

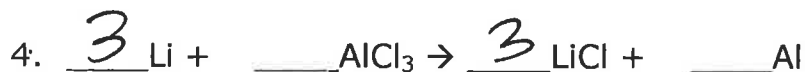
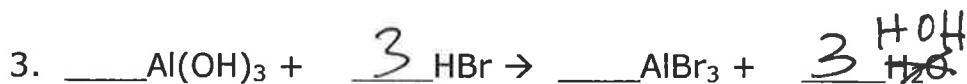
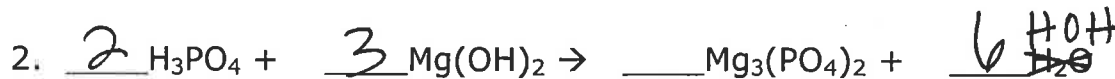
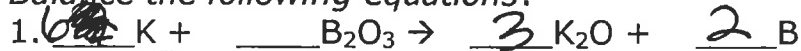
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Chemical Equations and Stoichiometry Review

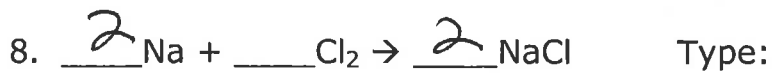
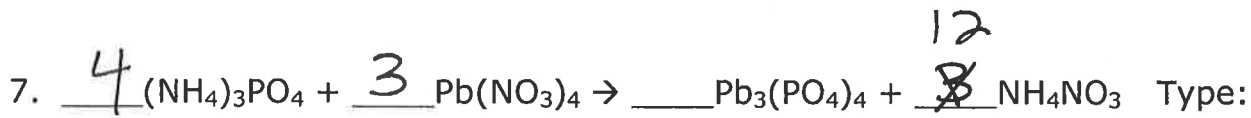
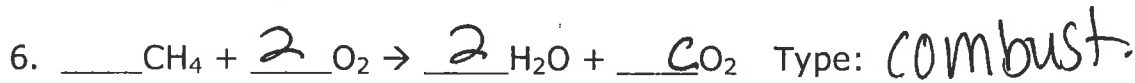
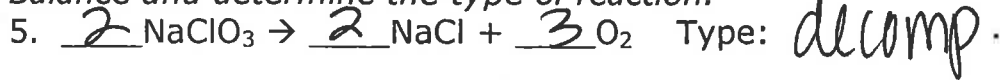
Balancing Equations:

Balance the following equations:



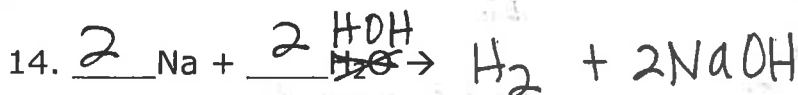
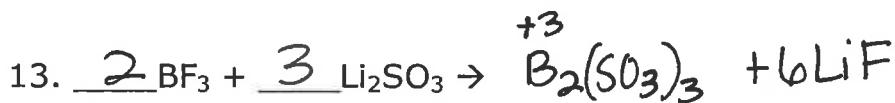
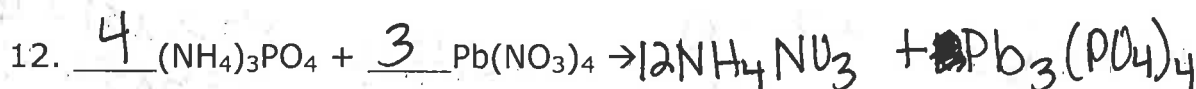
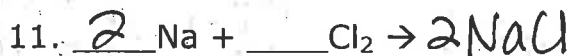
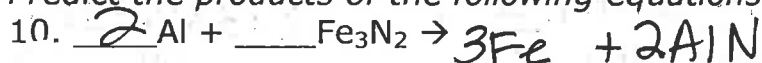
Types of Reactions:

Balance and determine the type of reaction.



Predicting Products:

Predict the products of the following equations.



Mole Conversions:

Perform the following conversions.

15. Determine the number of moles in 35.2 grams of $\text{C}_6\text{H}_{12}\text{O}_6$.

$$35.2 \text{ g } \text{C}_6\text{H}_{12}\text{O}_6 \times \frac{1 \text{ mol}}{180 \text{ g}} = .20 \text{ mol}$$

$\text{C} = 6 \times 12 = 72$
 $\text{H} = 12 \times 1 = 12$
 $\text{O} = 6 \times 16 = 96$
 $180 \frac{\text{g}}{\text{mol}}$

16. Determine the number of moles in 152.3 grams of $\text{Mg}_3(\text{PO}_4)_2$.

$$152.3 \text{ g } \times \frac{1 \text{ mol}}{262 \text{ g}} = 0.58 \text{ mol } \text{Mg}_3(\text{PO}_4)_2$$

$$\begin{aligned} \text{Mg} &= 3 \times 24 = 72 \\ \text{P} &= 2 \times 31 = 62 \\ \text{O} &= 8 \times 16 = 128 \\ & \underline{262} \end{aligned}$$

17. Determine the number of moles in 65.23 grams of chromium (II) nitrate.

$$65.23 \text{ g } \text{Cr}(\text{NO}_3)_2 \times \frac{1 \text{ mol}}{176 \text{ g}} = .37 \text{ mol } \text{Cr}(\text{NO}_3)_2$$

$$\begin{aligned} \text{Cr} &= 1 \times 52 = 52 \\ \text{N} &= 2 \times 14 = 28 \\ \text{O} &= 6 \times 16 = 96 \\ & \underline{176} \end{aligned}$$

18. Determine the number of grams in 8.2 moles of $(\text{NH}_4)_2\text{CO}_3$.

$$8.2 \text{ mol } (\text{NH}_4)_2\text{CO}_3 \times \frac{96 \text{ g } (\text{NH}_4)_2\text{CO}_3}{1 \text{ mol } (\text{NH}_4)_2\text{CO}_3} = 787.2 \text{ g } (\text{NH}_4)_2\text{CO}_3$$

$$\begin{array}{l} \text{N} = 2 \times 14 = 28 \\ \text{H} = 8 \times 1 = 8 \\ \text{C} = 1 \times 12 = 12 \\ \text{O} = 3 \times 16 = 48 \\ \hline 96 \end{array}$$

19. Determine the number of grams in 23.1 moles of NaClO_3 .

$$23.1 \text{ mol } \text{NaClO}_3 \times \frac{106 \text{ g}}{1 \text{ mol}} = 2,448.6 \text{ g } \text{NaClO}_3$$

$$\begin{array}{l} \text{Na} = 1 \times 23 = 23 \\ \text{Cl} = 1 \times 35 = 35 \\ \text{O} = 3 \times 16 = 48 \\ \hline 106 \end{array}$$

20. Determine the number of grams in 10.2 moles of diphosphorus pentasulfide.

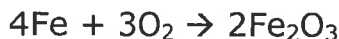
$$10.2 \text{ mol } \text{P}_2\text{S}_5 \times \frac{222 \text{ g}}{1 \text{ mol}} = 2264.4$$

$$\begin{array}{l} \text{P} = 2 \times 31 = 62 \\ \text{S} = 5 \times 32 = 160 \\ \hline 222 \end{array}$$

Mole Ratio:

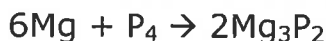
Solve the following problems using mole ratios.

21. How many moles of O_2 are needed if we wish to make 6.2 moles of Fe react?



$$\frac{6.2 \text{ mol Fe}}{x \text{ mol O}_2} = \frac{4 \text{ mol Fe}}{3 \text{ mol O}_2} \quad \frac{6.2 \times 3}{4} = 4.65 \text{ mol O}_2$$

22. How many moles of Mg are needed in order to produce 2.8 moles of Mg_3P_2 ?



$$\frac{2.8 \text{ mol Mg}_3\text{P}_2}{x \text{ mol Mg}} = \frac{2 \text{ mol Mg}_3\text{P}_2}{6 \text{ mol Mg}} = 8.4 \text{ mol Mg}$$

23. If 8.45 moles of magnesium chloride react with enough aluminum, how many moles of aluminum chloride are produced?



$$\frac{8.45 \text{ mol MgCl}_2}{x \text{ mol AlCl}_3} = \frac{3 \text{ mol MgCl}_2}{2 \text{ mol AlCl}_3} = 5.63 \text{ mol AlCl}_3$$

Stoichiometry:

Solve for the following stoichiometry problems.

1. Find the mass of oxygen required to react with 28.4 g of ethyl alcohol, C_2H_5OH , according to the following equation.

$$\begin{aligned} C &= 2 \times 12 = 24 \\ H &= 5 \times 1 = 5 \\ O &= 1 \times 16 = 16 \\ H &= 1 \times 1 = 1 \\ \hline &46 \\ O &= 2 \times 16 = 32 \end{aligned}$$

$$C_2H_5OH(l) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(l)$$

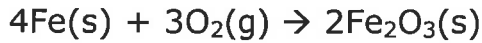
28.4g	Xg	 	
$46 \frac{g}{mol}$	$32 \frac{g}{mol}$	 	
1 mol	3 mols	 	

$$= 59.3 g O_2$$

molar mass

moles

25. What is the mass of iron(III) oxide, Fe_2O_3 , produced by the rusting of 10.0 g of iron with excess oxygen?

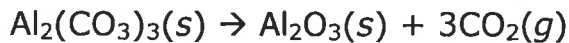


10g	 	Xg
$56 \frac{g}{mol}$	 	$160 \frac{g}{mol}$
4 mol	 	2 mol

$$\begin{aligned} Fe &= 2 \times 56 = 112 \\ O &= 3 \times 16 = 48 \\ \hline &160 \frac{g}{mol} \end{aligned}$$

$$= 14.3 g Fe_2O_3$$

26. How many moles of carbon dioxide is produced by the decomposition of 72 g of aluminum carbonate, $Al_2(CO_3)_3$, according to the following equation.



72g	 	X mol
$234 \frac{g}{mol}$	 	X
1 mol	 	3 mol

$$= \underline{\underline{.923 mol CO_2}}$$

$$\begin{aligned} Al &= 2 \times 27 = 54 \\ C &= 3 \times 12 = 36 \\ O &= 9 \times 16 = 144 \\ \hline &234 \frac{g}{mol} \end{aligned}$$

