HINTS for understanding and memorizing selected polyatomic ions

1^+ CHARGE:

ammonium $(NH_4)^+$

- Ammonia is NH_3 (a good formula to know), so it is closely related to ammonium.

1^- CHARGE:

acetate $(C_2H_3O_2)^-$ or $(CH_3COO)^-$

- acetic acid is $HC_2H_3O_2$

perchlorate $(ClO_4)^-$, chlorate $(ClO_3)^-$, chlorite $(ClO_2)^-$, and **hypochlorite $(ClO)^-$**

- The Cl refers to *chlorine*, not carbon and iodine. Notice the *chlor* in the names.
- Think of a countdown: 4, 3, 2, 1… The amount of O decreases that way for all four ions.
- *Per*chlor*ate is* hy*per*, so it "ATE the most." It has 4 O's.
- Chlor*ate* "ATE more than chlorite" so it has more O's that chlorite: 3 instead of 2.
- *Hypo* has one less O that chlorite (hypo = less; opposite of hyper = more).
- The charge on all four is 1-… remember that Cl forms a 1- ion.

cyanide $(CN)^-$

- CyaNide is the *one* to kill you (charge is 1-). Yes, cyanide is lethal.

hydrogen carbonate or bicarbonate $(HCO_3)^-$

- Hydrogen means adding one H to the formula, and (CO_3) refers to the carbonate ion, $(CO_3)^{2-}$
- The (CO_3) ion has a charge of 2-, and there is one H added here (H is usually a 1+ ion), which changes the overall charge to 1- (-2 + 1 = -1)

hydroxide $(OH)^-$

- HydrOxide is the *one* (charge is 1-).

nitrate $(NO_3)^-$ and **nitrite $(NO_2)^-$**

- Nitr*ate* "ATE more" so it has more O's than nitrite: 3 instead of 2.

permanganate $(MnO_4)^-$

- *Mang* refers to manganese, Mn.
- *Permanganate* has the same amount of O's as *perchlorate*: 4
- *Permanganate* has the same charge as *perchlorate*: 1-
- See **perchlorate $(ClO_4)^-$** for comparison

2^- CHARGE:

carbonate $(CO_3)^{2-}$

- The carbonate ion has carbon at the main atom.

chromate $(CrO_4)^{2-}$

- The chromate ion has chromium as the main atom.
- The charge is the same is the **chromate ion**.

dichromate $(Cr_2O_7)^{2-}$

- The DIchromate ion has TWO chromium atoms instead of one
- The charge is the same is the chromate ion

silicate $(SiO_3)^{2-}$

- The silicate ion has silicon at the main atom.

sulfate $(SO_4)^{2-}$ and **sulfite $(SO_3)^{2-}$**

- Sulf*ate* "ATE more, ATE four" so it has more O's that sulfite: 4 instead of 3.
- The charge on both is 2-… remember that S forms a 2- ion.

3^- CHARGE:

phosphate $(PO_4)^{3-}$ and **phosphite $(PO_3)^{3-}$**

- Phosph*ate* "ATE more, ATE four" so it has more O's that phosphate: 4 instead of 3.
- The charge is 3-… remember that P forms a 3- ion.