Monday, April 6th

Learning Target : I can understand why a current passes through a system on a molecular level.

Homework: n/a

As you enter... (Write down questions and answers)

WELCOME BACK!!!

Using lab 20...

What was the major discovery of Galvani? What about Volta?

Produce electric current between 2 metals in a moist environment.

Developed device that measures current. Termed the word volt.

Reminder: 2 weeks left of 3rd marking period

Statement of Inquiry: Energy allows for the movement of the parts of a system which is used to manipulate chemical reactions for scientific and technological uses.

9th period:

- Intro new unit: Electrochemistry (15 min)
- Lab 20: Electrochemistry Exploration (30 min)
- Do 1 experiment today
- We will finish the lab tomorrow

Tix out the door (Don't forget your name.)

Thinking about the molecular level, what allows a current to pass through a system?
Explain your answer with an example from the lab.

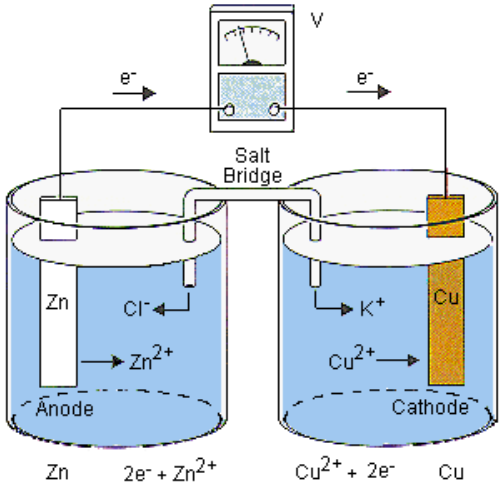
Electrochemistry

Class discussion: Looking at the parts of this word... what do you think this unit will be focusing on?

electricity / current → charge
\ conduct
↓
* Electrons

Pair and share: Analyze this diagram with a person sitting next to you. Make 2 inferences about what may be happening in the diagram below.

* Electrons flowing between 2 metals



Tuesday, April 7th

Learning Target : I can apply the rules for assigning oxidation numbers.

Homework: Worksheet due Friday, April 10th

As you enter... (Write down questions and answers)

Thinking about the lab, explain the role of the lemon in an electrochemical cell. Draw a particle diagram that represents what is happening within the lemon.

Lemons have acid (like electrolytes which have ions) which allows for current to flow.

Reminder: Tomorrow we are going to the computer lab, room 228

Statement of Inquiry: Energy allows for the movement of the parts of a system which is used to manipulate chemical reactions for scientific and technological uses.

8th/9th period:

- Finish lab 20 and hand in (60 min)

9th period

- Notes and Practice on Oxidation Numbers (30 min)
- Exit Tix (5 min)

Tix out the door (Don't forget your name.)

Assign the oxidation state for each element within the following three compounds.

1. H_2 H =
2. Na_2O Na = O =
3. MgF_2 Mg = F =

Electrochemical cells conduct a current through the transfer of electrons. We can use oxidation numbers to determine how many electrons are transferred in a given reaction.

Table 4.2 | Rules for Assigning Oxidation States

The Oxidation State of . . .	Summary	Examples
• An atom in an element is zero	Element: 0	$Na(s)$, $O_2(g)$, $O_3(g)$, $Hg(l)$
• A monatomic ion is the same as its charge	Monatomic ion: charge of ion	Na^+, Cl^-
• Fluorine is −1 in its compounds	Fluorine: −1	HF, PF_3
• Oxygen is usually −2 in its compounds Exception: peroxides (containing O_2^{2-}), in which oxygen is −1	Oxygen: −2	H_2O, CO_2
• Hydrogen is +1 in its covalent compounds	Hydrogen: +1	H_2O, HCl, NH_3

Assign oxidation states to all atoms in the following.

a. CO_2 C = +4 O = -2

+4 + 2(-2) = 0

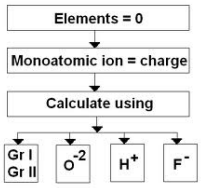
b. SF_6 S = +6 F = -1

+6 + (-6) = 0

c. NO_3^- N = +5 O = -2

5 + (-6) = -1

Summary



1) N_2	N: 0		
2) $ZnCl_2$ +2 +2(-1) = 0	Zn: +2	Cl: −1	
3) K_2SO_3 +2 + _ + (-6) = 0	K: +1	S: +4	O: -2
4) S_8	S: 0		
5) Fe	Fe: 0		
6) PbO	Pb: +2	O: −2	
7) PbO_2 -4	Pb: +4	O: -2	
8) $CuCO_3$ +2 +4 -6 = 0	Cu +2	C +4	O -2
9) Na_2CrO_4 +2 +6 -8 = 0	Na: +1	Cr: +6	O: -2
10) $Cu(ClO_3)_2$ -2	Cu: +2	Cl: +5	O: -2
11) $Cu(ClO_2)_2$	Cu:	Cl:	O:
12) $Cu(ClO)_2$ +2 +1 -4 = 0	Cu: +2	Cl: +1	O: -2
13) K	K:		
14) NO_2	N:	O:	
15) SO_2	S:	O:	

Wednesday, April 8th

Learning Target : I can apply the rules for assigning oxidation numbers using my reference tables.

Homework: Worksheet due Friday, April 10th

As you enter... (Write down questions and answers)

Using your reference tables and the Rules from yesterday...

Determine the oxidation numbers for each element in the following compounds.

1. F_2 F: 0
2. H_2O H: +1 O: -2 -> 0
3. PF_5 P: +5 F: -1

Reminder: Go to Room 228 tomorrow

Statement of Inquiry: Energy allows for the movement of the parts of a system which is used to manipulate chemical reactions for scientific and technological uses.

9th period:

- Finish Worksheet (15 min)
- Oxidation Numbers Bingo (25 min)
- Exit Tix (5 min)

Tix out the door (Don't forget your name.)

Assign the oxidation number for each element within the following three compounds.

1. Cl_2 Cl: ___
2. NH_3 N: ___ H: ___
3. KF K: ___ F: ___

Friday, April 10th

Learning Target : I can write half-reactions to show how electrons were lost and gained.

Homework: Worksheet due today

As you enter... (Write down questions and answers)

Write the oxidation numbers above each element. Then write the oxidation and reduction half-reactions.

$\overset{+1}{Cu^+} + \overset{0}{Ag} \rightarrow \overset{+1}{Ag^+} + \overset{0}{Cu}$

OIL RIG

gain e-

loss e-

Oxidation half-reaction: $Ag \rightarrow Ag^+ + e^-$

Reduction half-reaction: $Cu^+ + e^- \rightarrow Cu$

Reminder: 1 week left of 3rd marking period

Statement of Inquiry: Energy allows for the movement of the parts of a system which is used to manipulate chemical reactions for scientific and technological uses.

AGENDA

9th period

- More & more practice writing half-reactions! (40 min)
- Exit Tix (5 min)

Tix out the door (Don't forget your name.)

Write the half-reactions for the following reaction. Identify which is reduction and which is reduction.

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

ELECTROCHEMISTRY: Half-Reactions

Whatever is not finished in class is homework.

1. What is a redox reaction?

   Reaction that involves the transfer of e^-

2. Can oxidation occur without reduction? Explain. OIL RIG

   No, e^- gain = e^- loss

3. Why would a nail corrode more quickly in saltwater than in distilled water?

   B/c salt turns into ions to allow e^- flow.

4. a. What is the oxidation number of any atom in the elemental state? 0
   b. What is the oxidation number of any monatomic ion? charge of ion
   c. What is the sum of the oxidation numbers in a neutral compound equal? 0
   d. What is the sum of the oxidation numbers in a polyatomic ion equal? charge of ion

5. Determine the oxidation number of phosphorous in each substance.

   a. P_4O_8 +4
   b. P 0
   c. P_4O_6 +3
   d. H_3PO_4 +5
   e. PO_3^{3-} +3
   f. PO_4^{3-} +5

6. Determine the oxidation numbers of each element in each of the following compounds.

   a. S_2O_3 S = +3 O = −2
   b. Cl_2 Cl = 0
   c. CO_3^{2-} C = +4 O = −2
   d. NO_3 N = 6 O = −2
   e. KCl K = 1 Cl = −1
   f. He He = 0
   g. NO_2 N = +4 O = −2
   h. H_3N H = +1 N = −3

7. If a substance is "reduced" does it gain or lose electrons?__________ If a substance is "oxidized" does it gain or lose electrons?__________ OIL RIG

8. Distinguish between an oxidizing agent and a reducing agent.

   Oxidizing agent = particle that's reduced
   reducing agent = particle that's oxidized

9. Use the changes in oxidation numbers to identify which atom is oxidized and which is reduced. Then, determine which reactant is the oxidizing agent and which is the reducing agent. (Show your work.) You may need to use electronegativity values (p. 405) to determine which atom is gaining or losing electrons, especially for molecular compounds.

   a. $H_2 + Cl_2 \rightarrow 2\,HCl$

   Oxidized H_2 Reduced Cl_2
   Oxidizing Agent Cl_2 Reducing Agent H_2

   b. $2\,O_2 + N_2 \rightarrow 2\,NO_2$

   Oxidized ______ Reduced ______
   Oxidizing Agent ______ Reducing Agent ______

   c. $2\,Li + F_2 \rightarrow 2\,LiF$

   Oxidized ______ Reduced ______
   Oxidizing Agent ______ Reducing Agent ______

   d. $3\,H_2S + 2\,HNO_3 \rightarrow 3\,S + 2\,NO + 4\,H_2O$

   Oxidized ______ Reduced ______
   Oxidizing Agent ______ Reducing Agent ______

10. Write the oxidation number above each element. Then, determine if each equation represents a redox reaction (circle yes or no).

    a. $2\,KClO_3 \rightarrow 2\,KCl + 3\,O_2$ yes / no
    b. $BaCl_2 + 2\,KIO_3 \rightarrow Ba(IO_3)_2 + 2\,KCl$ yes / no
    c. $HCl + NaOH \rightarrow H_2O + NaCl$ yes / no
    d. $Mg + Br_2 \rightarrow MgBr_2$ yes / no
    e. $NH_4NO_3 \rightarrow N_2 + H_2O$ yes / no

C) Balance the following redox reactions by the half-reaction method, rewriting the balanced equations below the given unbalanced equation. Show your work below each reaction and put coefficients in the spaces provided:

1) ____Cu + ____Ag^{+1} ---> ____Cu^{+2} + ____Ag

2) ____Fe + ____Pb^{+2} ---> ____Fe^{+3} + ____Pb

3) ____Ag^{+1} + ____Cr ---> ____Ag + ____Cr^{+3}

4) ____Ni^{+2} + ____Li ---> ____Li^{+1} + ____Ni

5) ____Al + ____H^{+1} ---> ____Al^{+3} + ____H_2