Balancing Redox Equations by the Method of Half-Reactions

1. **Write the unbalanced equation.**
2. **Determine the oxidation state of each atom or ion in the reaction.**
3. **Write the oxidation half-reaction. It may be incomplete &/or unbalanced. That's OK for now.**
4. **Write the reduction half-reaction. It may be incomplete &/or unbalanced. That's OK for now.**
4. **Balance by inspection, all atoms in each half-reaction, except O and H.**
5. **Balance oxygen by adding H_2O**
6. **Balance hydrogen by adding H^+.**

   If in acidic solution go to step 8.

   If in basic solution go to step 7.
7. **Add OH^- to <u>both</u> sides of the equation (add enough to neutralize the added H^+, making H_2O).**
8. **Balance the charge in each half-reaction by adding electrons as reactants or products.**
9. **Balance the electrons in each half-reaction, by multiplying the balanced half-reactions by appropriate integers.**
10. **Add the resulting half-reactions and eliminate any common terms to obtain the balanced equation.**

Enjoy!