃⁻¹

ClO₂⁻¹

CN⁻¹

CNO⁻¹

H₂PO₄⁻¹

H₂PO₃⁻¹

HCO₃⁻¹

HSO₄⁻¹

HSO₃⁻¹

ClO⁻¹

OH⁻¹

CO₃⁻²

CrO₄⁻²

Cr₂O₇⁻²

C₂O₄⁻²

O₂⁻²

HPO₄⁻²

HPO₃⁻²

SiO₃⁻²

SO₃⁻²

SO₄⁻²

S₂O₃⁻²

AsO₄⁻³

PO₃⁻³

Name: _____ Date: _____ Class period: _____



Unit: Chemical Reactions
Bellwork, Day 1: "Remember this?"

Directions: When given the chemical name, write the formula, and when given the formula write the chemical name. (You **NEED** your polyatomic ion sheet!)

1. magnesium sulfate _____

2. dinitrogen hexasulfide _____

3. $\text{Na}_2(\text{CO}_3)$ _____

Find the error!

4. AlF_3 _____

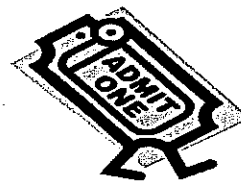
Name: _____ Date: _____ Period: _____

Your Exit Ticket Practice - To Be Handed in Before You Leave Today!

Directions: Convert the following word equation into a formula equation:

fluorine + aluminum bromide \rightarrow bromine + aluminum fluoride

Exit Ticket



Name: Ken Date: _____ Class period: _____

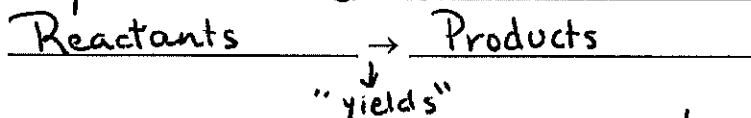
After today, you should be able to:

- Identify and write formulas for the diatomic elements
- Write a formula equation given the word equation for a chemical reaction

Unit: Chemical Reactions

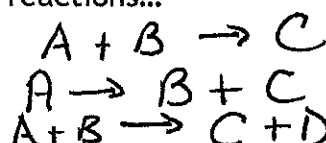
Day 1 Notes - Writing Formula Equations from Word Equations

A chemical equation represents a chemical reaction



Reactants and products are separated from each other with a plus (+) sign.

Common forms of chemical reactions...



Chemical equations can be written as word equations or formula equations

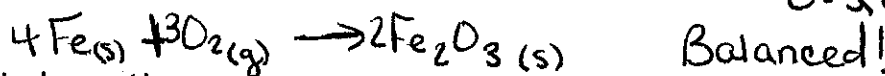
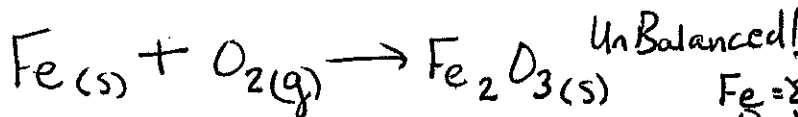
Formula equations can be balanced or unbalanced

Word Equation: Iron + oxygen → Iron (III) Oxide



Formula Equation:

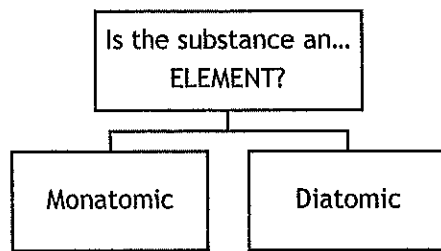
Fe = 54
O = 16



Symbols in chemical equations

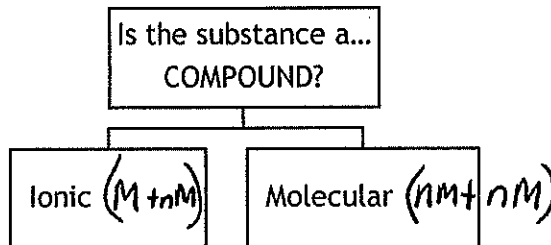
Symbol	Meaning
(s)	Solid
(l)	liquid
(g)	gas
(aq)	aqueous (dissolved in water)
↔	equilibrium (can go either way)
Δ or $\xrightarrow{\text{heat}}$	catalyst (such as heat)
→	yields

To change word equations into formula equations follow the flow chart...



- Just write the symbol
Example: Na = Sodium

- Br₂ I₂ N₂ Cl₂ H₂ O₂ F₂
- Have the subscript "2"
Examples: Bromine = Br₂
Hydrogen = H₂

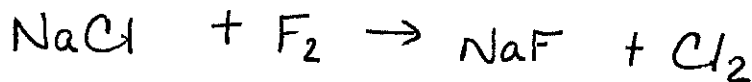


- Balance Charges!
Examples: Calcium chloride = CaCl₂

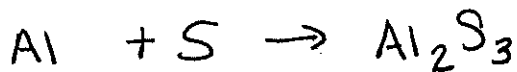
- Prefix for subscripts
Example: dinitrogen tetroxide = N₂O₄

Examples: Convert into formula equations.

1. $\overset{Na^{+1}}{Na} \overset{Cl^{-1}}{Cl} + \text{fluorine} \rightarrow \overset{Na^{+1}}{Na} \overset{F^{-1}}{F} + \text{chlorine}$

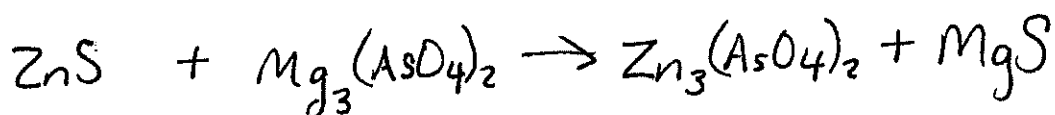


2. ~~Al~~ aluminum + sulfur \rightarrow aluminum sulfide $\overset{Al^{+3}}{Al} \overset{S^{-2}}{S}$



Helpful tip: Keep all substances and + signs in line with each other

3. zinc sulfide + magnesium arsenate \rightarrow zinc arsenate + magnesium sulfide
 $Zn^{+2} S^{-2} \quad Mg^{+2} AsO_4^{-3} \quad Zn^{+2} AsO_4^{-3} \quad Mg^{+2} S^{-2}$



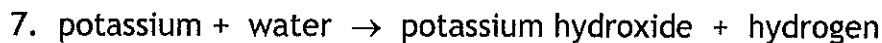
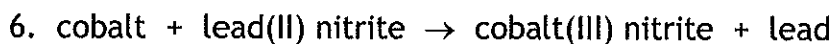
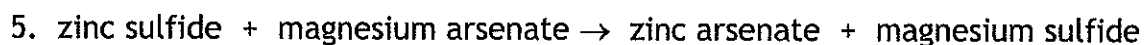
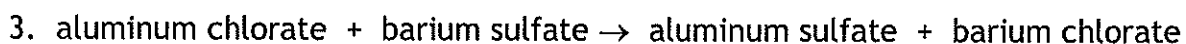
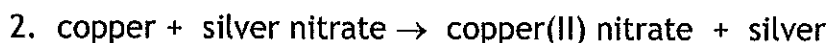
Name: _____ Date: _____ Class period: _____



Unit: Chemical Reactions

“Writing Formula Equations” - WS #1

Directions: Convert the following word equations into formula equations by changing element and compound names into chemical formulas.



8. lithium hydroxide + hydrogen acetate → lithium acetate + water

9. ammonium chloride + nickel(II)chromate → ammonium chromate + nickel(II)chloride

10. phosphorous + oxygen → tetraphosphorous decaoxide ← *find the error*

11. sodium chlorate → sodium chloride + oxygen

12. iron(III) oxide + potassium → potassium oxide + iron

13. sulfur + fluorine → sulfur hexafluoride

14. barium carbonate → barium oxide + carbon dioxide

Name: _____ Date: _____ Class period: _____

Unit: Chemical Reactions

Bellwork, Day 2: "Word Equations into Formula Equations"

Directions: Please convert the following word equations into formula equations.

1. hydrogen + oxygen → water

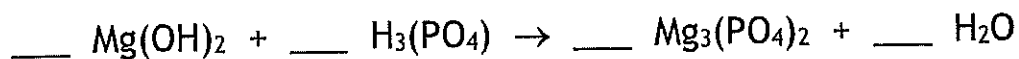
2. copper + tin(IV) sulfite → copper(I) sulfite + tin

Exit Ticket

Name: _____ Date: _____ Period: _____

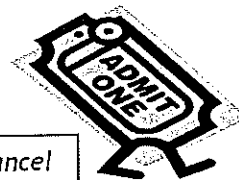
Your Exit Ticket Practice - To Be Handed in Before You Leave Today!

Directions: Balance the following equation.



H₃PO₄ doesn't need ()

Hint: Cross-out H₂O and write H(OH) above it. This will make it much easier to balance!



Name: Key Date: _____ Class period: _____

After today, you should be able to:

- Explain the Law of Conservation of Atoms
- Balance equations using the "tally method"

Unit: Chemical Reactions

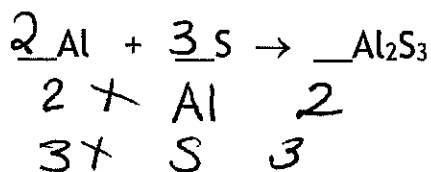
Day 2 Notes - Balancing Equations

Law of Conservation of Atoms: There must be the same number of each type of atom before the reaction as after the reaction

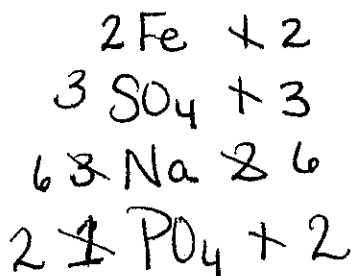
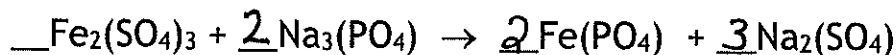
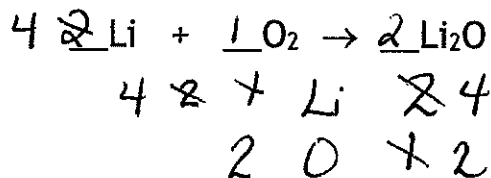
Coefficients: Numbers that go in front of each substance to indicate the number of atoms or molecules that are reacting or being produced.

Examples:

Balance using
"tally" method.



If #s on either side of \rightarrow equal,
then you are balanced.



Helpful Hint!

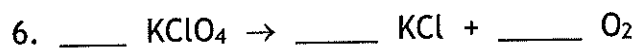
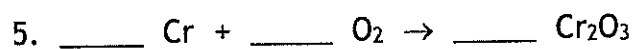
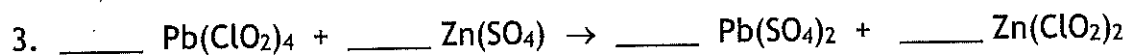
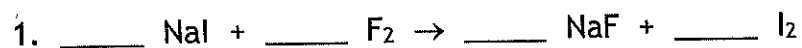
Do not separate
polyatomic ions!

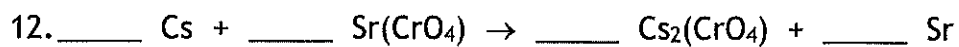
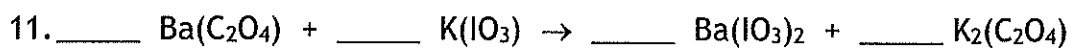
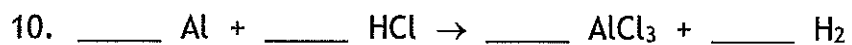
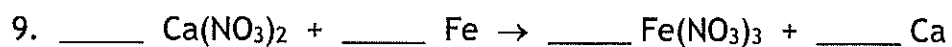
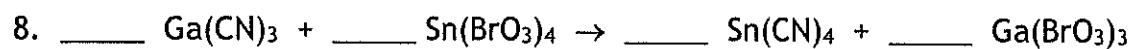
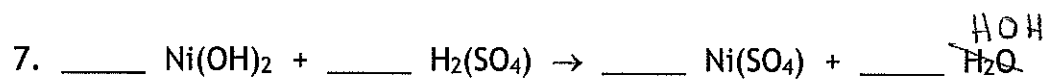
Name: _____ Date: _____ Class period: _____



Unit: Chemical Reactions "Balancing Equations" - WS #2

Directions: Balance the following equations:

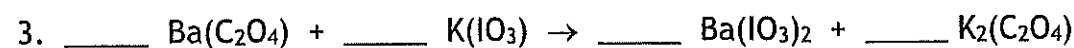
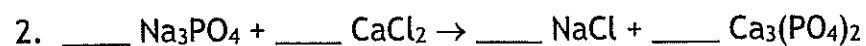
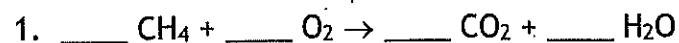




Name: _____ Date: _____ Class period: _____

Unit: Chemical Reactions
Bellwork, Day 3: "Balancing Equations"

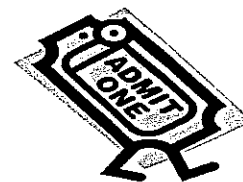
Directions: Please balance the following equations.



Name: _____ Date: _____ Period: _____

Your Exit Ticket Practice - To Be Handed in Before You Leave Today!

Directions: Convert the following word equation into a balanced formal equation.



Exit Ticket

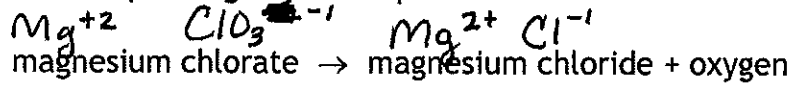
After today, you should be able to:

- Write balanced formula equations from word equations

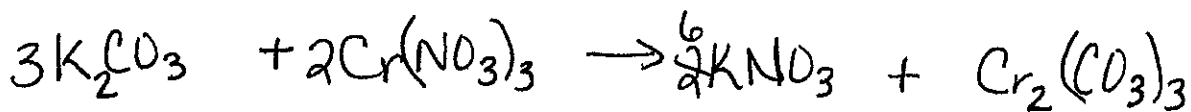
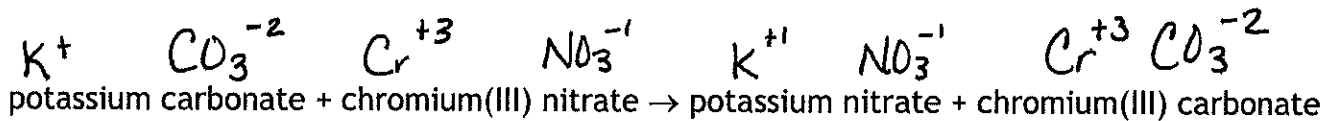
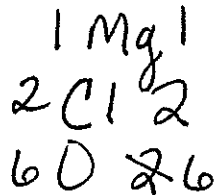
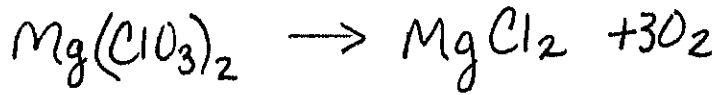
Unit: Chemical Reactions

Day 3 Notes - Writing Formula Equations and Balancing

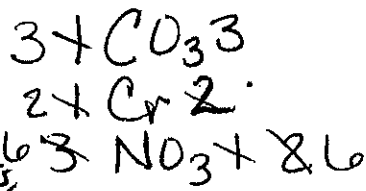
Examples: Write the corresponding formula equation and balance it.



Hint: if a polyatomic breaks up going from Reactants to Products, you need to break it up to balance the equation.



Hint: if polyatomic keeps the same appearance from Reactants to products,



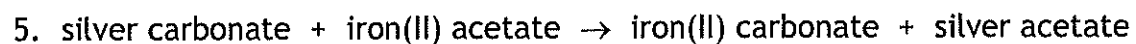
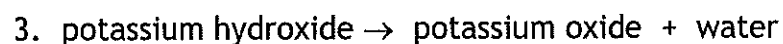
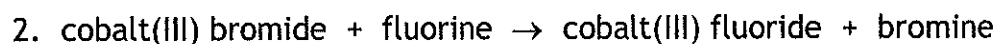
Keep it together to balance

Name: _____ Date: _____ Class period: _____



Unit: Chemical Reactions "Putting it Together" - WS #3

Directions: Convert the following word equations into formula equations then balance them.



6. copper(I) phosphate + nickel → nickel (II) phosphate + copper

7. sodium iodide + magnesium chlorate → magnesium iodide + sodium chlorate

8. iron(III) chromate + lithium nitrate → iron(III) nitrate + lithium chromate

9. aluminum chlorate → aluminum chloride + oxygen

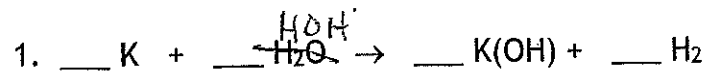
10. barium + $\overset{\text{HOH}}{\text{water}}$ → barium hydroxide + hydrogen

Name: _____ Date: _____ Class period: _____

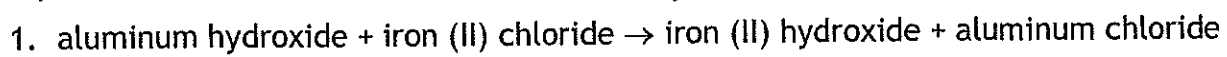
Unit: Chemical Reactions

Bellwork, Day 4: "Problem areas to watch out for..."

Directions: Please balance the following equation.



Directions: Please convert the word equation into the formula equation, and balance the equation.



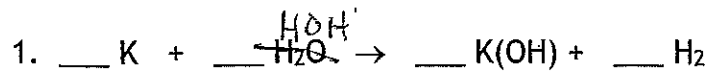
Name: _____ Date: _____

Class period: _____

Unit: Chemical Reactions

Bellwork, Day 4: "Problem areas to watch out for..."

Directions: Please balance the following equation.



Directions: Please convert the word equation into the formula equation, and balance the equation.



Name: _____ Date: _____ Class period: _____

After today, you should be able to:

- Identify synthesis and decomposition reactions
- Use patterns to predict the products of synthesis and decomposition reactions

Unit: Chemical Reactions

Day 4 Notes - Types of Reactions: Synthesis and Decomposition

- 1) Synthesis
- 2) Decomposition
- 3) Single Replacement
- 4) Double Replacement
- 5) Combustion

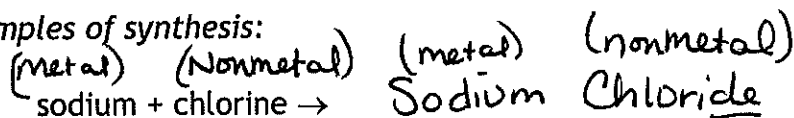
Predicting Products

1) Synthesis: 2 elements combine to form a compound

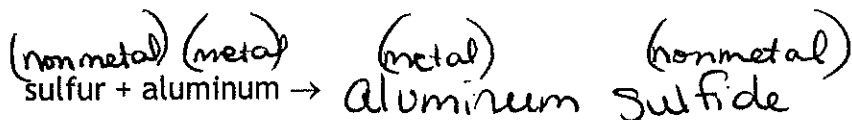
Common form:



Examples of synthesis:

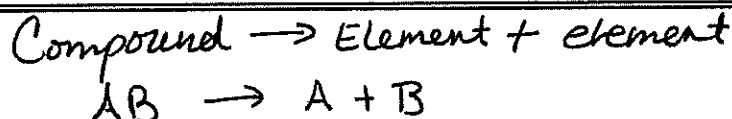


Metals come first in ionic bond names!

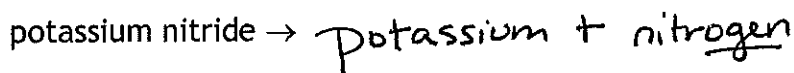


2) Decomposition: A compound breaks down into elements and/or smaller compounds

Common form:

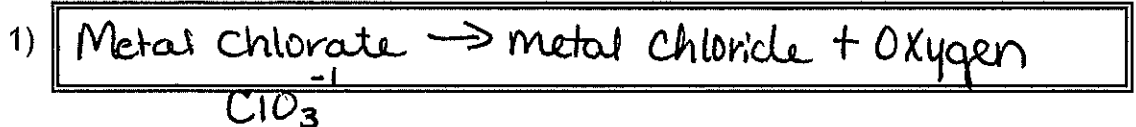


Example of decomposition:

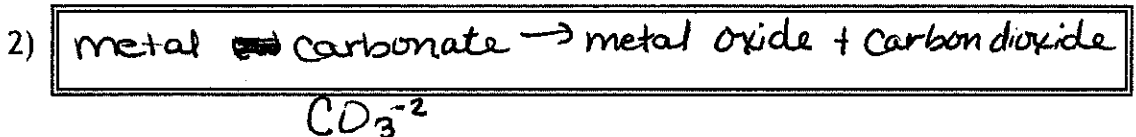
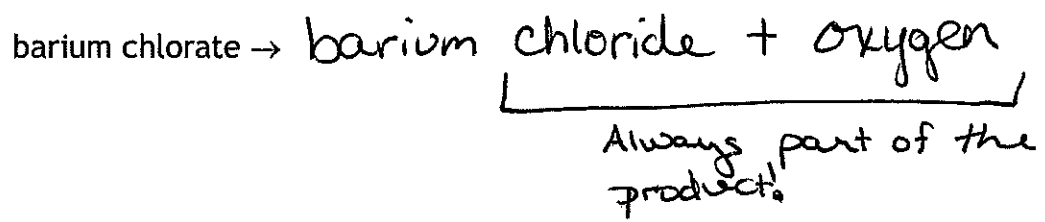


Go back to non-metal's original ending.

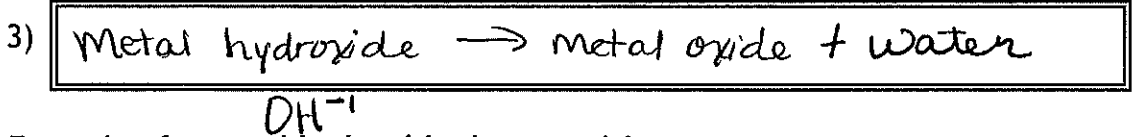
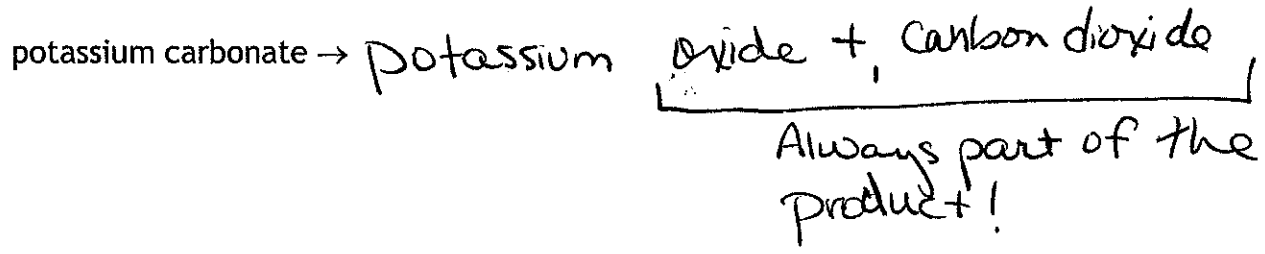
Examples of "Special Decompositions":



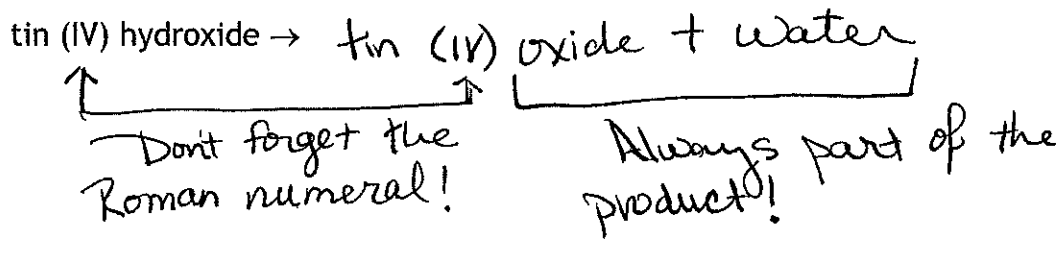
Example of a metal chlorate decomposition:



Example of a metal carbonate decomposition:



Example of a metal hydroxide decomposition:



Name: _____ Date: _____ Class period: _____



Unit: Chemical Reactions

"Predicting Products - S/D" - WS #4

Directions: Predict the products for each of the following reactions in words.

1. barium + oxygen →

2. magnesium + sulfur →

3. fluorine + calcium →
Metal 1st!

4. potassium + iodine →

5. aluminum + phosphorus →

6. bromine + sodium →
Metal 1st!

7. gallium + chlorine →

8. lithium + nitrogen →

9. oxygen + strontium →
Metal 1st!

10. sodium + phosphorus →

11. silver + iodine →

12. zinc + nitrogen →

13. potassium chloride →

14. iron(III) oxide →

15. sodium sulfide →

16. magnesium nitride →

17. calcium chlorate →
Oxygen is a product

18. strontium hydroxide →
Water is a product

19. lithium carbonate →
Carbon dioxide is a product

20. silver fluoride →

21. tin(IV) chlorate →
Oxygen is a product

22. zinc phosphide →

23. copper(I) hydroxide →
Water is a product

24. nickel (II) bromide →

Name: _____ Date: _____ Class period: _____

Unit: Chemical Reactions

Bellwork, Day 5: "Synthesis and Decomposition Reactions"

Directions: Please predict the products in words for the following word equations.

1. calcium hydroxide →
water is a product

2. oxygen + magnesium →
metal 1st!

3. silver nitride →

After today, you should be able to:

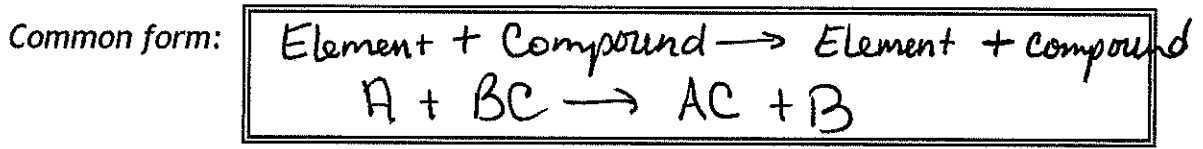
- Identify single replacement reactions
- Use patterns to predict products of single replacement reactions
- Predict whether or not a single replacement reaction will occur

Unit: Chemical Reactions

Day 5 Notes - Types of Reactions: Single Replacement

Predicting Products

3) Single Replacement: An element and compound react to form a different element and different compound



- These reactions do not always occur in nature (they're impossible)
- You must use the "activity series" sheet
- "Like will replace like" - metals always replace metals, etc.

Examples of single replacements:

(1) A metal in a compound is replaced by a more active metal

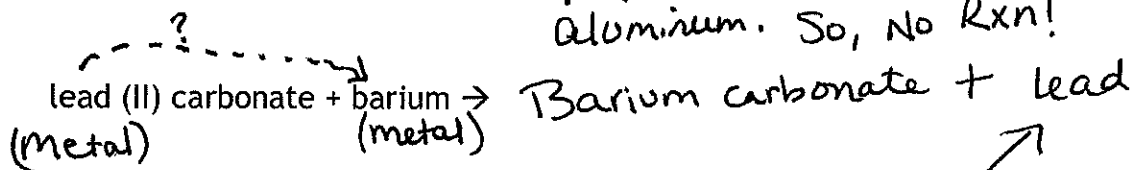


Since lithium is listed higher than zinc on "activity series" sheet, therefore → Lithium is more reactive than zinc.

the reaction goes forward!

$$\begin{array}{c} \text{---} \quad \text{---} \quad \text{---} \quad \text{---} \\ \text{copper} + \text{aluminum sulfate} \rightarrow \text{No Reaction!} \\ \text{(metal)} \quad \text{(metal)} \end{array}$$

Copper is lower on "activity series" sheet & therefore is less reactive than aluminum. So, No Rxn!



Barium is higher (ie more reactive) than lead, so reaction proceeds.

↑
No Roman numeral necessary when it's by itself.

(2) Hydrogen in water is replaced by a more active metal

hydrogen hydroxide
sodium + water \rightarrow

Sodium hydroxide + Hydrogen

1st change ^(H₂O) water to hydrogen hydroxide (HOH)

2nd Look at activity series.

3rd Sodium is "more" reactive than hydrogen b/c it's listed higher on "activity series" sheet

So, Reaction occurs.

(3) Hydrogen in acid is replaced by a more active metal

hydrogen phosphate
Example: calcium + phosphoric acid \rightarrow

Calcium phosphate + Hydrogen

Since calcium is more reactive than hydrogen, it will replace hydrogen

Helpful tip: Change acid name to ionic name.

(4) A nonmetal in a compound is replaced by a more active nonmetal

Example: fluorine + magnesium iodide \rightarrow
(nonmetal) (nonmetal)

magnesium Fluoride + iodine

* Look at "activity series" for non-metals *

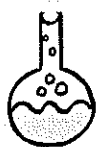
Fluorine is higher than iodine so it's strong enough to replace iodine.

Watch your endings!

Make sure "like Replaces like"

In this example, nonmetal Replaces non-metal.

Name: _____ Date: _____ Class period: _____



Unit: Chemical Reactions "Predicting Products - SR" - WS #5

Directions: Predict the products for each of the following reactions in words.

1. calcium + magnesium sulfide →

2. sodium + silver chloride →

3. iron(II) sulfide + potassium →

4. barium + aluminum nitrate →

5. potassium iodide + chlorine →

6. zinc + lead(IV) chloride →

7. silver + sulfuric acid →

8. barium + water →

9. tin + hydrochloric acid →

*don't worry about Roman
numerals in product*

10. gallium bromide + fluorine →

11. water + potassium →

*Oops!
Mrs. Lewis
almost
burnt vase*

Time of combustion Ben

Name: _____ Date: _____ Class period: _____

Unit: Chemical Reactions

Bellwork, Day 6: "Loaded question... Muahaha!"

Directions: Please answer each of the following questions to the best of your ability.

zinc + arsenic acid →

1. What type of reaction is this?
2. Using the reaction above, write out the word equation:
3. Write the balanced formula equation below:



After today, you should be able to:

- Identify double replacement and combustion reactions
- Use patterns to predict the products of double replacement and combustion reactions
- Predict the products in words for double replacement reactions
- Predict the products and balance combustion reactions

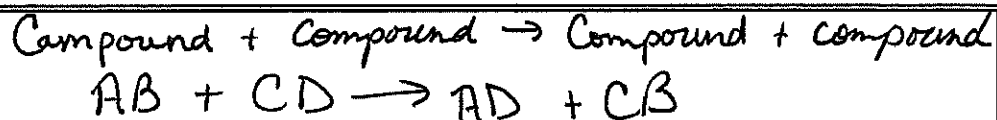
Unit: Chemical Reactions

Day 6 Notes - Types of Chemical Reactions: Double Replacement and Combustion

Predicting Products

4) Double Replacement: Two compounds react to form two new compounds

Common form:



Examples of a double replacement:

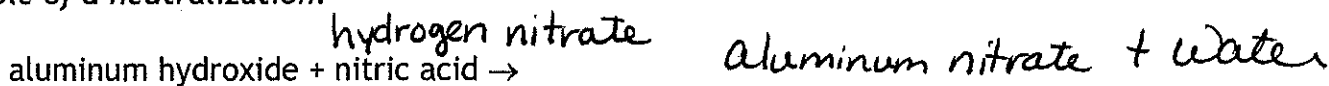


Do not use "activity series" sheet for these!

A neutralization reaction is a type of double replacement reaction.

Neutralization Reaction: A neutralization reaction is a reaction between an acid and a base (base - a metal hydroxide ex: NaOH)

Example of a neutralization:

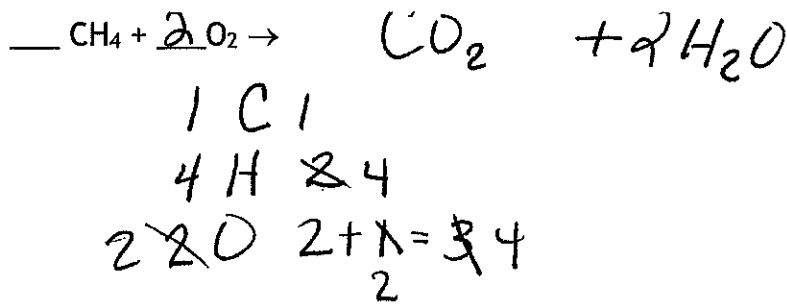


Water will always be a product!

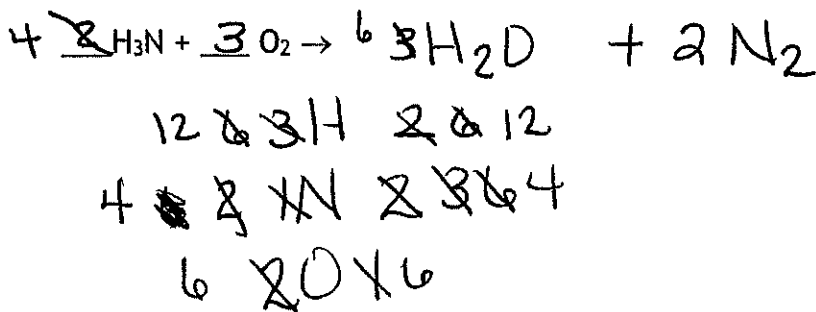
5) Combustion: A reaction with oxygen (O₂)

If your reactant contains:	The product will be:
C	CO ₂
H	H ₂ O
S	SO ₂
N	N ₂

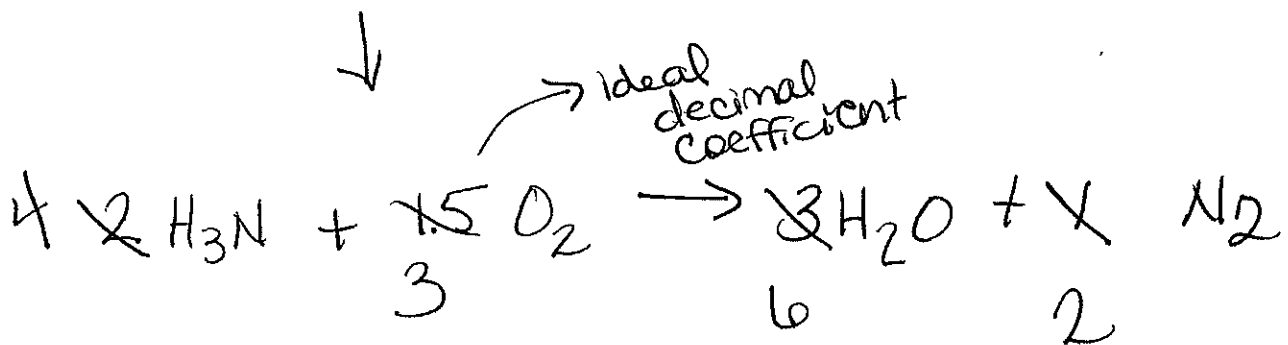
Examples: Predict the products and balance.



Helpful tip: Balance the O₂ ~~last!~~ ^{last!}



Helpful tip: Put the ideal decimal coefficient, then ~~double~~ ^{double} all coefficients to balance.



Name: _____ Date: _____ Class period: _____

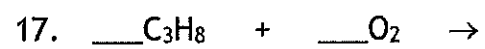
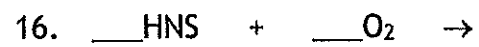
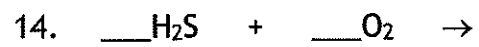


Unit: Chemical Reactions "Predicting Products - DR/C" - WS #6

Directions: Predict the products in words for the following double replacement reactions:

1. barium chloride + sodium phosphate →
2. lithium sulfate + magnesium nitrate →
3. potassium oxide + calcium chlorate →
4. sodium hydroxide + nitric acid →
5. silver acetate + tin(IV) nitride →
6. lead(II) iodide + strontium carbonate →
7. magnesium hydroxide + acetic acid →
8. zinc oxide + cobalt(III) nitrite →
Cobalt (II) produced
9. calcium hydroxide + phosphoric acid →
10. copper(I) dichromate + iron(III) arsenate →
Iron(II) produced
11. hydrochloric acid + aluminum hydroxide →

Directions: Write the products for the following reactions then balance!



FORMULA WRITING

Chemical substances are described by names and formulas. A chemical formula is a shorthand method for indicating a compound. The formulas for ionic compounds are determined by the charges on the ions. In this activity, you will use cards to represent ions and put them together to make compounds. You will then determine the formula for the ionic compound.

Procedure:

1. Obtain two ions sheets (one positive and one negative). Cut out all of the ions discarding all waste in the trash can.
2. Put the ions together to form the compounds below. All compounds should be represented by a rectangle. (Fill all indentations and cover all points.)
3. Glue the ion cards in your notebook. Write the name and formula near each compound.

NOTE:

- Positive ions are written first in a formula.
- Subscripts follow the symbol and indicate the number of atoms of each element present.
- One's are understood and not written as subscripts.

Results:

1. sodium chloride ~~[scribbled]~~
2. barium oxide ~~[scribbled]~~
3. aluminum nitride ~~[scribbled]~~
4. potassium sulfide ~~[scribbled]~~
5. magnesium fluoride ~~[scribbled]~~
6. lithium nitride ~~[scribbled]~~
7. aluminum bromide ~~[scribbled]~~
8. calcium phosphide ~~[scribbled]~~
9. iron (III) oxide ~~[scribbled]~~

Conclusion:

Describe how you would determine the formula for an ionic compound without using ion cards. Use specific examples in your discussion.

ANIONS

72

P^{3-}	P^{3-}	S^{2-}	O^{2-}
N^{3-}	N^{3-}	O^{2-}	O^{2-}
O^{2-}	O^{2-}	O^{2-}	O^{2-}
F^{-}	F^{-}	Br^{-}	Br^{-}
F^{-}	F^{-}	Br^{-}	Br^{-}
Cl^{-}	Cl^{-}	Br^{-}	Br^{-}

CATIONS

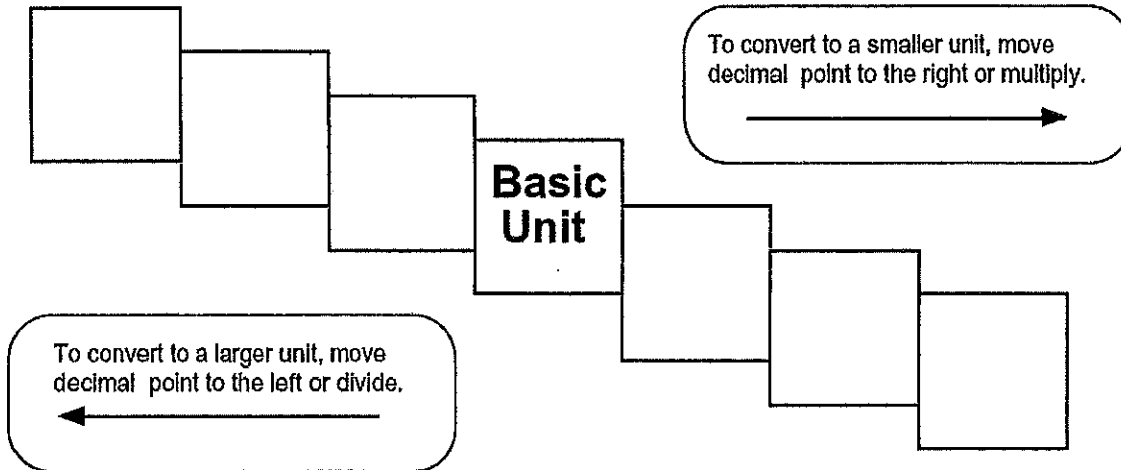
Na^{+}	Mg^{2+}	Al^{3+}	Fe^{3+}
K^{+}	K^{+}	Al^{3+}	Fe^{3+}
K^{+}	Ca^{2+}	Ca^{2+}	Ca^{2+}
Li^{+}	Li^{+}	Li^{+}	Ca^{2+}
Li^{+}	Li^{+}	Li^{+}	Ca^{2+}
Li^{+}	Li^{+}	Li^{+}	Ca^{2+}
Ba^{2+}	Ba^{2+}	Ba^{2+}	Ba^{2+}

Metric Mania

Name _____

Metric Conversions

Fill in the boxes in the stair step diagram.



Try these conversions using the ladder method.

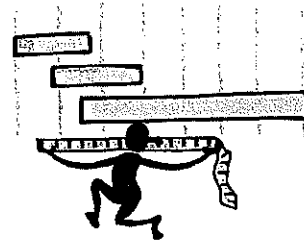
1000 mg = _____ g 1 L = _____ mL 160 cm = _____ mm

14 km = _____ m 109 g = _____ kg 250 m = _____ km

Compare using $<$, $>$, or $=$.

56 cm \bigcirc 6 m

7 g \bigcirc 698 mg



Metric Mania

Name _____

Metric Conversion Practice

Write the correct abbreviation for each metric unit.

1) Kilogram _____

4) Milliliter _____

7) Kilometer _____

2) Meter _____

5) Millimeter _____

8) Centimeter _____

3) Gram _____

6) Liter _____

9) Milligram _____

Try these conversions, using the ladder method.

10) 2000 mg = _____ g

15) 5 L = _____ mL

20) 16 cm = _____ mm

11) 104 km = _____ m

16) 198 g = _____ kg

21) 2500 m = _____ km

12) 480 cm = _____ m

17) 75 mL = _____ L

22) 65 g = _____ mg

13) 5.6 kg = _____ g

18) 50 cm = _____ m

23) 6.3 cm = _____ mm

14) 8 mm = _____ cm

19) 5.6 m = _____ cm

24) 120 mg = _____ g

Compare using $<$, $>$, or $=$.

25) 63 cm 6 m

27) 5 g 508 mg

29) 1,500 mL 1.5 L

26) 536 cm 53.6 dm

28) 43 mg 5 g

30) 3.6 m 36 cm

Challenge: Create three conversion problems for your classmates along with the correct answers.

Name _____

Calculate the molar masses of the following chemicals:

