

## Common Polyatomic Ions and Their Charges

A mastery of the common polyatomic ions, their formulas and their charges, is essential to success in College-level chemistry courses, including AP Chemistry. We are offering students the opportunity to memorize these ions and demonstrate a mastery of using them in ionic compound formulas. There will be an **extra-credit** quiz.

A college-level or AP course would have MANY MORE ions that you are expected to know, but learning the naming patterns below will greatly reduce your future work in such a course.

Ions to Memorize	
Cations	Name
$\text{NH}_4^+$	Ammonium
Anions	Name
$\text{NO}_2^-$	Nitrite
$\text{NO}_3^-$	Nitrate
$\text{SO}_3^{2-}$	Sulfite
$\text{SO}_4^{2-}$	Sulfate
$\text{OH}^-$	Hydroxide
$\text{PO}_4^{3-}$	Phosphate
$\text{CO}_3^{2-}$	Carbonate
$\text{HCO}_3^-$	Hydrogen carbonate (bicarbonate)
$\text{ClO}_2^-$	Chlorite
$\text{ClO}_3^-$	Chlorate
$\text{C}_2\text{H}_3\text{O}_2^-$	Acetate

### Tips for Learning the Ions

There are a number of patterns that can greatly reduce the amount of memorizing that one must do.

- “ate” anions have one more oxygen than the “ite” ion, but the same charge. If you memorize the “ate” ions, then you should be able to derive the formula for the “ite” ion and vice-versa.
  - sulfate is  $\text{SO}_4^{2-}$ , so sulfite has the same charge but one less oxygen ( $\text{SO}_3^{2-}$ )
  - nitrate is  $\text{NO}_3^-$ , so nitrite has the same charge but one less oxygen ( $\text{NO}_2^-$ )
- If you know that a carbonate ion is  $\text{CO}_3^{2-}$  then to get the formula for hydrogen carbonate ion (also called “bicarbonate”), you add a hydrogen ion to the front of the formula. Since a hydrogen ion has a 1+ charge, the net charge on the new ion is less negative by one.
  - Example:

