CONCEPT: STANDARD REDUCTION POTENTIALS

- **Standard Reduction Potential** ($E°_{red}$) is a tendency of a species to gain _____ from another species.
  - □ Recall: Reduction is _____ of electrons, while oxidation is _____ of electrons.
  - □ $E°_{red}$ values are measured at standard conditions: 25°C, 1 atm, ____ M solution and pH = ____.
    - _____ $E°_{red}$, more likely _____ will occur.

___ Strength of Oxidizing Agent

Standard Reduction Potentials	
Reduction Half-Reaction	**$E°_{red}$ (V)**
F_2 (g) + 2e$^-$ → 2 F$^-$ (aq)	2.87
Cl_2 (aq) + e$^-$ → 2 Cl$^-$ (aq)	1.36
O_2 (g) + 4 H$^+$ (aq) + 4e$^-$ → 2 H_2O (l)	1.23
Br_2 (l) + 2e$^-$ → 2 Br$^-$ (aq)	1.09
Fe^{3+} (aq) + e$^-$ → Fe^{2+} (aq)	0.77
2 H$^+$ (aq) + 2e$^-$ → H_2 (g)	**0**
Pb^{2+} (aq) + 2e$^-$ → Pb (s)	-0.13
Ni^{2+} (aq) + 2e$^-$ → Ni (s)	-0.23
Zn^{2+} (aq) + 2e$^-$ → Zn (s)	-0.76
Al^{3+} (aq) + 3e$^-$ → Al (s)	-1.66
Mg^{2+} (aq) + 2e$^-$ → Mg (s)	-2.37
Li^+ (aq) + e$^-$ → Li (s)	-3.04

___ Strength of Reducing Agent

EXAMPLE: Determine which of the following will least likely donate an electron?

a) H_2 b) Br_2 c) Zn^{2+} d) Cl_2 e) Li^+

PRACTICE: Rank the given metal ions in order of increasing strength as an oxidizing agent.

Pb^{2+} (-0.13 V), Mn^{2+} (-1.18 V), Cu^{2+} (+0.16 V), Co^{3+} (+1.82 V), Fe^{3+} (+0.77 V)

PRACTICE: Determine which species can oxidize Br_2.

a) Fe^{3+} b) Ni^{2+} c) H^+ d) F_2