

### Polyatomic ions:

Groups of covalently bonded nonmetals that carry an overall charge. You do not have to establish where the charge comes from nor do you ever break apart a polyion or change its charge when using in a formula.

Memorize the following 22 polyions:

acetate, bromate, chlorate, chlorite, cyanide, hydrogen carbonate (bicarbonate), hydrogen sulfate (bisulfate), hydroxide, hypochlorite, nitrate, nitrite, perchlorate, permanganate, carbonate, chromate, dichromate, manganate, peroxide, sulfate, sulfite, phosphate, ammonium.

Hints for memorization:

1. Must be memorized in order to be used when writing formulas. Students who do not memorize these polyions struggle for the remainder of the year.
2.  $1^-$ ,  $\bar{1}$ ,  $\bar{\quad}$ , all mean the same thing, a negative 1 charge.
3. Most poly ions end in "ate" or "ite".
  - "ate" one more oxygen atom
  - "ite" one less oxygen atom
  - \*have same charge
4. There is only 1 positive charged polyion,  $\text{NH}_4^+$ , but it is important and will be used frequently.
5. Polyions are often named after root element:
  - $\text{SO}_4^{-2}$  sulfate = sulfur
  - $\text{SO}_3^{-2}$  sulfite = sulfur
  - $\text{ClO}_3^-$  chlorate = chlorine
6. Know the entire series for the chlorides,
  - $\text{ClO}_4^-$ ,  $\text{ClO}_3^-$ ,  $\text{ClO}_2^-$ ,  $\text{ClO}^-$
7. Phosphate is the only -3 charge and there are seven -2 charges. The remaining are -1 charge.

\*A useful website:

<http://antoine.frostburg.edu/chem/senese/101/compounds/polyatomic.shtml#expertbyfamily>  
may be accessed and reviewed to assist you in memorizing.

\*Most problems for the remainder of the year will be in word format. You will have to develop correct formulas in order to proceed with the problems. If your formulas are incorrect, your work will be incorrect.

EX: ammonium chlorate mixes with ferrous sulfate to produce:

1. Write a balanced equation for the complete reaction.
2. Calculate grams of ferrous sulfate needed to react with 25 grams of ammonium chlorate.

\*If you do not write correct formulas you will not get a balanced equation. If you do not have a balanced equation your work for #2 will be incorrect.

\*This is very important!

