BALANCING REDOX EQUATIONS BY THE ION-ELECTRON METHOD

1. **Separate the skeletal equation into two half reactions**. Each half reaction refers to the conversion of a species in either its oxidized or reduced form into a related species in either its reduced or oxidized form. One half reaction will be a reduction and the other will be an oxidation.

2. **Balance each half reaction separately.** Balance atoms on each side of a half reaction by inspection, using H_2O, H^+ (if in acid), or OH^- (if in base) to make the balance in hydrogen and/or oxygen, if needed. Do *not* add any other new species (e.g., O_2, H_2) unless already a part of the skeletal half reaction.

3. **Balance the net charge across each half reaction by adding electrons to the side with the more positive net ionic charge.** If by this process electrons are added on the left side of a half reaction, the half reaction is a reduction. If electrons are added to the right side, the half reaction is an oxidation. (If you add electrons to the same side in both half reactions, something is wrong!)

4. **Multiply both half-reactions by appropriate factors (usually whole numbers), so that the number of electrons is the same in both half reactions and will cancel when the two are added together.**

5. **Add the two multiplied half reactions together to obtain the overall redox equation**.

6. **Check the balance.** No electrons should appear in the overall redox equation. Not only should there be a balance in atoms across the equation, but also the net charge on both sides of the equation should be equal.