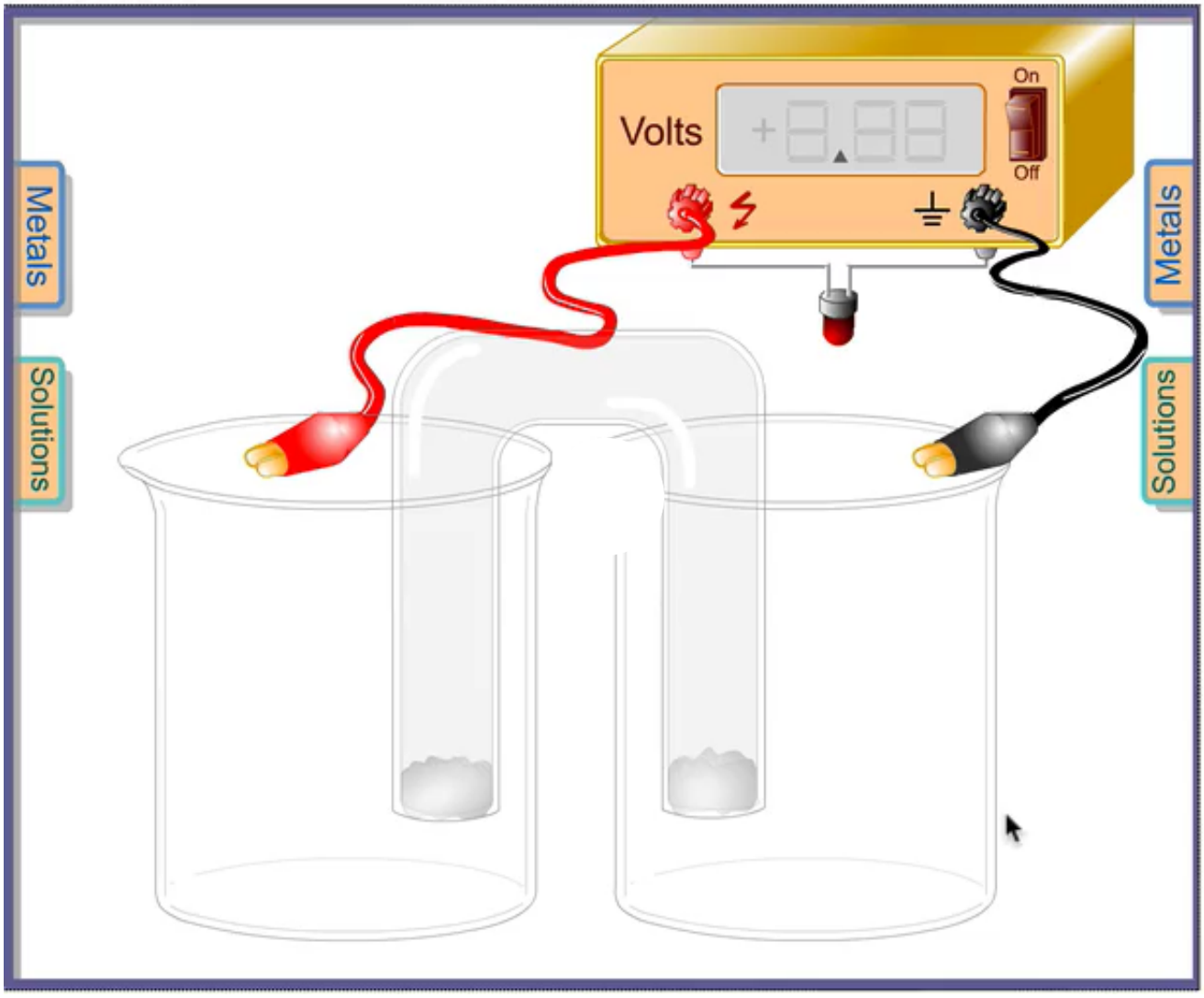
This is BCE#27.

I recommend you print out this page and bring it to class. Click here to show a set of five BCE27 student responses randomly selected from all of the student responses thus far in a new window.

John , here are your responses to the BCE and the Expert's response.

Look at the QuickTime movie below. Play it, and answer the questions that follow based on the movie.



1. Identify the composition of the metal electrode in the beaker on the left and the composition of the metal electrode in the beaker on the right.

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Zn is the metal in the right-hand beaker 77% 7% zinc nitrate 14 copper/Cu

The electrode is made of zinc (Zn).

Cu is the metal in the left-hand beaker 77% "

The electrode is made of copper (Cu).

2. Identify the ion(s) in the beaker on the right and the ion(s) in the beaker on the left.

Zn^2+ and NO3^- are the ions in the right-hand beaker 25% SO_4^{2-} ??? 25%

Zn^{2+} and NO_3^- ions are in the beaker.

Cu^2+ and NO3^- are the ions in the left-hand beaker 15% " 25%

Cu^{2+} and NO_3^- ions are in the beaker.

3a. Write the half-reaction that occurs in the beaker with copper metal.

Cu^2+(aq) +2e^- ---> Cu 77% $Cu^{2+} \rightarrow Cu + 2e^-$

$Cu^{2+}(aq) + 2e^- \text{----> } Cu(s)$

b. Is this an oxidation half-reaction or a reduction half-reaction?

reduction 77%

reduction half-reaction

4a. Write the half-reaction that occurs in the beaker with the zinc metal.

Zn --> Zn^2+ +2e^- 77%

$Zn(s) \text{ ----> } Zn^{2+}(aq) + 2e^-$

b. Is this an oxidation half-reaction or a reduction half-reaction?

oxidation 77%

oxidation half-reaction

5a. The U-tube connecting the two compartments is called a salt bridge, describe the importance of the salt bridge. e⁻ do not move through SB

ions in the salt bridge move to balance the charge

The ions in the salt bridge flow towards either compartment to balance the charge.

b. Explain why the ions move the direction they move.

ions in the salt bridge move to balance the charge

The ions move in this direction to have a charge balance in both beakers. The cations move towards the left beaker because $Cu^{2+}(aq)$ ions are being removed from the solution in that compartment. Everytime a $Cu^{2+}(aq)$ ion is reduced cations from the salt bridge must flow in that direction to balance the charge. The anions move towards the right beaker because $Zn^{2+}(aq)$ ions are being added to the solution in that compartment. Everytime a $Zn^{2+}(aq)$ ion is produced from the oxidation of Zn(s) anions from the salt bridge must flow in that direction to balance the charge.

6. The color changes in the beaker containing the copper metal, explain why the color changes? ↖ have to indicate what that change is

as the Cu^2+ ion react the color of the solution fades

Since $Cu^{2+}(aq)$ are being removed (the concentration is decreasing) from the solution in the left-hand beaker, the blue color becomes lighter.

7. Describe the movement of the electrons in the electrochemical cell. Where do the electrons originate? Where is their 'final destination'? How do they get from their origin to their destination?

from anode to cathode

The electron originate at the right-hand electrode when a Zn atom is oxidized. Producing two electrons on the surface of the Zn electrode in the right-hand beaker, forces two electrons onto the surface of the copper electrode in the left-hand beaker. Those two electrons are captured by a $Cu^{2+}(aq)$ in solution and a Cu^{2+} ion is reduced.

The electrons can only move through the wire attached to the electrodes. This path means the electron cans do work. In this case they produce a display indicating the voltage different between the two electrodes.

8. Is there anything about the questions that you feel you do not understand? List your concerns/questions.

nothing

9. If there is one question you would like to have answered in lecture, what would that question be?

nothing