Name: _____ Date: _____

Unit 11 - Topic 2

Redox Half Reactions & Skeleton Reactions

Writing Half Reactions

*Reduction: occurs when an atom or ion **gains*** one or more electrons. The charge on the atom becomes **more negative**, or in other words, is REDUCED in value! The following half reactions are examples of reduction:

$S + 2e^- \rightarrow S^{2-}$

$Cl_2 + 2e^- \rightarrow 2Cl^-$

Oxidation: occurs when an atom or ion ***loses*** one or more electrons. The charge on the atom becomes **more positive**. The following half reactions are examples of oxidation:

$Na \rightarrow Na^+ + 1e^-$

$2Br^- \rightarrow Br_2 + 2e^-$

Identify the following half reactions as oxidation or reduction. THEN, complete the reaction showing electrons in the right place (see examples above!).

1. $Li \rightarrow Li^{1+}$

2. $Mn^{7+} \rightarrow Mn^{4+}$

Write the half reactions for each redox reaction below:

3. $Zn + HNO_3 \rightarrow Zn(NO_3)_2 + NO_2 + H_2O$

4. $CdS + I_2 + HCl \rightarrow CdCl_2 + HI + S$

Name: _____ *Date:* _____

Balancing Skeleton Redox Reactions

- Identify which is the oxidation half reaction and which is the reduction half reaction.
- Explain or show how: # of electrons lost = # of electrons gained.
- Combine the half reaction pairs in order to write a **balanced** skeleton reaction.

5. Fe^{3+} + ____e^{1-} → Fe^{2+} and $Zn \rightarrow Zn^{2+}$ + ____e^{1-}

6. Sr^{2+} + ____e^{1-} → Sr and $Rb \rightarrow Rb^{1+}$ + ____e^{1-}

- Write balanced half reactions for each of the following.
- Indicate which half reaction is oxidation and which is reduction.
- Combine the half reaction pairs in order to balance the given skeleton reactions.

7. _____ Mg + _____ Fe^{3+} → _____ Mg^{2+} + _____ Fe^{2+}

8. _____ Al + _____ Ti^{4+} → _____ Al^{3+} + _____ Ti