WKS
Oxidation and Reduction (Redox)

Name Answer Key
Period _____ Date _____

1) When a substance is oxidized, its charge (**increases, decreases**). Thus, when a substance is oxidized it (**gains, loses**) electrons.

2) When a substance is reduced, its charge (**increases, decreases**). Thus, when a substance is reduced it (**gains, loses**) electrons.

3) Label these changes as either oxidation or reduction:
   a) Cu^{2+} (aq) → Cu^{0} (s) reduction
   b) Cl_2^{0} (g) → Cl^{-} (aq) reduction
   c) Fe^{0} (s) → Fe^{3+} (aq) oxidation
   d) Cr^{3+} (aq) → Cr^{6+} (aq) oxidation

4) Put in all charges (oxidation numbers) in the following substances. *(Remember: The charge on pure elements is zero. Also, when H is in a compound, its charge is +1)*

   a) $\overset{1+}{K}\overset{1-}{Cl}$ b) $\overset{2+}{Fe}\overset{1-}{Br_2}$ c) $\overset{1+}{H}\overset{1-}{Cl}$ d) $\overset{0}{H_2}$ e) $\overset{3+}{Co}\overset{1-}{I_3}$ e) $\overset{0}{Na}$ f) $\overset{0}{Cl_2}$

5) Put in all charges (oxidation numbers). Then indicate which substance is being oxidized, which is being reduced, and what their products are. [Remember LEO-GER!]

   a) $\overset{0}{Cu}$ (s) + 2 $\overset{1+}{Ag}\overset{1-}{Cl}$ (aq) → $\overset{2+}{Cu}\overset{1-}{Cl_2}$ (aq) + 2 $\overset{0}{Ag}$ (s)
   Oxidized: Cu^{0} Product: Cu^{2+}
   Reduced: Ag^{+} Product: Ag^{0}

   b) 2 $\overset{0}{Na}$ (s) + $\overset{0}{Br_2}$ (g) → 2 $\overset{1+}{Na}\overset{1-}{Br}$ (aq)
   Oxidized: Na^{0} Product: Na^{+}
   Reduced: Br_2 Product: Br^{-}

   c) $\overset{0}{F_2}$ (g) + 2 $\overset{1+}{Li}\overset{1-}{Cl}$ (aq) → 2 $\overset{1+}{Li}\overset{1-}{F}$ (aq) + $\overset{0}{Cl_2}$ (g)
   Oxidized: Cl^{-} Product: Cl_2^{0}
   Reduced: F_2^{0} Product: F^{-}

6) Complete the following reactions. Put in all charges (oxidation numbers). Then indicate which substance is being oxidized, which is being reduced, and what their products are. [Remember LEO-GER!]

   a) _____ $\overset{0}{Zn}$ (s) + _____ $\overset{2+}{Cu}\overset{1-}{Br_2}$ (aq) → $\overset{0}{Cu}$ (s) + $\overset{2+}{Zn}\overset{1-}{Br_2}$ (aq)
   Oxidized: Zn^{0} Product: Zn^{2+}
   Reduced: Cu^{2+} Product: Cu^{0}

   b) 3 $\overset{0}{Cl_2}$ (g) + 2 $\overset{3+}{Fe}\overset{1-}{I_3}$ (aq) → 2 $\overset{3+}{Fe}\overset{1-}{Cl_3}$ (aq) + 3 $\overset{0}{I_2}$ (s)
   Oxidized: I^{-} Product: I_2^{0}
   Reduced: Cl_2^{0} Product: Cl^{-}

   c) 3 $\overset{0}{Mg}$ (s) + 2 $\overset{3+}{Al}\overset{1-}{Cl_3}$ (aq) → 3 $\overset{2+}{Mg}\overset{1-}{Cl_2}$ (aq) + 2 $\overset{0}{Al}$ (s)
   Oxidized: Mg^{0} Product: Mg^{2+}
   Reduced: Al^{3+} Product: Al^{0}