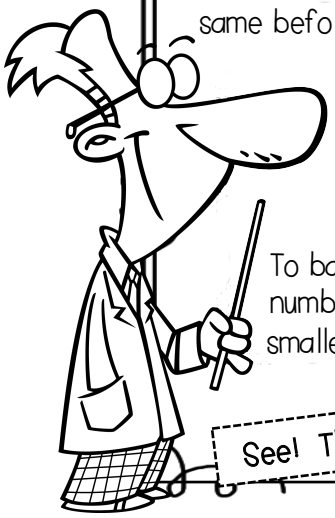
Name _____ Date _____ Section _____

Introduction to Balancing Equations



The Law of Conservations of Mass tells us that the total amount of matter is neither created nor destroyed during any physical or chemical change. Therefore, the mass stays the same before and after a chemical reaction.

Chemical equations demonstrate this principle because they are always balanced. The total mass of the reactants must equal the total mass of the products. You can check to see if an equation is balanced by counting up the number of atoms- it has to be the same on each side of the equation.

To balance an equation, you can adjust the coefficients until there are the same number of each type of atom on both sides. You are never allowed to change the smaller numbers that make up the chemical formulas.

See! This is balanced!

$N_2 + 3\ F_2 \rightarrow 2\ NF_3$

2 nitrogens and 6 fluorines on this side...

and 2 nitrogens and 6 fluorines on this side!

Practice

Balance each equation using the law of conservation of mass. There is a chart above each problem to help you. Use the chart to make sure that you have the same number of atoms on each side.

First- Count up the number of atoms you currently have. Write that number in the chart for both sides of the equation.

Second- If the numbers don't match, try adjusting the coefficients one at at time. Make sure to change the number in the chart.

Remember- you can't change the formulas!

1.

Reactants		Products	
H		H	
O		O	

____ H_2 + ____ O_2 → ____ H_2O

2.

Reactants		Products	
P		P	
O		O	

____ P_4 + ____ O_2 → ____ P_2O_3

3. Reactants Products

N	
H	

N	
H	

____ N_2 + ____ H_2 → ____ NH_3

4. Reactants Products

K	
Cl	

K	
Cl	

____ K + ____ Cl_2 → ____ KCl

5. Reactants Products

C	
F	
Br	

C	
F	
Br	

___ CF_4 + ___ Br_2 → ___ CBr_4 + ___ F_2

6. Reactants Products

Ga	
F	
Cs	

Ga	
F	
Cs	

___ GaF_3 + ___ Cs → ___ CsF + ___ Ga

7. Reactants Products

Ag	
N	
O	
Cu	

Ag	
N	
O	
Cu	

___ $AgNO_3$ + ___ Cu → ___ $Cu(NO_3)_2$ + ___ Ag

8. Reactants Products

Ba	
S	
Pt	
F	

Ba	
S	
Pt	
F	

___ BaS + ___ PtF_2 → ___ BaF_2 + ___ PtS

9. Reactants Products

Na	
P	
O	
K	
H	

Na	
P	
O	
K	
H	

___ Na_3PO_4 + ___ KOH → ___ NaOH + ___ K_3PO_4

10. Reactants Products

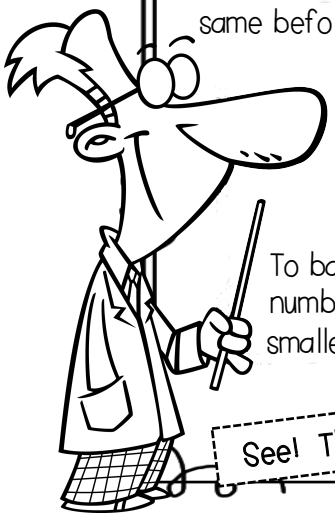
Mg	
F	
Li	
C	
O	

Mg	
F	
Li	
C	
O	

___ MgF_2 + ___ Li_2CO_3 → ___ $MgCO_3$ + ___ LiF

Name Answers Date Section

Introduction to Balancing Equations



The Law of Conservations of Mass tells us that the total amount of matter is neither created nor destroyed during any physical or chemical change. Therefore, the mass stays the same before and after a chemical reaction.

Chemical equations demonstrate this principle because they are always balanced. The total mass of the reactants must equal the total mass of the products. You can check to see if an equation is balanced by counting up the number of atoms- it has to be the same on each side of the equation.

To balance an equation, you can adjust the coefficients until there are the same number of each type of atom on both sides. You are never allowed to change the smaller numbers that make up the chemical formulas.

See! This is balanced!

$N_2 + 3\ F_2 \rightarrow 2\ NF_3$

2 nitrogens and 6 fluorines on this side...

and 2 nitrogens and 6 fluorines on this side!

Practice

Balance each equation using the law of conservation of mass. There is a chart above each problem to help you. Use the chart to make sure that you have the same number of atoms on each side.

First- Count up the number of atoms you currently have. Write that number in the chart for both sides of the equation.

Second- If the numbers don't match, try adjusting the coefficients one at at time. Make sure to change the number in the chart.

Remember- you can't change the formulas!

1.

Reactants		Products	
H	4	H	4
O	2	O	2

2 H_2 + ____ O_2 → 2 H_2O

2.

Reactants		Products	
P	4	P	4
O	6	O	6

____ P_4 + 3 O_2 → 2 P_2O_3

You should do this in pencil!

3.

Reactants	
N	2
H	6

Products	
N	2
H	6

___ N_2 + 3 H_2 → 2 NH_3

4.

Reactants	
K	2
Cl	2

Products	
K	2
Cl	2

2 K + ___ Cl_2 → 2 KCl

5.

Reactants	
C	1
F	4
Br	4

Products	
C	1
F	4
Br	4

___ CF_4 + 2 Br_2 → ___ CBr_4 + 2 F_2

6.

Reactants	
Ga	1
F	3
Cs	3

Products	
Ga	1
F	3
Cs	3

___ GaF_3 + 3 Cs → 3 CsF + ___ Ga

7.

Reactants	
Ag	2
N	2
O	6
Cu	1

Products	
Ag	2
N	2
O	6
Cu	1

2 $AgNO_3$ + ___ Cu → ___ $Cu(NO_3)_2$ + 2 Ag

8.

Reactants	
Ba	1
S	1
Pt	1
F	2

Products	
Ba	1
S	1
Pt	1
F	2

___ BaS + ___ PtF_2 → ___ BaF_2 + ___ PtS

9.

Reactants	
Na	3
P	1
O	7
K	3
H	3

Products	
Na	3
P	1
O	7
K	3
H	3

___ Na_3PO_4 + 3 KOH → 3 NaOH + ___ K_3PO_4

10.

Reactants	
Mg	1
F	2
Li	2
C	1
O	3

Products	
Mg	1
F	2
Li	2
C	1
O	3

___ MgF_2 + ___ Li_2CO_3 → ___ $MgCO_3$ + 2 LiF