

Thursday
April
23
2020

AIM

- What are acid/base indicators?

AGENDA

- Indicator notes
- U10L7 video

YOYO

- Pull up the U10L7 (unit 10 lesson 7) video on YouTube

HOMEWORK

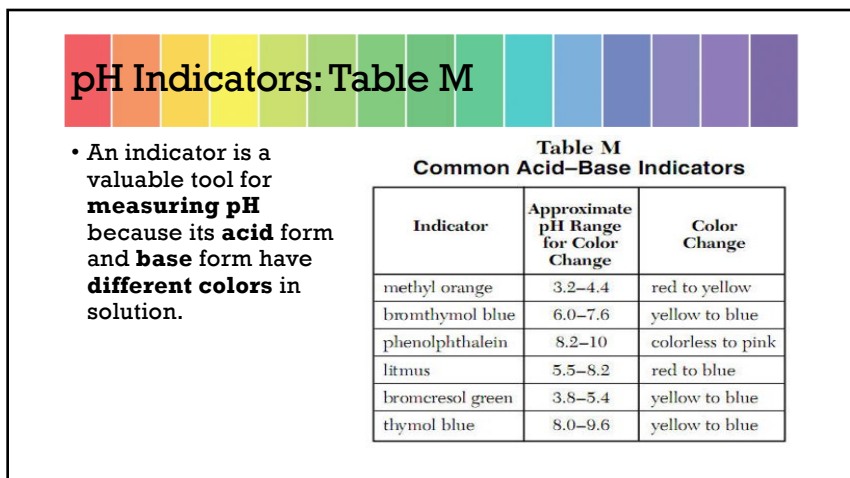
- pH Scale/Indicator CL due tonight by 11:59 pm
- Follow the calendar

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Indicators

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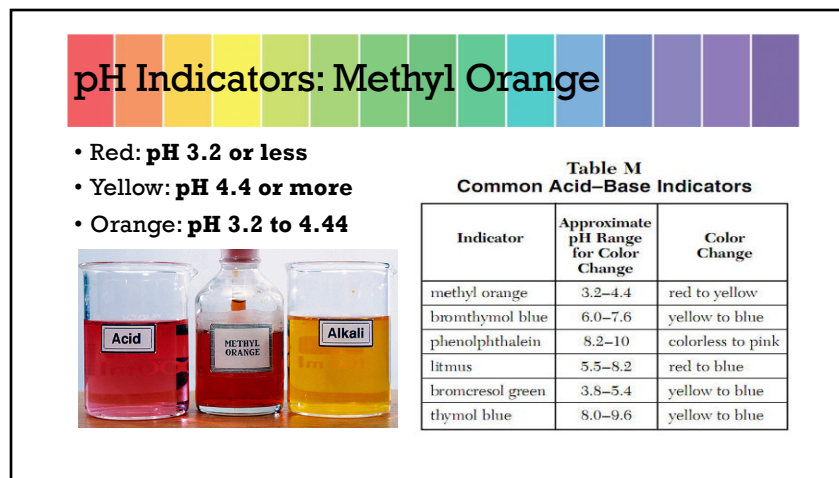
pH Indicators: Table M

- An indicator is a valuable tool for **measuring pH** because its **acid form** and **base form** have **different colors** in solution.

Table M
Common Acid–Base Indicators

Indicator	Approximate pH Range for Color Change	Color Change
methyl orange	3.2–4.4	red to yellow
bromthymol blue	6.0–7.6	yellow to blue
phenolphthalein	8.2–10	colorless to pink
litmus	5.5–8.2	red to blue
bromcresol green	3.8–5.4	yellow to blue
thymol blue	8.0–9.6	yellow to blue

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pH Indicators: Methyl Orange

- Red: **pH 3.2 or less**
- Yellow: **pH 4.4 or more**
- Orange: **pH 3.2 to 4.44**




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pH Indicators: Phenolphthalein

- Colorless: **pH 8.2 or less**
- Pink: **pH 9 or more**

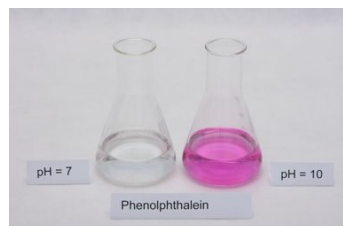


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pH Indicators: Litmus

- Blue paper turns **red** for **acidic** solutions
- Red paper turns **blue** for **basic** solutions

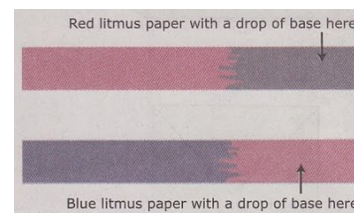


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pH Indicators: Bromcresol Green

- Yellow: **pH 3.8 or less**
- Blue: **pH 5.4 or more**

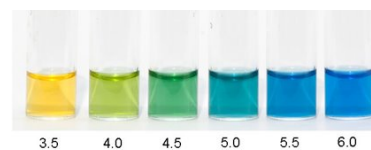
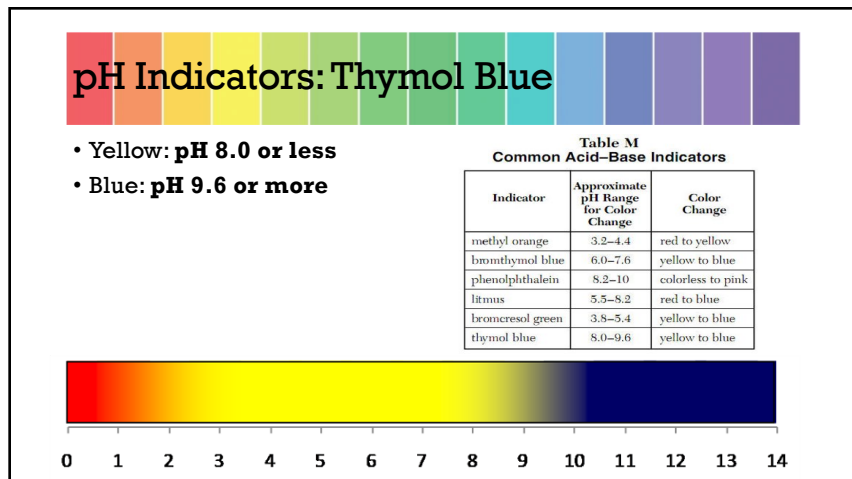


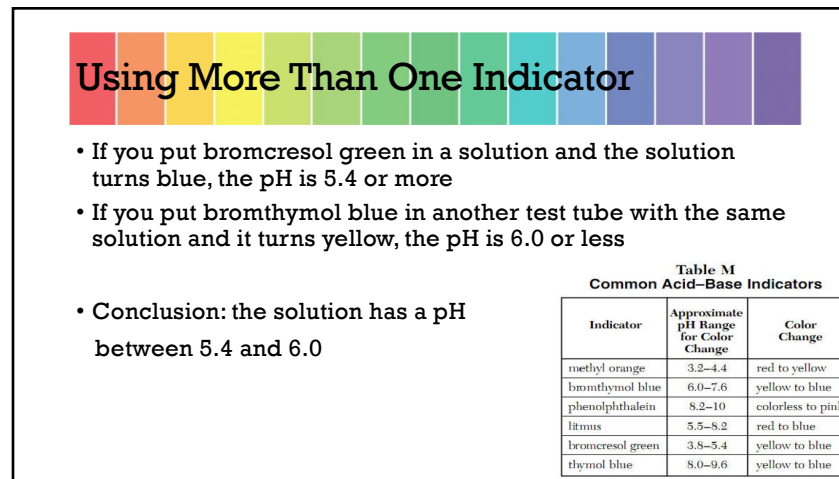
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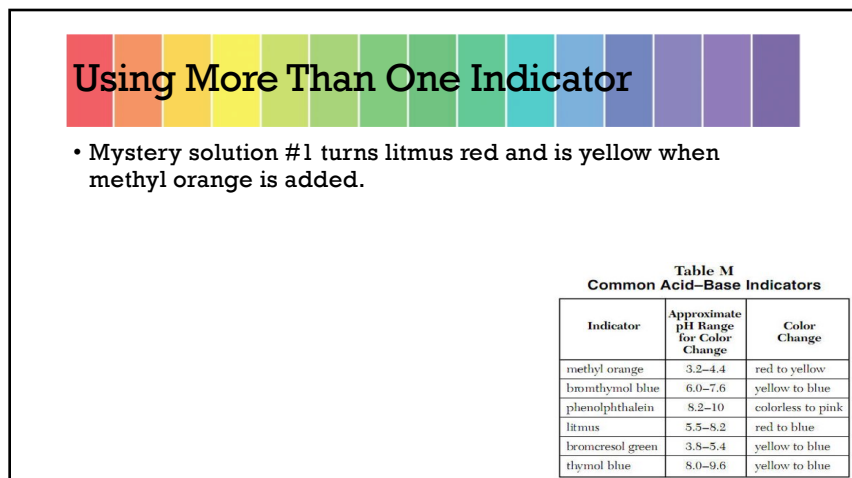
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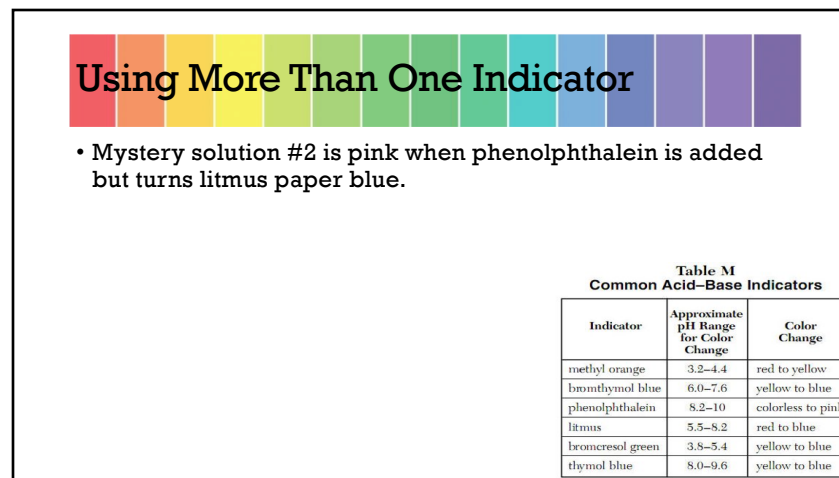
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Summary



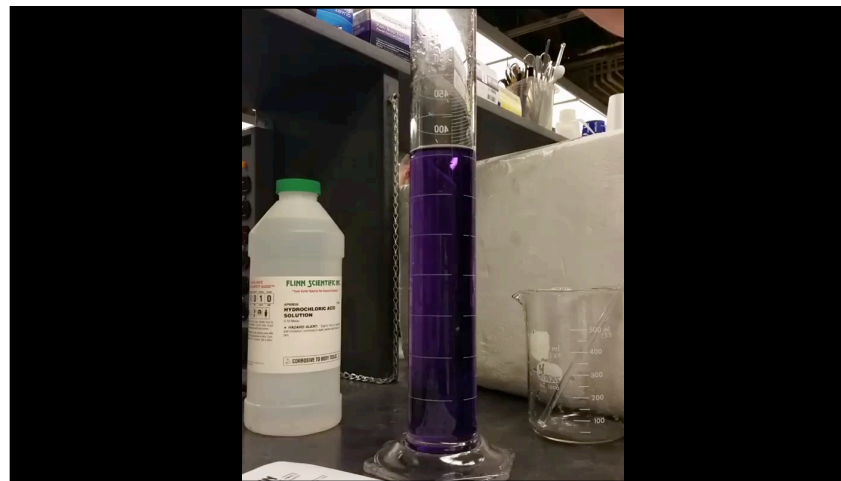
• Acids

- pH **lower than 7**
- Litmus → **red**
- Phenolphthalein → **clear**
- Bromthymol blue → **yellow**
- Methly orange → **red**

• Bases

- pH **higher than 7**
- Litmus → **blue**
- Phenolphthalein → **pink**
- Bromthymol blue → **blue**
- Methly orange → **yellow**

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Video Demo:



- Hint: Universal Indicator was used (red when acidic and purple when basic)
- Describe the pH change
 - Basic to acidic
- Describe the change in $[H^+]$ concentration.
 - It increases

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Summary Questions



- If an aqueous solution turns blue litmus red, which relationship exists between the hydronium ion and the hydroxide ion concentration?
 - $[H_3O^+] > [OH^-]$
 - $[H_3O^+] < [OH^-]$
 - $[H_3O^+] = [OH^-] = 10^{-7}$
 - $[H_3O^+] = [OH^-] = 10^{-14}$

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Summary Questions

- In which 0.01M solution is phenolphthalein pink?
 - $\text{CH}_3\text{OH}_{(\text{aq})}$
 - $\text{Ca}(\text{OH})_{2(\text{aq})}$
 - $\text{CH}_3\text{COOH}_{(\text{aq})}$
 - $\text{HNO}_{3(\text{aq})}$

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Summary Questions

- The results of testing a colorless solution with three indicators are shown below

Test – Result

Red litmus – blue

Blue litmus – blue

Phenolphthalein - pink

- Which formula could represent the solution tested?
 - $\text{NaOH}_{(\text{aq})}$
 - $\text{HCl}_{(\text{aq})}$
 - $\text{C}_6\text{H}_{12}\text{O}_6_{(\text{aq})}$
 - $\text{C}_{12}\text{H}_{22}\text{O}_{11(\text{aq})}$

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Summary Questions

- Three samples of the same solution are tested, each with a different indicator. All three indicators, bromthymol blue, bromcresol green and thymol blue, appear blue if the pH of the solutions is
 - 4.7
 - 6.0
 - 7.8
 - 9.9

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Summary Questions

- Which statement correctly describes a solution with a pH of 9?
 - It has a higher concentration of H_3O^+ than OH^- and causes litmus to turn blue
 - It has a higher concentration OH^- than H_3O^+ and causes litmus to turn blue.
 - It has a higher concentration of H_3O^+ than OH^- and causes methyl orange to turn yellow
 - It has a higher concentration of OH^- than H_3O^+ and causes methyl orange to turn red.

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