

The most important point to remember when dealing with chemical equations is that the amount of an element on one side of the equation must equal the amount of that element on the other side of the equation. This is true for each element involved in the reaction. This rule is referred to as the law of conservation of mass.

When balancing chemical reactions you may add coefficients in front of the compounds to balance the reaction, but you can not change the subscripts. Changing the subscripts changes the compounds.

Steps for Balancing Equations:

There are four basic steps to balance a chemical equation:

- Write the correct formula for the reactants and the products. DO NOT TRY TO BALANCE IT YET! You write the correct formulas first! Once you write them correctly, DO NOT CHANGE THE FORMULAS!
- 2) Find the number of atoms for each element on the left side . Compare against the number of the atoms of the same element on the right side.
- 3) Determine where to place coefficients in front of the formulas so that the left side has the same number of atoms as the right side for each element in order to balance the equation.
- 4) CHECK YOUR ANSWER TO SEE IF:
 - The number of atoms on both sides of the equation are now balanced
 - The coefficients are in the lowest possible whole ratios. (Reduce)

Here are some helpful hints for balancing:

- Take one element at a time, working from left to right except for Hydrogen (H) and Oxygen(O). Save H for next to last, and O until last.
- If everything balances except for O, and there is no way to balance O with a whole number, double all coefficients and try again. (Remember, O is diatomic as an element.
- Polyatomic ions that appear on both sides of the equation should be balanced as independents units.



IDENTIFYING/BALANCING CHEMICAL REACTIONS For each of the following: (a) Choose the correct responses for the balancing of each reaction. (b) Identify the reaction type. Write your answers on the summary sheet. 1) ____ NaOH (aq) + ___ CaBr₂ (aq) → ___ Ca(OH)₂ (s) + ____ NaBr (aq) A. 1,1,1,1 B. 2,1,1,2 C. 2,2,1,2 Type of reaction: ____ A. synthesis B. decomposition C. single replacement D. double replacement E. combustion 2) ____ N_{2 (g)} + ___ H₂ (g) \rightarrow ___ NH_{3 (g)} A. 1,3,2 B. 1,3,1 C. 1,2,1 Type of reaction: A. synthesis **B.** decomposition C. single replacement D. double replacement E. combustion $C_3H_8(q) + ____O_2(q) \rightarrow ____CO_2(q) + ____H_2O(q)$ 3) A. 1,3,3,4 B. 1,4,3,4 C. 1,5,3,4 Type of reaction: A. synthesis B. decomposition C. single replacement D double replacement E. combustion Pb (s) + ____ H₃PO_{4 (aq)} \rightarrow ____ H_{2 (g)} + ____ Pb₃(PO₄)_{2 (s)} 4) A. 3,2,3,1 B. 3,3,3,1 C. 3,4,3,1 Type of reaction: A. synthesis B. decomposition C. single replacement D. double replacement E. combustion

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9)	NH ₃	(\rightarrow)	N2 (a) +	H2 (g)

A. 2,1,2 B. 2.1.3	
C. 2.2.1	
Type of reaction:	
A. synthesis	
B, decomposition	
C. single replacement	
D. double replacement	
E. compustion	
10) Li (s) + AgNO ₃ (sq) →	Ag (s) + LINO3 (aq)

A. 3,2,1,1 B, 2,1,1,1 C 1,1,1,1 Type of reaction: A. synthesis B, decomposition C single replacement D. double replacement E. combustion

emistry: Balancing Chemical Equations

actions: First, balance each of the chemical equations below. Then, classify each reaction as synthesis, decomposition, single-replacement, or double-replacement. To earn full credit, write the words o when classifying.

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ance the equation	and classify it.
$_$ Sb + $_$ Cl ₂ \rightarrow $_$ SbCl ₃	
Mg +O₂ →MgO	
CaCl ₂ → Ca + Cl ₂	
NaClO3 → NaCl + O2	
Fe + HCl → FeCl₂ + H₂	
CuO +H₂ →Cu +H₂O	
$AI + \ H_2SO_4 \rightarrow \ AI_2(SO_4)_3 + \ H_2$	
$\underline{\qquad MgBr_2 + \underline{\qquad Cl_2 \rightarrow \underline{\qquad MgCl_2 + \underline{\qquad Br_2}}}$	
SnO ₂ +C →Sn +CO	
$\underline{\qquad} Pb(NO_3)_2 + \underline{\qquad} H_2S \rightarrow \underline{\qquad} PbS + \underline{\qquad} HNO_3$	
HgO →Hg +O₂	
KCłO₃ → KCl + O₂	1
$N_2 + H_2 \rightarrow NH_3$	
NaBr +Ci ₂ →NaCl +Br ₂	
$2n + AgNO_3 \rightarrow Zn(NO_3)_2 + Ag$	
Sn +Cl₂ →SnCl₄	
Ba(OH)₂ → BaO + H₂O	

***SCIENCE 1206 Section 2:

For each of the following skeleton chemical equations:

a) <u>Identify the type of reaction</u>. Remember that the five identifiable types of reactions are synthesis (composition), decomposition, single displacement (replacement), double displacement (replacement), and hydrocarbon combustion.

b) Balance the equation.

1) ____Na_3PO_4 (aq) + ____KOH (aq)
$$\rightarrow$$
 ____NaOH (aq) + ___K_3PO_4 (aq)
2) ____MgCl_2 (aq) + ___Ll_2CO_3 (aq) \rightarrow ____MgCO_3 (a) + ____LiCl (aq)
3) ___C_{0}H_{12} (10 + ___O_2 (g) \rightarrow CO₂ (g) + __H_2O (g)
4) ___Pb (a) + ___FeSO_4 (aq) \rightarrow ___PbSO_4 (aq) + ___Fe (a)
5) ___CaCO_3 (a) \rightarrow ___CaO (a) + ___CO_2 (g)
6) ___P4 (a0 + ___O_2 (g) \rightarrow ___P2O_3 (a)
7) ___RbNO_3 (aq) + ___BeF_2 (aq) \rightarrow ___Be(NO_3)₂ (aq) + ___RbF (aq)
8) ___AgNO_3 (aq) + ___Cu (a) \rightarrow __Cu(NO_3)₂ (aq) + ___Ag (a)
9) ___C_3H_6O (1) + __O_2 (g) \rightarrow __CO_2 (g) + ___H_2O (g)
10) ___CeH_5 (g) + ___Fe (a) \rightarrow Fe(CeH_5)₂ (a)
11) ___SeCl_6 (a) + ___O_2 (g) \rightarrow ___SeO_2 (a) + 3Cl_2 (g)
12) ___Mgl_2 (aq) + ___Mn(SO_3)_2 (aq) \rightarrow ___MgSO_3 (1) + ___Mnl_4 (1)
13) ___O_3 (g) \rightarrow ___O (g) + ___O_2 (g)

ALANCING (SHEMICAL REACTIONS
or each at the	
or each or the Balance the	7 following; 3 skeleton equations and
) Indicate whi	ich of the 5 types of chemical reaction is represented.
NaOH ((aq) + CaBr ₂ (aq) \rightarrow Ca(OH) ₂ (a) + NaBr (aq)
•	Type of reaction:
Nz	(g) + H ₂ (g) \rightarrow NH ₃ (g)
	Type of reaction:
•	•
CaH	$H_{2}(g) + \underline{O}_{2}(g) \rightarrow \underline{O}_{2}(g) + \underline{H}_{2}O(g)$
•	Type of reaction:
	•
Pb ((s) + H_3PO ₄ (aq) \rightarrow H_2 (g) + Pb_3(PO ₄) ₂ (a)
	Type of reaction:
Ll ₃ N	$I + \ NH_4NO_3 \rightarrow \ LINO_3 + \ (NH_4)_0N$
	Type of reaction:
HBr	(aq) + AI(OH)_s (aq) \rightarrow HOH (i) + AIBirs
· .	Type of reaction:
	Α
KCIO	$s(s) \rightarrow \underline{KCl}(s) + \underline{O_2}(g)$
, ·	Type of reaction:
H2 (0)	+ $O_2 (g) \rightarrow H_2O_m$
· (Type of reaction
NHs t	$\mu \rightarrow \underline{\qquad} N_2 (\mu) + \underline{\qquad} H_2 (q)$
	Type of reaction:

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