Practice Balancing Redox Reactions **KEY**

0 0 +2-2

1. N_2 + O_2 □ 2NO

1. Assign Oxidation #'s

2. Determine which element is oxidized and which is reduced…

Oxidized: N

Reduced: O

3. Write out the half-reactions. (*Hint: Are your half-reactions balanced?*)

Oxidation: N_2 □ $2N^{+2}$ + $4e^-$

Reduction: O_2 + $4e^-$ □ $2O^{-2}$

4. Balance the electrons…Done!

5. Transfer the new balancing coefficients back into the original…The 2's were added above.

6. Balance the remaining elements…Didn't need to…

+1-1 0 +1 -1 0

2. 2NaBr + Cl_2 □ 2NaCl + Br_2

Ox: $2Br^{-1}$ □ Br_2+ $2e^-$

Red: Cl_2 + $2e^-$ □ $2Cl^{-1}$

+2-2 0 0 +1-2

3. CuO + H_2 □ Cu + H_2O

Ox: H_2 □ $2H^{+1}$ + $2e^-$

Red: Cu^{+2} + $2e^-$ □ Cu

+1+3-2 +1-1 +2-2 0 +1-2

4. $2HNO_2 + 2HI$ □ $2NO + I_2 + 2H_2O$

Ox: $2I^{-1}$ □ $I_2 + 2e^-$

Red: $2(N^{+3} + 1e^-$ □ $N^{+2})$

0 +4-2 +3-2 0

5. $4Al + 3MnO_2$ □ $2Al_2O_3 + 3Mn$

Ox: $2(2Al$□ $2Al^{+3} + 6e^-)$

Red: $3(Mn^{+4} + 4e^-$ □ $Mn)$

+1 +6 -2 +1-1 +1-1 +3-1 +1-2 0

6. $Na_2Cr_2O_7 + 14HCl$ □ $2NaCl + 2CrCl_3 + 7H_2O + 3Cl_2$

Ox: $3(2Cl^{-1}$ □ $Cl_2 + 2e^-)$

Red: $2Cr^{+6} + 6e^-$ □ $2Cr^{+3}$

*Not all of the Cl- were oxidized, so the balancing on the HCl had to be adjusted to account for them. Blue are coefficients added to balance non-redox elements.

0 +1+5-2 +2+5-2 +1-2 +1-2

7. $4Fe + 10HNO_3$ □ $4Fe(NO_3)_2 + N_2O + 5H_2O$

Ox: $4(Fe$ □ $Fe^{+2} + 2e^-)$

Red: $2N^{+5} + 8e^-$ □ $2N^{+1}$

*Not all of the N^{+5} were oxidized, so the balancing on the HNO_3 had to be adjusted to account for them. Blue are coefficients added to balance non-redox elements.

+2+6-2 +1+7-2 +1+6-2 +2+6-2 +3 +6-2 +1-2

8. $10FeSO_4 + 2HMnO_4 + 7H_2SO_4$ □ $2MnSO_4 + 5Fe_2(SO_4)_3 + 8H_2O$

Ox: $5(2Fe^{+2}$ □ $2Fe^{+3} + 2e^-)$

Red: $2(Mn^{+7} + 5e^-$ □ $Mn^{+2})$

Blue are coefficients added to balance non-redox elements.

+2-2 +1+7-2 +3 -2 +2-2 +1-2

9. $10FeO + 2KMnO_4$ □ $5Fe_2O_3 + 2MnO + K_2O$

Ox: $5(2Fe^{+2}$ □ $2Fe^{+3} + 2e^-)$

Red: $2(Mn^{+7} + 5e^-$ □ $Mn^{+2})$