

# CHEMISTRY FLIPCARDS™

CONCEPTS ON-THE-GO



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# CHEMISTRY FLIPCARDS



*Chemistry FlipCards* organize a vast amount of information for the serious science competitor and presents key elements of science in a concise and compact format. *Chemistry FlipCards* are not a replacement for an in-depth study of chemistry, but rather a method of reinforcing basic chemistry concepts that appear on many state and national tests. We believe you will find *Chemistry FlipCards* to be a handy reference guide and an integral part of contest preparation in the field of science. This product is ideal for high school study and for college chemistry intro courses. This product is single-hole punched for those who wish to insert the flip cards into a binder.

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# Chemistry Basics

Pages 4-16

## CHEMISTRY REMINDERS

- Become familiar with the periodic chart.
- Always start with a balanced chemical equation.
- Remember, mole ratios do apply to most equations.
- Use the units in a problem's answer to help determine formula needed.
- Know where the metals, nonmetals, and metalloids are.
- Positive ions have LOST electrons, negative ions have gained.
- Ionic bonds: metal + nonmetal; Covalent: two or more nonmetals.
- Remember, the mole is the central value in stoichiometry.
- Be familiar with the UIL formula cheat-sheet.

## METRIC PREFIXES

May go in front of grams (g), liters (L) or meters (m).

$10^{-9}$   $10^{-8}$   $10^{-7}$   $10^{-6}$   $10^{-5}$   $10^{-4}$   $10^{-3}$   $10^{-2}$   $10^{-1}$   $10^0$   $10^1$   $10^2$   $10^3$   $10^4$   $10^5$   $10^6$

nano  
(n)

micro  
( $\mu$ )

milli centi deci one  
(m) (c) (d)

kilo mega  
(k) (M)

## NOMENCLATURE

**Charges on monatomic ions:** (mainly "s" and "p" block atoms)

"s" block: positive, same as column number (Group I and 2)

"p" block: negative, subtract Roman numeral column number from 8 (Group IIIA – Group VIIIA)

exceptions: Column III is +3  
Column IV is +4

Gr #	1	2		13	14	15	16	17	18
Chg of ion	+1	+2		+3	±4	-3	-2	-1	0

**Symbols for monatomic ions:**

The same as the element symbol, charge is written as a superscript: **Na<sup>+</sup>**



## NOMENCLATURE – continued

### Symbol and charges on polyatomic ions:

$\text{NH}_4^{+1}$	ammonium	$\text{CO}_3^{-2}$	carbonate
$\text{CN}^{-1}$	cyanide	$\text{CrO}_4^{-2}$	chromate
$\text{OH}^{-1}$	hydroxide	$\text{Cr}_2\text{O}_7^{-2}$	dichromate
$\text{NO}_3^{-1}$	nitrate	$\text{SO}_4^{-2}$	sulfate
$\text{MnO}_4^{-1}$	permanganate	$\text{PO}_4^{-3}$	phosphate
$\text{HCO}_3^{-1}$	bicarbonate	$\text{C}_2\text{H}_3\text{O}_2^{-1}$	acetate

(Ideally, these should be memorized.)

## PERCENT COMPOSITION

$$\text{\% composition} = 100 \times \frac{\text{mass of element in 1 mole of compound}}{\text{Molar mass of compound}}$$

*Example: What is the % composition of NaCl?*

1. mass of Na in one mole of NaCl: 22.99 g Na
2. mass of Cl in one mole of NaCl: 35.45 g Cl
3. Molar mass of NaCl: 58.44 g/mol
4. % Na:  $100 \times (22.99 \text{ g.}/58.44\text{g}) = 39.34 \text{ \% Na}$
5. % Cl:  $100 \times (35.45 \text{ g.}/58.44\text{g}) = 60.66\% \text{ Cl}$

## SOLUBILITY RULES

1. All compounds of  $\text{Na}^{+1}$ ,  $\text{K}^{+1}$  and  $\text{NH}_4^{+1}$  are **soluble**.
2. All compounds of  $\text{Cl}^{-1}$ ,  $\text{Br}^{-1}$  and  $\text{I}^{-1}$  are soluble except for  $\text{Ag}^{+1}$ ,  $\text{Hg}_2^{+2}$  and  $\text{Pb}^{+2}$ .
3. Salts of  $\text{F}^{-1}$  are soluble except for Group 2 cations and  $\text{Pb}^{+2}$ .
4. Salts of **nitrates, chlorates, perchlorates and acetates** are soluble.
5. All sulfates are soluble except for  $\text{Sr}^{+2}$ ,  $\text{Ba}^{+2}$  and  $\text{Pb}^{+2}$ .
6. Poorly soluble (insoluble) salts are formed by carbonates, phosphates, oxalates, chromates, sulfides, hydroxides and oxides unless they have the **cations** listed in #1.

## CELL POTENTIAL OF A VOLTAIC CELL

- **Reduction Potential:** the tendency of a material to gain electrons
- **Voltaic Cell:** Electrochemical cell or device that converts chemical energy to electrical energy via **Redox reactions.**
- **Half-Cells:** two parts in a voltaic cell
  - Anode: oxidation takes place here
  - Cathode: reduction takes place here
- Greater the potential difference between two half-cells, the more energy available to move charge.

If you like this product, we also recommend the following Hexco products:

- Science Workbooks for Chemistry and Physics
- Science Tests/Mentors/Flips for Biology, Chemistry or Physics
- Science Concepts for Biology, Chemistry, or Physics
- Biology and Physics FlipCards
- Science Practice Packets

Note: There are sample "View Inside" pages of the above products on our website! Thank you for your business and we wish you the best in your science studies.



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