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?

Current flows between 2 metals in a moist environment.

Made battery. Termed 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.

3rd period:

- Intro new unit: Electrochemistry (20 min)

3rd/4th period:

- Lab 20: Electrochemistry Exploration (75 min)
  - Do 1 experiment
  - Regroup and discuss
  - Do last 2 experiments

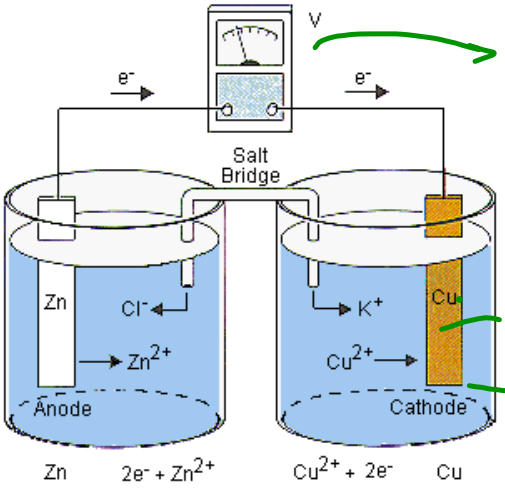
Tix out the door (Don't forget your name.)

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?

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.



electricity
transfer
measurement
- metals
- "energy" in water
- current
copper
electrolytes

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.

Role: lemon has acid (like an electrolyte)

ions

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.

3rd period:

- Finish lab 20 and hand in (10 min)
- Notes and Practice on Oxidation Numbers (30 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. H_2
2. Na_2O
3. MgF_2

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 (aka charge)

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.

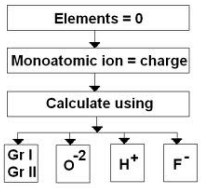
a. CO_2 C: +4 O: -2

b. SF_6 S: +6 F: -1

c. NO_3^- N: O: -2

(+5) + 3(-2) = -1

Summary



1) N_2	N: 0		
2) $ZnCl_2$	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 -4 = 0	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 +10 -12	Cu: +2	Cl: +5	O: -2
★ 11) $Cu(ClO_2)_2$	Cu:	Cl:	O:
12) $Cu(ClO)_2$ +2 +2 -4 = 0	Cu: +2	Cl: +1	O: -2
→ 13) K	K: 0		
14) NO_2 +4 -4 = 0	N: +4	O: -2	
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(2) O = -2 → 0
3. Na_2O Na = +1(2) O = -2 → 0

Reminder: Computer Lab 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.

3rd period:

- Practice Oxidation Numbers (20 min)

3rd/4th period

- Oxidation Stations (20 min each)
- 1. Mahjong on computers (in pairs)
- 2. Kahoot Game with Ms. Eng
- 3. Bingo at the Lab tables
- 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. H_2
2. Na_2O
3. MgF_2

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.

OIL RIG loss e- gain e-

$Cu^{+} + Ag \rightarrow Ag^{+} + Cu$ (+1, 0 → +1, 0)

Oxidation: $Ag \rightarrow Ag^{+} + e^{-}$

Reduction: $Cu^{+} + e^{-} \rightarrow Cu$

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.

3rd period:

- Practice Writing Half-Reactions (45 min)

**5 min Break... Once you have finished up to #9

4th period

- More & more practice writing half-reactions! (45 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 oxidation and which is reduction.

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

oxidation:

reduction:

ELECTROCHEMISTRY: Half-Reactions

Whatever is not finished in class is homework.

1. What is a redox reaction? electrons gain = e⁻ loss
Reaction that transfers electrons

2. Can oxidation occur without reduction? Explain.
No, electrons gained = e⁻ lost

3. Why would a nail corrode more quickly in saltwater than in distilled water?
Salt water has ions (Na^+ Cl^-) that allow e⁻'s to 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 whole ion

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

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

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

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

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

8. Distinguish between an oxidizing agent and a reducing agent.
ox. agent = gains e⁻
red. agent = loses e⁻

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. $H_2 + Cl_2 \rightarrow 2\,HCl$ (0 0 +1 -1)

Oxidized _____ Reduced _____
Oxidizing Agent _____ Reducing Agent _____

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