**Date:** January 7. 2019 | **School Day:** 86

**Learning Objectives** – "Students CAN…"

1. Analyze new concept vocabulary – Vocabulary Enhancement (BW)

2. Electrolysis Labs: Conservation of matter / The electrolysis apparatus – Problem solving through invention (Day 1)

**Assessment**

In-class completion of the notebook/bell work

*The electrolysis apparatus – Problem solving through invention (Day 1)*

**Homework**

1. Complete week 21 vocabulary – In Class

2. Complete the electrolysis labs diagram (Part 1) – 1/8

Reminders / DO NOT COPY

Need make-up work, concept review, or just a quiet place to study **Room 216 / Wednesday 4:00 – 5:00. (Weger - Science students ONLY)**

**The teacher's notebook is no longer available during the second semester**. Students must use the information provided in the daily lesson plans for make-up..

**Bell work**

Using the vocabulary list provided at your seat: *Complete the five starred* terms*

| For each term on the list you may do <u>one</u> of the following: | **Incomplete or incorrect vocabulary will be scored accordingly.** |
|---|---|
| • Copy<br>• Summarize<br>• Provide an example | **No pictures – Text only** |

***Vocabulary assignments must be complete prior to notebook assessments – please plan/prepare accordingly.*

**Linked Documents and Class Resource** *Electrolysis Lab Handout* ↓ *Vocabulary 11-1* ↓

*Periodic Table (Printable)*

**District Content Descriptor:**

Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. (07-PS3-5)

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- Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (07-PS1-2)
- Matter is conserved because atoms are conserved in physical and chemical processes. (07-PS1-5)

*Fayette County 2018-19 District Content Map*

**Date:** January 8. 2019 | **School Day:** 87

**Learning Objectives** – "Students CAN…"

1. Current events in science – refine reading practices, comprehension and increase vocabulary (BW)

2. Electrolysis Labs: Lab Tests & Measurements (Day 2)

**Assessment**

In-class completion of the notebook/bell work

*Electrolysis Labs: Lab Tests & Measurements*

**Homework**

1. Complete the article Q-Review (BW) – In Class

2. Complete the electrolysis labs test & measurement (Part 2) – 1/9

Reminders / DO NOT COPY

Need make-up work, concept review, or just a quiet place to study **Room 216 / Wednesday 4:00 – 5:00. (Weger - Science students ONLY)**

**The teacher's notebook is no longer available during the second semester**. Students must use the information provided in the daily lesson plans for make-up.

**Bell work**

Using good-practice reading techniques, read this week's science article. When you finish reading, complete the article questions below.

1. **Select <u>two</u> substances described in the article – explain where they come from and what effects they have on our body.**
2. **Why is it so difficult to remove these from our drinking water? Give two examples from the article.**
3. **Who do you think is at greatest risk of these toxins? Explain your response.**

**Linked Documents and Class Resource**

*Electrolysis Lab Handout* ↓

Weekly Article: What's in your water?

*Periodic Table (Printable)*

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Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. (07-PS3-5)

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- Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (07-PS1-2)
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*Fayette County 2018-19 District Content Map*

**Date:** January 9. 2019 | **School Day:** 88

**Learning Objectives** – "Students CAN…"

1. Use critical thinking to solve a problem. (BW)

2. Electrolysis Labs: Lab Graphing (Day 3)

**Assessment**

In-class completion of the notebook/bell work

*Electrolysis Labs: Lab Graphing*

**Homework**

1. Complete the week 21 challenge question (BW) – In Class

2. Complete the electrolysis labs graphing (Part 3) – 1/9

Reminders / DO NOT COPY

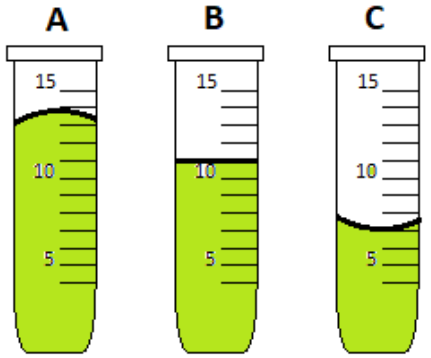
Need make-up work, concept review, or just a quiet place to study **Room 216 / Wednesday 4:00 – 5:00. (Weger - Science students ONLY)**

**The teacher's notebook is no longer available during the second semester**. Students must use the information provided in the daily lesson plans for make-up.

**Bell work**

Complete today's challenge question in the notebook. When you finish, record your answer on a small piece of paper and place it in the solutions chest at the front of the room.

**Provide an accurate reading of each meniscus A, B and C** - You may need to refer to this week's vocabulary for assistance.




**Linked Documents and Class Resource** *Electrolysis Lab Handout* ↓

*Periodic Table (Printable)*

**District Content Descriptor:**

Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. (07-PS3-5)

---

- Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (07-PS1-2)
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*Fayette County 2018-19 District Content Map*

**Date:** January 10. 2019 | **School Day:** 89

**Learning Objectives** – "Students CAN…"

1. Analyze and respond to this week's YouTube (Q-Review) BW

2. Electrolysis Labs: Writing a conclusion – Identification of our samples (Day 4)

**Assessment**

In-class completion of the notebook/bell work

*Electrolysis Labs: Writing a conclusion – Identification of our samples*

**Homework**

1. Complete the video Q-Review (BW) – In Class

2. Quiz 3-1: Classroom Expectations – 1/11

3. Complete the electrolysis lab conclusion/graph – 1/14

Reminders / DO NOT COPY

Need make-up work, concept review, or just a quiet place to study **Room 216 / Wednesday 4:00 – 5:00. (Weger - Science students ONLY)**

**The teacher's notebook is no longer available during the second semester**. Students must use the information provided in the daily lesson plans for make-up.

**Bell work**

YouTube Science – Watch the video and respond to the questions below.

1. **Why are "reduction" reactions confusing?**
2. **Provide three examples of a redox reaction shared in the video.**
3. **In your opinion – Are redox reactions important? Explain your response**


Video LINK

**Linked Documents and Class Resource** *Electrolysis Lab Handout* ↓ *Weekly Video: Redox Reactions*

**District Content Descriptor:**

Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. (07-PS3-5)

---

- Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (07-PS1-2)
- Matter is conserved because atoms are conserved in physical and chemical processes. (07-PS1-5)

*Fayette County 2018-19 District Content Map*

**Date:** January 11. 2019 | **School Day:** 90

**Learning Objectives** – "Students CAN…"

1. Sharing Ideas – Write a paragraph in your science journal using the BW writing prompt.

2. Quiz 3-2: Lab and notebook concept mastery check (Summative)

**Assessment**

In-class completion of the notebook/bell work

*Quiz 3-2: Lab and notebook concept mastery check (Summative)*

**Homework**

1. Complete the science journal entry (BW) – In Class

2. Complete the electrolysis lab conclusion/graph – 1/14

3. Notebook assessment 3-1 (Personal Review) – 1/16

Reminders / DO NOT COPY

Need make-up work, concept review, or just a quiet place to study **Room 216 / Wednesday 4:00 – 5:00. (Weger - Science students ONLY)**

**The teacher's notebook is no longer available during the second semester**. Students must use the information provided in the daily lesson plans for make-up.

**Bell work**

Science Journal: Week 21

Complete a paragraph containing no less than five additional sentences that continue the lead below.

**Water powered engines could change the way we live.**

**Linked Documents and Class Resource** *Electrolysis Lab Handout ↓* *Quiz 3-2**

**District Content Descriptor:**

Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. (07-PS3-5)

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- Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (07-PS1-2)
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*Fayette County 2018-19 District Content Map*





**Vocabulary 11-1:** Electrolysis Lab

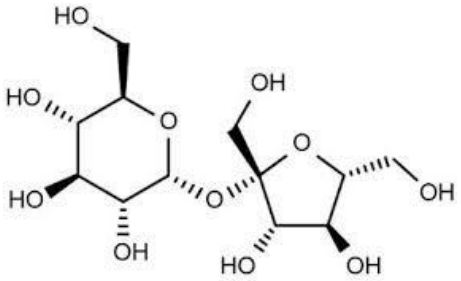
Complete the vocabulary by copying, summarizing or providing an example for each of the starred terms (*).

| Term | Definition |
|---|---|
| **Catalyst / Electrolyte** | a substance that increases the rate of a chemical reaction without itself undergoing any permanent chemical change |
| **Anode – Reaction Description*** | electrolysis forces a chemical reaction to occur. The electrode which supplies the electrons, or where the oxidation reactions occur, is called the anode. |
| **Chemical** | a compound or substance that has been purified or prepared, especially artificially |
| **Chemical Reaction** | a process that involves rearrangement of the molecular or ionic structure of a substance, as opposed to a change in physical form or a nuclear reaction |
| **Conservation of Matter** | the principle that **matter** is neither created nor destroyed during any physical or chemical change. also **conservation** of mass |
| **Electricity** | a form of energy resulting from the existence of charged particles (such as electrons or protons), either statically as an accumulation of charge or dynamically as a current |
| **Electrode*** | a conductor through which electricity enters or leaves an object, substance, or region |
| **Electrolysis*** | chemical decomposition produced by passing an electric current through a liquid or solution containing ions |
| **Inert** | chemically inactive |
| **Mass** | The amount of matter in an object |
| **Meniscus*** | meniscus occurs because of surface tension in the liquid and must be read at eye level. For a concave meniscus, the correct volume will be read at the bottom of the curve. For a convex meniscus, the opposite is true and the correct reading will be at the top of the curve |
| **Oxidation Reduction or Redox Reaction*** | **oxidation-reduction** (**redox**) **reaction** is a type of chemical **reaction** that involves a transfer of electrons between two substances |
| **Physical Reaction** | are **changes** affecting the form of a chemical substance, but not its chemical composition. **Physical changes** are used to separate mixtures into their component compounds, but can not usually be used to separate compounds into chemical elements or simpler compounds |
| **Reactivity** | the degree to which a thing is reactive, reactive - showing a response to a stimulus |
| **SI – Units of Measurement** | The International System of Units (abbreviated **SI** from systeme internationale , the French version of the name) is a scientific method of expressing the magnitudes or quantities of important natural phenomena. There are seven base units in the system, from which other units are derived |
| **Speed** | the rate at which someone or something is able to move or operate – $m/s^2$ |
| **Volume** | the amount of space that a substance or object occupies |

**Electrolysis Lab**

Using salt to increase the rate of an oxidation reduction reaction.

Electrolysis of Water: Using electricity to break down water into its basic parts hydrogen and oxygen – This reaction uses the energy in electricity and ions found in salt to break the covalent and hydrogen bonds that occurs in $H_2O$.



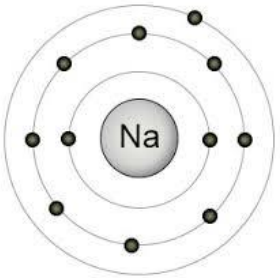

**Observe the molecular formula of water to the left**. You can observe how hydrogen and oxygen bond together to form water molecules. Using your previous studies of chemistry why are these elements able to bond so easily?

*Create a BOHR model for each element to see how they fit together.*

**Observe the sodium atom to the right.** In this experiment we will use different amounts of a compound that contain sodium, to accelerate the electrolysis reaction. Sodium when bonded with a compound forms an ion (an atom or molecule with a positive or negative charge) by sharing its valence electron ions can motivate (catalyze) electricity and speed up chemical reactions.

*Sodium is not the only substance that can do this – but due to its abundance on earth is easily obtained as shown in the samples below.*

*Salt - Sodium Chloride | Baking Soda - Sodium Bicarbonate | Lab Grade Catalyst - Sodium Sulfate*




**LAB SAFETY HAZARDS***

| | | | | | |
|---|---|---|---|---|---|
| Electricity / Shock<br>Flammable Gasses / Combustible<br>Fire / Burns<br>Glass / Breakables & Sharps<br>Chemicals / Irritants |  |  |  |  |  |

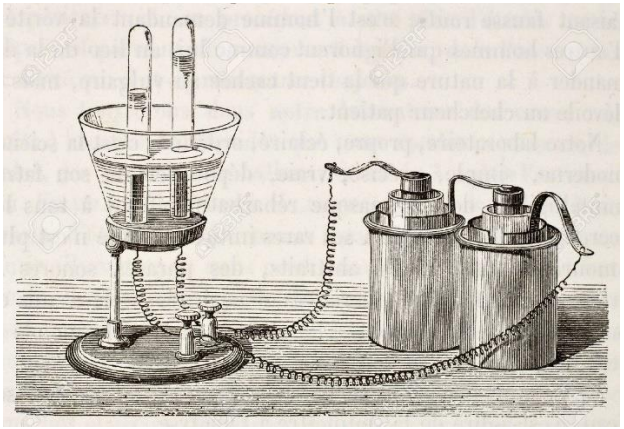
**Part 1**

In order to measure the rate of the reaction we must have a way to separate and capture the gases that make-up water (hydrogen/oxygen).

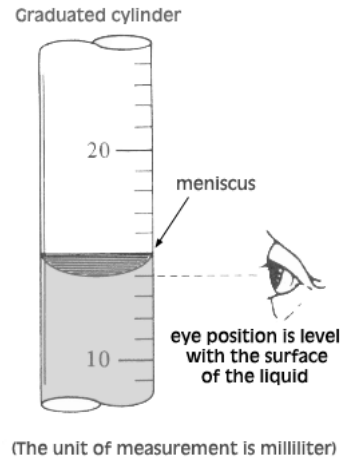
The device we have to build is called an "**electrolysis apparatus**"

An electrolysis apparatus uses two electrodes to charge/separate the gases into two separate measuring tubes. Because the system is closed it operates much like a circuit. The electricity moves through the water forcing the elements to separate and move toward their attracting charge, the gases (hydrogen/oxygen) then move to the top of each of the test tubes where they are trapped/collected. *It is important to note which test tube contains the positive electrode (anode), and the negative electrode (cathode) as this will help us to identify which gas has been collected.*

To the right you can observe an example of this equipment from the early 19th century.



**Complete the classroom model in your notebook.** Below are materials that will be used in the electrolysis lab. *Can you figure out how to build the electrolysis apparatus?*

| *Materials* | *Measuring Electrolyte (Catalyst)* | *Taking Measurements from the Apparatus* |
|---|---|---|
| ***1 – Beaker***<br>***2 – Test Tubes***<br>***2 – Electrodes***<br>***1 – Battery Pack***<br>***1 - Timer***<br><br>*If students are collecting samples for ignition* ***2 – rubber stoppers***<br><br>***Sodium Compound / Electrolyte Powder***<br>***Sink filled with water***<br>***Area for clean-up / Paper towels*** | **Group 1** – Will measure 5g of electrolyte<br>**Group 2** – Will measure 10g mg of electrolyte<br>**Group 3** – Will measure 15g mg of electrolyte<br>*If additional groups are used increase electrolyte by 5g – also consider having student groups run a control group at 0g.* | In order to correctly take measurements, you will need to review your notes on meniscus.<br><br>Always measure to the center of the line. (SEE RIGHT)<br><br>*The markings on a graduated cylinder are commonly milliliters and centiliters.*<br><br>  |

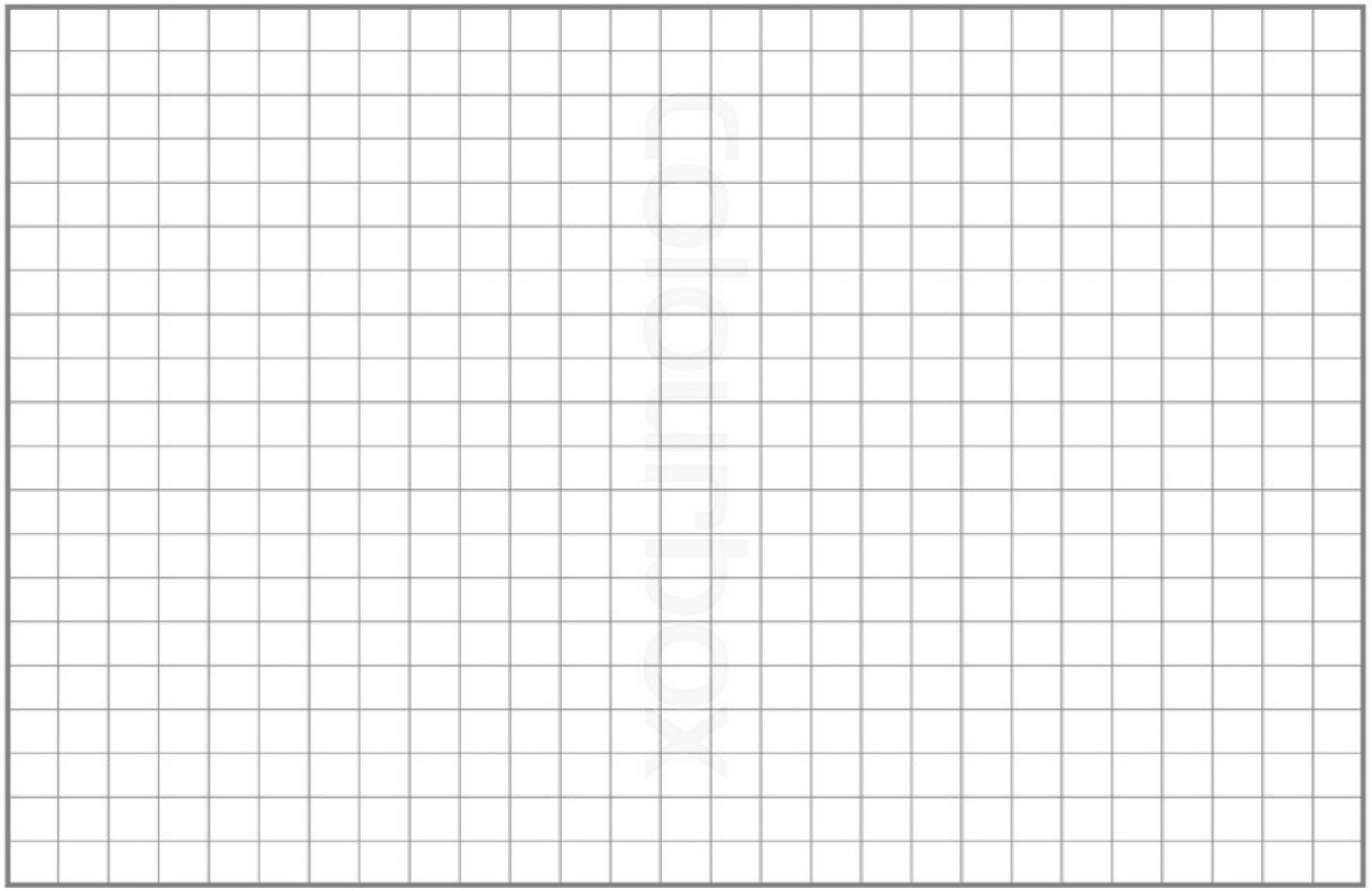
**Part 2 – TO BE COMPLETED IN THE NOTEBOOK**

When you finish the data collection, you should be able to:

- Calculate the volume of gas collected for each sample in milliliters (ml)
- Calculate the rate of the reaction in ml/minute
- Identification of the element/gas and its charge based on its collection point in the electrolysis apparatus

**Part 3**

Using the class results complete a line graph that compares the rate of the reaction (ml/min) for each group (g of electrolyte).



**Part 4** - Writing a conclusion for the electrolysis lab.

**Question/Observation:** How does the amount of electrolyte effect the rate of the redox reaction?

**Hypothesis:** Answer the experimental question – *No experimentation has been completed at this time*

**Data:** Identify the data from the class results that answers the experimental question – *To be completed after experimentation*

**Summary:** Complete the conclusion by responding to your hypothesis – *Use data sets to support your learning statement*

***Chemistry Application Questions****

1. *Which gas collected had greater volume? Support your conclusion with an explanation*

2. *Which gas collected at the anode (positive electrode)? Support your conclusion with an explanation*