### **How to Balance Chemical Equations**

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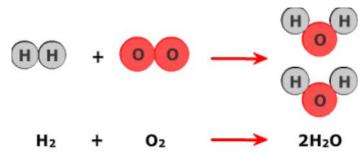
The number and form ne	r of pe ew gro	ople on tups calle	he dance floo	r remains th Γhis is what	people starting the dance are called <b>reactants</b> . e same. During the dance people change partners happens in a chemical reaction. Atoms swap with
Old chem	icals(_		)	rearrange to	produce new chemicals()
			F	Reactants	Products
			The arr	ow means '	,
bonds are f	ormed	. The 'lav	ms are rearrar w of conservat eactants and t	tion of	chemical bonds are broken and new chemical' is supported as the weight doesn't change the products.
2. How to k	alanc	e a cher	nical equatio	n	
In balancing	g chen	nical equ	ations you nee	ed to remen	ber to <b>three</b> important points.
a) You d	o not o	change th	ne <b>chemical</b> _		of a substance to balance an equation.
b) An eq	uation	is balan	ced by writing		_numbers before a chemical symbol or formula.
c) The _		and	0	of atoms mu	st <b>balance</b> on both sides of the chemical equation.
-		ed chemi	-	of hydrogen	on combining with oxygen to produce water.
	_ +			Water	
H <sub>2</sub>		_		H <sub>2</sub> O	n both sides of the equation
The <b>type</b> a	na <b>nu</b> i	nber or a	atoms must be	e the same (	on both sides of the equation.
HH	+ (	00	$\rightarrow$	HO	н
H <sub>2</sub>	+	O2	$\longrightarrow$	H <sub>2</sub> O	
b) Check th	e num	ber of at	oms for each	element.	
Element	Reac	tants	Products		
Н					
0					

An oxygen atom cannot disappear in the reaction.

 $H_2 + O_2$   $H_2O$  (\_\_\_\_oxygen atom short)

# c) A helpful hint is to look for an odd number of elements in the product side of the reaction and \_\_\_\_\_it

The oxygen in  $H_2O$  is an odd number so it is doubled.  $H_2 + O_2 = 2H_2O$ 

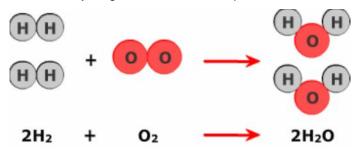


d) Check the number of atoms for each element.

Element	Reactants	Products
Н		
О		

The oxygen is now balanced however, now we don't have enough hydrogen atoms.

Since the hydrogen atoms come in pairs we need \_\_\_\_\_ pairs to make 4.



e) Check the number of atoms for each element.

Element	Reactants	Products
Н		
0		

$$2H_2 + O_2 2H_2O$$

The chemical equation is now \_\_\_\_\_

### **How to Balance Chemical Equations - ANSWERS**

#### 1. Chemical reactions

Chemical reactions are like a 'dance'. The people starting the dance are called **reactants.** The number of people on the dance floor remains the same. During the dance people change partners and form new groups called **products.** This is what happens in a chemical reaction. Atoms swap with one another and produce new chemicals.

Old chemicals(reactants) rearrange to produce new chemicals(products)

#### Reactants Products

The arrow means 'produces'

In a chemical reaction atoms are rearranged as old chemical bonds are broken and new chemical bonds are formed. The 'law of conservation of mass' is supported as the weight doesn't change between the mass of the reactants and the mass of the products.

#### 2. How to balance a chemical equation

In balancing chemical equations you need to remember to three important points.

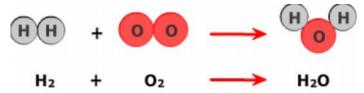
- a) You do not change the **chemical formula** of a substance to balance an equation.
- b) An equation is balanced by writing whole numbers before a chemical symbol or formula.
- c) The **type** and **number** of atoms must **balance** on both sides of the chemical equation.

#### 3. Example of how to balance a chemical equation

a) Write a balanced chemical equation of hydrogen combining with oxygen to produce water.

Hydrogen + Oxygen Water 
$$H_2$$
 +  $O_2$   $H_2O$ 

The type and number of atoms must be the same on both sides of the equation.



b) Check the number of atoms for each element.

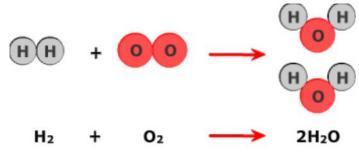
Element	Reactants	Products
Н	2	2
0	2	1

An oxygen atom cannot disappear in the reaction.

 $H_2 + O_2$   $H_2O$  (one oxygen atom short)

## c) A helpful hint is to look for an odd number of elements in the product side of the reaction and double it

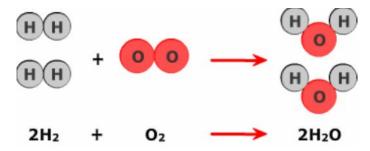
The oxygen in  $H_2O$  is an odd number so it is **doubled**.  $H_2 + O_2 = 2H_2O$ 



d) Check the number of atoms for each element.

Element	Reactants	Products
Н	2	4
0	2	2

The oxygen is now balanced however, now we don't have enough hydrogen atoms. Since the hydrogen atoms come in pairs we need 2 pairs to make 4.



e) Check the number of atoms for each element.

Element	Reactants	Products	
Н	4	4	
0	2	2	

$$2H_2 + O_2 2H_2O$$

The chemical equation is now balanced!