Name: …… Section: …… Date: ……..

5.10 HONORS CLASS WORKSHEET – DISPLACEMENT REACTIONS AND THE REACTIVITY SERIES

Note: most d-block metals form ions with a 2+ charge (eg Zn^{2+}, Cu^{2+}, Fe^{2+}, Co^{2+}, Ni^{2+})
Some of them can also form ions with a 3+ charge (eg Fe^{3+})
Silver is an exception, it only forms Ag^{+} ions
Group 4 metals like Sn and Pb also usually form ions with a 2+ charge (eg Pb^{2+}, Sn^{2+})
Carbon can form CO or CO_2

1. **The following reactions all take place.**
Complete and balance them, identify the atom or ion oxidized or reduced, identify the spectator ion and deduce which of the elements is more reactive:

		Equation	oxidized	reduced	spectator
(a)	Equation:	$CuSO_4 + Zn \rightarrow ZnSO_4 + Cu$	Zn	Cu^{2+}	SO_4^{2-}
	Conclusion:	Zn is more reactive than Cu			
(b)	Equation:	$ZnCl_2 + Mg \rightarrow MgCl_2 + Zn$	Mg	Zn^{2+}	Cl^{-}
	Conclusion:	Mg is more reactive than Zn			
(c)	Equation:	$Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$	Al	Fe^{3+}	O^{2-}
	Conclusion:	Al is more reactive than Fe			
(d)	Equation:	$Ni + H_2SO_4 \rightarrow NiSO_4 + H_2$	Ni	H^{+}	SO_4^{2-}
	Conclusion:	Ni is more reactive than H			
(e)	Equation:	$Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$	Cu	Ag^{+}	NO_3^{-}
	Conclusion:	Cu is more reactive than Ag			
(f)	Equation:	$2PbO + C \rightarrow CO_2 + 2Pb$	C	Pb^{2+}	
	Conclusion:	C is more reactive than Pb			
(g)	Equation:	$Cl_2 + 2KI \rightarrow I_2 + 2KCl$	I^{-}	Cl_2	K^{+}
	Conclusion:	Cl more reactive than I			

2. **Some of the following reactions do take place, others don't.**
Predict whether or not a reaction will take place; complete the reaction if it takes place; and explain your answer:

	Equation	Reason
(a)	$Mg + 2HCl \rightarrow MgCl_2 + H_2$	Mg is more reactive than H
(b)	$Cu + ZnSO_4 \rightarrow$ no reaction	Cu is less reactive than Zn
(c)	$FeCl_2 + Zn \rightarrow ZnCl_2 + Fe$	Zn is more reactive than Fe
(d)	$Ag + H_2SO_4 \rightarrow$ no reaction	Ag is less reactive than H
(e)	$Fe_2O_3 + 3C \rightarrow 3CO + 2Fe$	C is more reactive than Fe
(f)	$CuO + H_2 \rightarrow Cu + H_2O$	H is more reactive than Cu
(g)	$I_2 + 2NaBr \rightarrow$ no reaction	I is less reactive than Br