

Name _____ Period _____ Date _____

Oxidation-Reduction Worksheet

For each reaction below, identify the atom oxidized, the atom reduced, the oxidizing agent, the reducing agent, the oxidation half reaction, the reduction half reaction, and then balance the equation by the method of oxidation-reduction showing all electrons transfers.

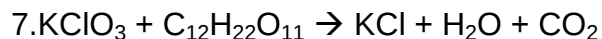
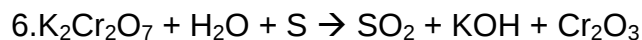
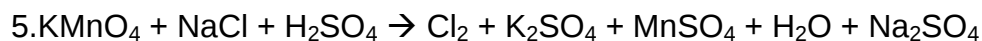
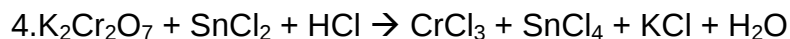
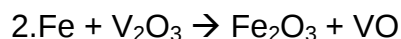
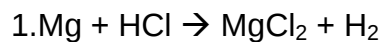


Table of Half Reactions

Rxn #	Atom Oxidized	Atom Reduced	Oxidizing Agent	Reducing Agent	Half reactions	
					Oxidation	Reduction
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Rxn #	Atom Oxidized	Atom Reduced	Oxidizing Agent	Reducing Agent	Half reactions	
					Oxidation	Reduction
1	Mg	H	HCl	Mg	$\text{Mg}^0 - 2\text{e}^- \Rightarrow \text{Mg}^{+2}$	$\text{H}^{+1} + 1\text{e}^- \Rightarrow \text{H}^0$
2	Fe	V	V_2O_3	Fe	$\text{Fe}^0 - 3\text{e}^- \Rightarrow \text{Fe}^{+3}$	$\text{V}^{+3} + 1\text{e}^- \Rightarrow \text{V}^{+2}$
3	N	Mn	KMnO_4	KNO_2	$\text{N}^{+3} - 2\text{e}^- \Rightarrow \text{N}^{+5}$	$\text{Mn}^{+7} + 5\text{e}^- \Rightarrow \text{Mn}^{+2}$
4	Sn	Cr	$\text{K}_2\text{Cr}_2\text{O}_7$	SnCl_2	$\text{Sn}^{+2} - 2\text{e}^- \Rightarrow \text{Sn}^{+4}$	$\text{Cr}^{+6} + 3\text{e}^- \Rightarrow \text{Cr}^{+3}$
5	Cl	Mn	KMnO_4	NaCl	$\text{Cl}^{-1} - 1\text{e}^- \Rightarrow \text{Cl}^0$	$\text{Mn}^{+7} + 5\text{e}^- \Rightarrow \text{Mn}^{+2}$
6	S	Cr	$\text{K}_2\text{Cr}_2\text{O}_7$	S	$\text{S}^0 - 4\text{e}^- \Rightarrow \text{S}^{-4}$	$\text{Cr}^{+6} + 3\text{e}^- \Rightarrow \text{Cr}^{+3}$
7	C	Cl	KClO_3	$\text{C}_{12}\text{H}_{22}\text{O}_{11}$	$\text{C}^0 - 4\text{e}^- \Rightarrow \text{C}^{+4}$	$\text{Cl}^{+5} + 6\text{e}^- \Rightarrow \text{Cl}^{-1}$
8	C	Mn	K_2MnO_4	$\text{H}_2\text{C}_2\text{O}_4$	$\text{C}^{+3} - 1\text{e}^- \Rightarrow \text{C}^{+4}$	$\text{Mn}^{+6} + 3\text{e}^- \Rightarrow \text{Mn}^{+3}$
9	Mn	Bi	NaBiO_3	$\text{Mn}(\text{NO}_3)_2$	$\text{Mn}^{+2} - 5\text{e}^- \Rightarrow \text{Mn}^{+7}$	$\text{Bi}^{+5} + 2\text{e}^- \Rightarrow \text{Bi}^{+3}$
10	C	Mn	KMnO_4	$\text{H}_2\text{C}_2\text{O}_4$	$\text{C}^{+3} - 1\text{e}^- \Rightarrow \text{C}^{+4}$	$\text{Mn}^{+7} + 4\text{e}^- \Rightarrow \text{Mn}^{+3}$

Oxidation Reduction Worksheet Answers

1. $\text{Mg}^0 + 2\text{H}^{+1} \text{Cl}^{-1} \rightarrow \text{Mg}^{+1} \text{Cl}_2^{-1} + \text{H}_2^0$
 $-2e^- \quad 2(+1e^-)$
2. $0 \quad +3 \quad -2 \quad 3 \quad -2 \quad +2 \quad -2$
 $2\text{Fe} + 3\text{V}_2\text{O}_3 \rightarrow \text{Fe}_2\text{O}_3 + 6\text{VO}$
 $2(-3e^-) \quad 3(+2e^-)$
3. $+1 \quad +7 \quad -2 \quad +1 \quad +3 \quad -2 \quad +1 \quad +6 \quad -2 \quad +2 \quad +6 \quad -2 \quad +1 \quad -2 \quad +1 \quad +5 \quad -2 \quad +1 \quad +6 \quad -2$
 $2\text{KMnO}_4 + 5\text{KNO}_2 + 3\text{H}_2\text{SO}_4 \rightarrow 2\text{MnSO}_4 + 3\text{H}_2\text{O} + 5\text{KNO}_3 + \text{K}_2\text{SO}_4$
 $2(+5e^-) \quad 5(-2e^-)$
4. $+1 \quad +6 \quad -2 \quad +2 \quad -1 \quad +1 \quad -1 \quad +3 \quad -1 \quad +4 \quad -1 \quad +1 \quad -1 \quad +1 \quad -2$
 $\text{K}_2\text{Cr}_2\text{O}_7 + 3\text{SnCl}_2 + 14\text{HCl} \rightarrow 2\text{CrCl}_3 + 3\text{SnCl}_4 + 2\text{KCl} + 7\text{H}_2\text{O}$
 $(+6e^-) \quad 3(-2e^-)$
5. $+1 \quad +7 \quad -2 \quad +1 \quad -1 \quad +1 \quad +6 \quad -2 \quad 0 \quad +1 \quad +6 \quad -2 \quad +2 \quad +6 \quad -2 \quad +1 \quad -2 \quad +1 \quad +6 \quad -2$
 $2\text{KMnO}_4 + 10\text{NaCl} + 8\text{H}_2\text{SO}_4 \rightarrow 5\text{Cl}_2 + \text{K}_2\text{SO}_4 + 2\text{MnSO}_4 + 8\text{H}_2\text{O} + 5\text{Na}_2\text{SO}_4$
 $+5e^- \quad 5(-1e^-)$
6. $+1 \quad +6 \quad -2 \quad +1 \quad -2 \quad 0 \quad 4 \quad -2 \quad +1 \quad -2 \quad +1 \quad +3 \quad -2$
 $2\text{K}_2\text{Cr}_2\text{O}_7 + 2\text{H}_2\text{O} + 3\text{S} \rightarrow 3\text{SO}_2 + 4\text{KOH} + 2\text{Cr}_2\text{O}_3$
 $2(+6e^-) \quad 3(-4e^-)$
7. $+1 \quad +5 \quad -2 \quad 0 \quad +1 \quad -2 \quad +1 \quad -1 \quad +1 \quad -2 \quad +4 \quad -2$
 $8\text{KClO}_3 + \text{C}_{12}\text{H}_{22}\text{O}_{11} \rightarrow 8\text{KCl} + 11\text{H}_2\text{O} + 12\text{CO}_2$
 $8(+6e^-) \quad -48e^-$
8. $+1 \quad +3 \quad -2 \quad +1 \quad +6 \quad -2 \quad +4 \quad -2 \quad +1 \quad -2 \quad +3 \quad -2 \quad +1 \quad -2$
 $3\text{H}_2\text{C}_2\text{O}_4 + 2\text{K}_2\text{MnO}_4 \rightarrow 6\text{CO}_2 + 2\text{K}_2\text{O} + \text{Mn}_2\text{O}_3 + 3\text{H}_2\text{O}$
 $3(-2e^-) \quad 2(+3e^-)$
9. $+2 \quad +5 \quad -2 \quad +1 \quad +5 \quad -2 \quad +1 \quad +5 \quad -2 \quad +1 \quad +7 \quad -2 \quad +3 \quad +5 \quad -2 \quad +1 \quad +5 \quad -2 \quad +1 \quad -2$
 $2\text{Mn}(\text{NO}_3)_2 + 5\text{NaBiO}_3 + 16\text{HNO}_3 \rightarrow 2\text{HMnO}_4 + 5\text{Bi}(\text{NO}_3)_3 + 5\text{NaNO}_3 + 7\text{H}_2\text{O}$
 $2(+5e^-) \quad 5(-2e^-)$
10. $+1 \quad +3 \quad -2 \quad +1 \quad +7 \quad -2 \quad +4 \quad -2 \quad +1 \quad -2 \quad +3 \quad -2 \quad +1 \quad -2$
 $4\text{H}_2\text{C}_2\text{O}_4 + 2\text{KMnO}_4 \rightarrow 8\text{CO}_2 + \text{K}_2\text{O} + \text{Mn}_2\text{O}_3 + 4\text{H}_2\text{O}$
 $2(-2e^-) \quad +4e^-$