Monday, March 16th

Learning Target: I can determine the relative acidity of solutions using indicators to measure pH.

Homework: Worksheet due Thursday

As you enter... (Copy or rephrase the question)

What does acid-base theory tell us is the difference between acids and bases? Name at least 2 parts.

1. Acids start with H, bases have OH (proton donor, Brønsted-Lowry theory)
2. Producers OH⁻ = base
   Producers H⁺ or H₃O⁺ = acid (Arrhenius theory)

Reminder: Acids/Bases Quiz Friday

Big Idea: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

AGENDA

3rd period
- Lab 18: Acid/Base Indicators (60 min)

4th period
- Lab Debrief (30 min)
- Exit Tix (5 min)

Lab 18 info...

- Keep all solutions and indicators at the materials table.
- Liquid indicators only need one drop per solution.
- 6 litmus papers per group (rip in half to get 12)
- Lab must be handed in by the end of 4th period.

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

What is the color of the indicator thymol blue in a solution that has a pH of 11?

(1) red  (3) pink  (2) blue  (4) yellow

Explain how you got your answer.
Learning Target: I can predict the products of a neutralization reaction.

Homework: Worksheet due Thursday

As you enter... (Copy or rephrase the question)

*Take out your reference tables. Table M

Which indicator is yellow in a solution with a pH of 9.8?
A. methyl orange  C. bromoresol green
B. bromthymol blue  D. thymol blue

Reminder: Acids/Bases Quiz Friday

Big Idea: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

3rd period
• Neutralization: Acid/Base Matching Game (35 min)
• Exit Tix (5 min)

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

Which statement describes one acid-base theory?
(1) An acid is an H⁺ acceptor, and a base is an H⁺ donor;
(2) An acid is an H⁺ donor, and a base is an H⁺ acceptor;
(3) An acid is an H⁻ acceptor, and a base is an H⁻ donor;
(4) An acid is an H⁻ donor, and a base is an H⁻ acceptor.
Neutralization: Acid/Base Matching Game

Write the general chemical equation for a neutralization reaction:

\[ \text{Acid} + \text{Base} \rightarrow \text{H}_2\text{O} + \text{Salt} \]

Example:

Write balanced chemical equations for these neutralization reactions. Be sure to: 1) balance the reaction 2) include phases.

1. \[
\text{Ba(OH)}_2(\text{aq}) + 2\text{HCl}(\text{aq}) \rightarrow 2\text{H}_2\text{O} + \text{BaCl}_2
\]

2. \[
2\text{Al(OH)}_2(\text{aq}) + 3\text{H}_2\text{SO}_4(\text{aq}) \rightarrow 6\text{H}_2\text{O} + \text{Al}_2(\text{SO}_4)_3
\]

1. Go back and circle all of the strong acids.
2. Go back and put a box around all of the strong bases.
Tuesday, March 17th

**Learning Target:** I can use titration to determine an unknown concentration of an acid with a known concentration of a base.

**Homework:** Worksheet due Thursday

As you enter... (Copy or rephrase the question)

Finish the neutralization reaction and balance the equation.

$$\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow 2\text{H}_2\text{O} + \text{Na}_2\text{SO}_4$$

Reminder: Acids/Bases Quiz Friday

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**Big Idea:** Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

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3rd period
- Finish Neutralization worksheet (20 min)

3rd/4th period
- Titration Lab (70 min)
- Exit Tix (5 min)

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

Which statement describes one acid-base theory?

1. An acid is an H⁺ acceptor, and a base is an H⁺ donor.
2. An acid is an H⁺ donor, and a base is an H⁺ acceptor.
3. An acid is an H⁻ acceptor, and a base is an H⁻ donor.
4. An acid is an H⁻ donor, and a base is an H⁻ acceptor.
What is the concentration of the acid if you use 0.1 M NaOH?

--Going to slowly add acid to the base until the pink color is gone. That's how you know you've added enough.

--Then use titration equation to solve for the unknown concentration.
As you enter... (Copy or rephrase the question)

1. From lab yesterday, which acid (HCl or H₂SO₄) did you need more of to titrate the NaOH? Why do you think that is?

HCl, because there are less hydrogens than H₂SO₄.

2. Solve: What is the concentration (Molarity) of 20 mL of HCl that is titrated with 10 mL of 1M NaOH?

\[
M_A \cdot V_A = M_B \cdot V_B \rightarrow (X)(20) = (1)(10)
\]

\[
X = \frac{20}{10} = 2\ M
\]

Reminder: Acids/Bases Quiz tmw

3. 50 mL of H₂SO₄ titrated with 5 mL of 10 M KOH. What is \(M_A\)?

\[
M_A \cdot V_A = M_B \cdot V_B \rightarrow X (50) = (10)(5)
\]

\[
X = \frac{50}{10} = 5\ M
\]

*Big Idea: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.*

3rd period

• Make up work...

• Then... Make yourself a vocabulary cheat sheet to use for the Kahoot game tmw.

*Winner of Kahoot will earn a free class work grade.*

Lab

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

What is the concentration (molarity) of 25 mL of H₂SO₄ that is titrated with 50 mL of 1M KOH?
Assignments to hand in from this unit:

- Acid/Base Intro Packet
- Acid/Base Scavenger Hunt (unless signed)
- Lab 18: Indicators and pH
- Neutralization Matching Game Worksheet (unless signed)
- Lab 19: Titration
- Acids and Bases HW
- Test Corrections with explanations on separate sheet
Learning Target: I can apply my knowledge of acids and bases to quiz questions.

Homework: n/a

As you enter... (Copy or rephrase the question)
1. What is the purpose of titration?

2. What color would bromthymol blue turn in a basic solution?

<table>
<thead>
<tr>
<th>M</th>
<th>8.14 = basic</th>
</tr>
</thead>
<tbody>
<tr>
<td>H^+</td>
<td>6.0-7.6</td>
</tr>
<tr>
<td>OH^-</td>
<td>8.0-9.6</td>
</tr>
</tbody>
</table>

Reminder: n/a

\[
M_A \cdot V_A = M_B \cdot V_B \\
10 \cdot x = \frac{10}{M} \\
10 = \frac{40}{70} \\
x = 4 \text{ M}
\]

NaOH has 20mL and is 2 M. What is the concentration of 10mL HCl?

Big Idea: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

3rd period
- Make cheat sheet for Kahoot game (20 min)
- Play Kahoot! (20 min)

4th period
- Acids and Bases Quiz (25 min)
- Choose a final acids and bases project for next week (30 min)

THE MOST COVETED BILLBOARD IN ROCHESTER IS FINALLY AVAILABLE AND YOUR RESEARCH TEAM HAS DONE SOME INCREDIBLE WORK IN THE FIELD OF ACID/BASE CHEMISTRY AND YOU NEED TO SHARE YOUR FINDINGS WITH THE PUBLIC!!! BUT... THERE ARE SEVERAL OTHER RESEARCH TEAMS THAT WILL FIGHT YOU FOR THIS ADVERTISEMENT SPACE.

YOUR JOB IS TO USE YOUR KNOWLEDGE OF CHEMISTRY TO PROVE WHY YOUR RESEARCH SHOULD BE BLOWN UP ON THE BILLBOARD. YOU WILL PRESENT TO THE ADVERTISEMENT COMMITTEE YOUR BILLBOARD DESIGN AND JUSTIFICATION FOR WHY YOU DESERVE THIS SPACE.

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