9th period:
- Intro new unit: Electrochemistry (15 min)
- Lab 20: Electrochemistry Exploration (30 min)
- Do 1 experiment today
- We will finish the lab tomorrow

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. \( \text{H}_2 \)  \( \overset{1}{\text{H}} \)
2. \( \text{Na}_2\text{O} \)  \( \overset{1}{\text{Na}}^+ \)  \( \overset{-2}{\text{O}}^− \)
3. \( \text{MgF}_2 \)  \( \overset{2+}{\text{Mg}}^2+ \)  \( \overset{-1}{\text{F}}^− \)
Assign oxidation states to all atoms in the following.

a. $\text{CO}_2$
   \[ +4 + 2(\cdot 2) + 0 \quad \text{C} = +4 \quad \text{O} = -2 \]

b. $\text{SF}_6$
   \[ +6 + 6(\cdot 1) + 0 \quad \text{S} = +6 \quad \text{F} = -1 \]

c. $\text{NO}_3^-$
   \[ +5 + 3(\cdot 2) - 1 \quad \text{N} = +5 \quad \text{O} = -2 \]

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<tbody>
<tr>
<td>1) $\text{N}_2$</td>
<td>N: 0</td>
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<tr>
<td>2) $\text{ZnCl}_2$</td>
<td>Zn: +2</td>
<td>Cl: -1</td>
</tr>
<tr>
<td>3) $\text{K}_2\text{SO}_3$</td>
<td>K: +1</td>
<td>S: +4</td>
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<tr>
<td>4) $\text{S}_8$</td>
<td>S: 0</td>
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<td>5) $\text{Fe}$</td>
<td>Fe:</td>
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<td>6) $\text{PbO}$</td>
<td>Pb: +2</td>
<td>O: -2</td>
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<tr>
<td>7) $\text{PbO}_2^-$</td>
<td>Pb: +4</td>
<td>O: -2</td>
</tr>
<tr>
<td>8) $\text{CuCO}_3$</td>
<td>Cu: +2</td>
<td>C: +4</td>
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<tr>
<td>9) $\text{Na}_2\text{Cr}_2\text{O}_7$</td>
<td>Na: 1</td>
<td>Cr: -6</td>
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<tr>
<td>10) $\text{Cu}^{2+}\text{Cl}_2$</td>
<td>Cu: +2</td>
<td>Cl: +5</td>
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<tr>
<td>11) $\text{Cu}^{2+}\text{Cl}_2$</td>
<td>Cu:</td>
<td>Cl:</td>
</tr>
<tr>
<td>12) $\text{Cu}^{2+}\text{Cl}_2$</td>
<td>Cu: +2</td>
<td>Cl: +1</td>
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<td>13) $\text{K}$</td>
<td>K:</td>
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<tr>
<td>14) $\text{NO}_2$</td>
<td>N:</td>
<td>O:</td>
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<tr>
<td>15) $\text{SO}_2$</td>
<td>S:</td>
<td>O:</td>
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Assign the oxidation number for each element within the following three compounds.

1. \( \text{Cl}_2 \)  
   \( \text{Cl: } \)  

2. \( \text{NH}_3 \)  
   \( \text{N: } \)  \( \text{H: } \)  

3. \( \text{KF} \)  
   \( \text{K: } \)  \( \text{F: } \)
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.

\[ \text{Cu}^{+} + \text{Ag} \rightarrow \text{Ag}^{+} + \text{Cu} \]

Oxidation half-reaction: \[ \text{Ag} \rightarrow \text{Ag}^{+} + e^{-} \]

Reduction half-reaction: \[ \text{Cu}^{+} + e^{-} \rightarrow \text{Cu} \]

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
- 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 oxidation and which is reduction.

\[ \text{Al} + \text{Pb}^{+2} \rightarrow \text{Al}^{+3} + \text{Pb} \]
1. What is a redox reaction?

2. If a reaction is written as: 
   \[ \text{OIL} \rightarrow \text{RIG} \]
   What does this mean?

3. At an electrode, if there is a positive charge on the cathode, which direction is the current of electrons flowing? From the cathode to the anode.

4. The charge of an ion is 2\text{+}.
   What is the sign of the charged species present?
   \[ \text{Na}^+ \]

5. How many electrons and protons are present in an atom of chlorine in its elemental state?
   17 electrons, 17 protons

6. What is the oxidation number of an atom in a neutral molecule?
   In a neutral molecule, the oxidation number of each atom is zero.

7. What is the difference between reducing and oxidizing agents?
   
   **Reducing Agent**: Reacts to gain electrons, and its oxidation number decreases.
   
   **Oxidizing Agent**: Reacts to lose electrons, and its oxidation number increases.

8. **Electrochemistry**

   a. **Explain** the difference between reducing and oxidizing agents using water as an example.
   
      - **Reducing Agent**: loses electrons to oxygen (oxidation)
      - **Oxidizing Agent**: gains electrons from water (reduction)

   b. **Determine** the oxidation number of each atom in the following compounds:
      
      a. \[ \text{Cl}_2 \]
      b. \[ \text{ClO}_2 \]
      c. \[ \text{ClO}_3^- \]
      d. \[ \text{ClO}_4^- \]

   c. **Balance the following redox reactions by the half-reaction method**.

      1) \[ \text{Cu} + \text{Ag}^+ \rightarrow \text{Cu}^2+ + \text{Ag} \]

      2) \[ \text{Fe} + \text{Pb}^{2+} \rightarrow \text{Fe}^{2+} + \text{Pb} \]

      3) \[ \text{Ag} + \text{Cr} \rightarrow \text{Ag} + \text{Cr}^{3+} \]

      4) \[ \text{I}_2 + \text{I}^- \rightarrow \text{I}_3^- + \text{I} \]

      5) \[ \text{Al} + \text{H}^+ \rightarrow \text{Al}^{3+} + \text{H}_2 \]