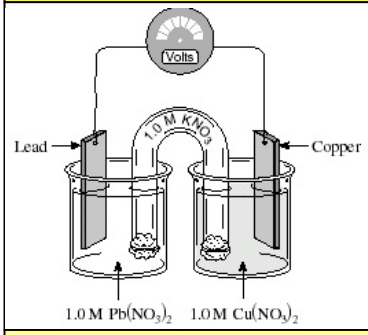
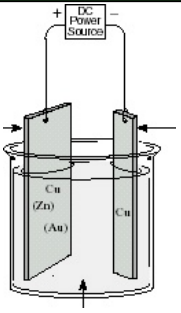
Chemistry 12
Electrochemical and Electrolytic Cells—Summary

In **BOTH** Cells:	
Losing	**G**aining
Electrons	**E**lectrons
Oxidation at the	**R**eduction at the
Anode	**C**athode

Electrochemical Cells	**Electrolytic Cells**
	
Higher Half-Rx. on Table **I**s the **C**athode SPONTANEOUS E^o is Positive + At the Cathode: *Reduction* of the Cation in the beaker. Eg. $Cu^{2+} + 2e^- \rightarrow Cu$	**A**node is + **C**athode is – NON-SPONTANEOUS E^o is Negative - At the Cathode: *Reduction* of Cation in the Electrolyte Eg. $Cu^{2+} + 2e^- \rightarrow Cu$ **or** *Reduction* of Water: $H_2O + 2e^- \rightarrow H_2 + 2OH^-$
At the Anode: *Oxidation* of the Metal Anode Electrode Eg. $Pb \rightarrow Pb^{2+} + 2e^-$	At the Anode: *Oxidation* of the Anion in Solution: Eg. $2Cl^- \rightarrow Cl_2 + 2e^-$ **or** *Oxidation* of Water: $H_2O \rightarrow ½\ O_2 + 2H^+ + 2e^-$ **or** *Oxidation* of the Metal Anode Electrode: Eg. $Cu \rightarrow Cu^{2+} + 2e^-$ (whichever has the *highest oxidation potential* ie. lowest on the right side of table)
Electrons go from A → C in the wire	External power supply pushes e^-'s on to the Cathode, making it – and takes e^-'s from the Anode making it +
Cations move toward → Cathode Anions move toward → Anode In the Salt Bridge	Cations(+) attracted to the – Cathode where they (or water) are *reduced*. Anions(-) attracted to the + Anode, where they, water or the anode is *oxidized*
Applications include: Automobile (Pb/Acid) Battery, Zn/C (Dry) Cells, Alkaline Cells, Fuel Cells	Applications include: Electrolysis to decompose compounds into elements, Downs Cell, Electrorefining, Electroplating, Electrowinning (eg. Production of Al)