Chemistry 12 **Name:**

SRP Table Worksheet

Date:

1. Describe the following reaction as oxidation or reduction. Circle all oxidizing agents.

a) $Na \rightarrow Na^+ + e^-$ oxidation
b) $Ca \rightarrow Ca^{2+} + 2e^-$ oxidation
c) $Al^{3+} + 3e^- \rightarrow Al$ reduction
d) $2F^- \rightarrow F_2 + 2e^-$ oxidation
e) $N_2 + 6e^- \rightarrow 2N^{3-}$ reduction
f) $2O^{2-} \rightarrow O_2 + 4e^-$ oxidation

2. Complete and balance the following reactions:

a) $Ca + Al^{3+}$

$3Ca + 2Al^{3+} \rightarrow 2Al + 3Ca^{2+}$

b) $Sn + Ag^+$

$Sn + 2Ag^+ \rightarrow 2Ag + Sn^{2+}$

c) $Sn + Au^{3+}$

$3Sn + 2Au^{3+} \rightarrow 2Au + 3Sn^{2+}$

3. Ni^{+2} reacts with Mn, however, Al^{+3} does not react with Mn. Rank the oxidizing agents in order of decreasing strength. Rank the reducing agents in order of decreasing strength.

strongest oxidizing agent $Ni^{2+} + 2e^- \rightarrow Ni$
$Mn^{2+} + 2e^- \rightarrow Mn$
$Al^{3+} + 3e^- \rightarrow Al$ strongest reducing agent

4. Cl_2 reacts with Ag, however, Ag does not react with Mg^{+2}. Rank the oxidizing agents in order of decreasing strength. Rank the reducing agents in order of decreasing strength.

strongest oxidizing agent $Cl_2 + 2e^- \rightarrow 2Cl^-$
$Ag^+ + 1e^- \rightarrow Ag$
$Mg^{2+} + 2e^- \rightarrow Mg$ strongest reducing agent

5. Ni^{+2} reacts with Mn, however, Al^{+3} does not react with Mn. Rank the reducing agents in order of decreasing strength. Rank the oxidizing agents in order of decreasing strength.

strongest oxidizing agent $Ni^{2+} + 2e^- \rightarrow Ni$
$Mn^{2+} + 2e^- \rightarrow Mn$
$Al^{3+} + 3e^- \rightarrow Al$ strongest reducing agent

6. Classify as oxidation, reduction or neither.

a) $SO_4^{2-} \rightarrow S^{2-}$ reduction
b) $MnO_2 \rightarrow MnO_4^-$ oxidation
c) $Cr_2O_7^{2-} \rightarrow CrO_4^{2-}$ neither
d) $IO_3^- \rightarrow I_2$ reduction

7. Given the following lab data

$SnCl_2$	&	Ni	Spontaneous
$Ni(NO_3)_2$	&	Fe	Spontaneous
$Cr(NO_3)_3$	&	Fe	Non spontaneous.

i) Write three balanced equations.

$Ni + Sn^{2+} \rightarrow Ni^{2+} + Sn$
$Fe + Ni^{2+} \rightarrow Fe^{2+} + Ni$
$Fe + Cr^{3+} \leftarrow Fe^{2+} + Cr$

ii) Rank the oxidizing agents in decreasing order of strength.

strongest oxidizing agent

$Sn^{2+} + 2e^- \rightarrow Sn$
$Ni^{2+} + 2e^- \rightarrow Ni$
$Fe^{2+} + 2e^- \rightarrow Fe$
$Cr^{3+} + 3e^- \rightarrow Cr$ strongest reducing agent

iii) Rank the reducing agents in decreasing order of strength. See above.

iv) Will $SnCl_2$ react with Cr? Explain? Yes, because Sn^{2+} is a stronger oxidizing agent than Cr^{3+}

v) Will Fe^{2+} react with Sn? No, because Fe^{2+} is a weaker oxidizing agent than Sn^{2+}

8. Describe as spontaneous or non-spontaneous. Use your reduction potential chart.

a) $ZnCl_2$ & Cu nonspontaneous
b) $CuCl_2$ & NaCl nonspontaneous
c) Br_2 & Fe^{2+} spontaneous
d) H_2S & Al^{3+} nonspontaneous

9. Can you keep HCl in a Zn container? No, Spontaneous reaction.

What about an Au container? Yes, nonspontaneous reaction.