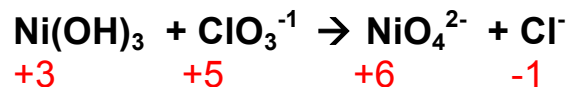


## Balancing Redox Reactions in a basic solution



### 1. Identify Oxidized and Reduced species .

Ni undergoes a 3 e<sup>-</sup> oxidation (+3 → +6)

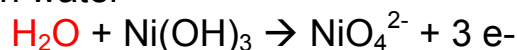
Cl undergoes a 6 e<sup>-</sup> reduction (+5 → -1)

### 2. Write and balance the half-reactions

#### Oxidation:



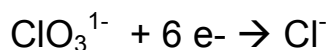
balance the oxygens with water



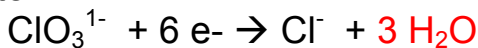
balance the hydrogens with H<sup>+</sup>



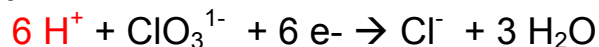
#### Reduction:



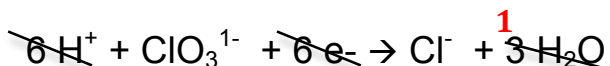
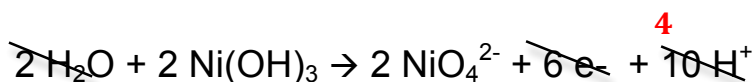
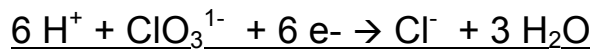
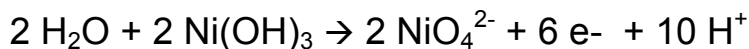
balance oxygens with water



balance hydrogens with H<sup>+</sup>

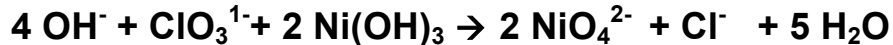


3. **Balance the total redox electrons by multiplying the Oxidation reaction by 2 and add the reactions.** Now there are 6 electrons gained and 6 electrons lost.



4. **Add hydroxide to get the final balanced equation.**

Because this reaction is in a basic solution, add 4 OH<sup>-</sup> to each side of the equation. On the left they will become reactants and on the right, they will combine with the 4 H<sup>+</sup> to make water.



5. **Check to make sure atoms sum up on each side of the chemical equation.**

oxygen = 13 each side

hydrogen = 10

Cl = 1

Ni = 2