

# Chemical Equations

# Chemical Equations

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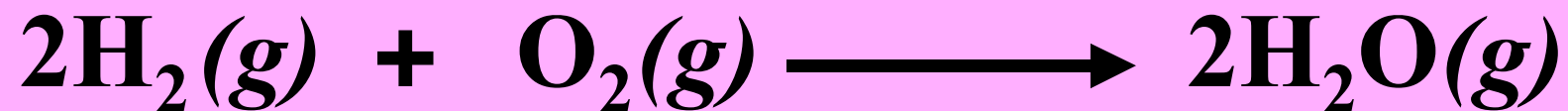
**shows the results of a chemical process**

**reactants (reagents)            products**

**coefficients**

**the numbers in front of formulas in  
chemical equations**

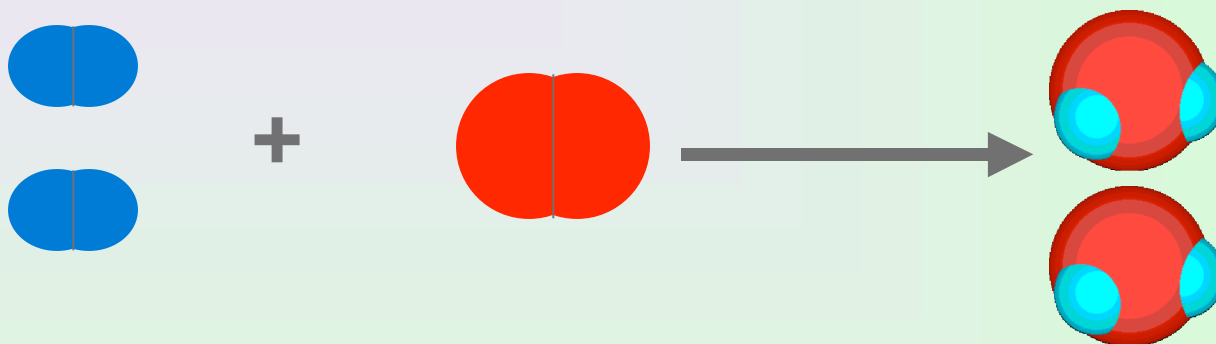
**gives the relative number of molecules  
taking part in a reaction**



**Chemical bonds have been broken and new chemical bonds have been formed**

# Writing Chemical Equations

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**2 moles**

**1 mole**

**2 moles**

**4.04 g**

**32.00 g**

**36.04 g**

**Parentheses show physical state of substances**

# physical state of substances

**(s)** = solid

**(l)** = liquid

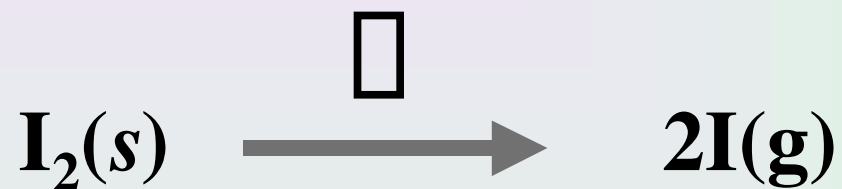
**(g)** = gas

**(aq)** = aqueous (dissolved in water)

# Example

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## molecular interpretation



1 molecule of solid iodine when heated ( $\square$ )  
gives 2 atoms of iodine in the gas phase

# Example

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## molar interpretation



**Start:**      1 mol      1 mol      0

**Finish:**      0      0      2 mol

# Example

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mass interpretation



4 g      32 g      36 g

**Start:**      4g      32g      0

**Finish:**      0      0      36 g

**The law of conservation of mass  
requires that chemical equations  
must balance.**

**What goes in**



**Must come out**

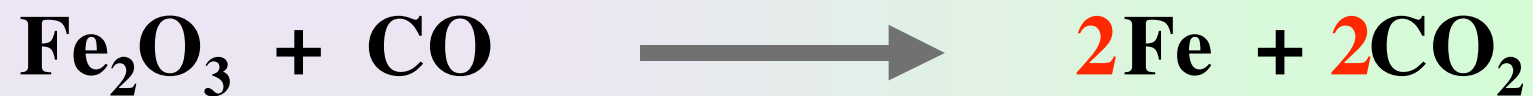
## **Writing and balancing the equation for a chemical reaction**

- 1. Identify all reactants and products and write their correct formulas on the left side and right side of the equation, respectively.**
- 2. Begin balancing the equation by trying suitable coefficients that will give us the same number of atoms of each element on both sides of the equation. Change coefficients, but not subscripts.**
- 3. Look for elements that appear only once on each side of the equation. Balance these first.**
- 4. Check.**

## Example

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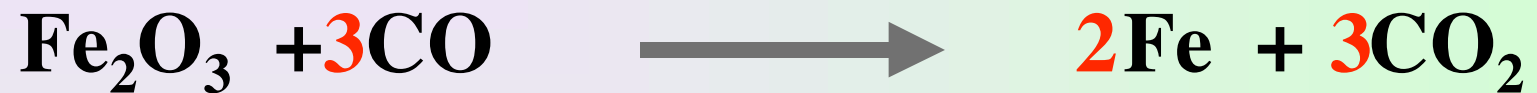
**Balance the following equation**



# Example

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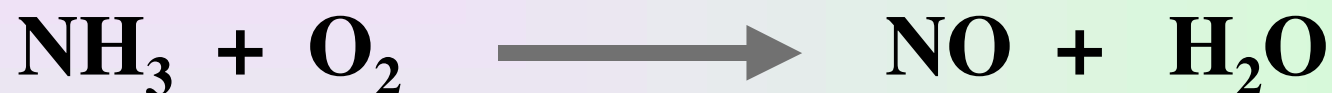
**Balance the following equation**



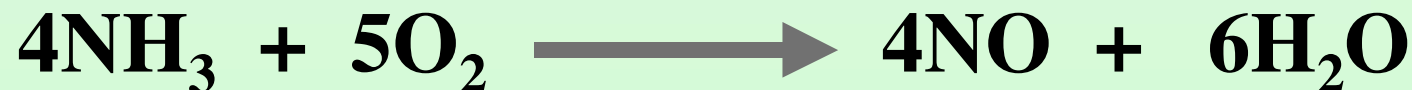
## Example

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Balance the following equation



multiply everything by 2



## Showing energy changes in equations

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**endothermic reaction**



**exothermic reaction**

