

Section 6.2 The pH scale and Indicators

SNC2DP

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**Chapter 4: Developing
Chemical Equations**

**Chapter 5: Classifying
Chemical Reactions**

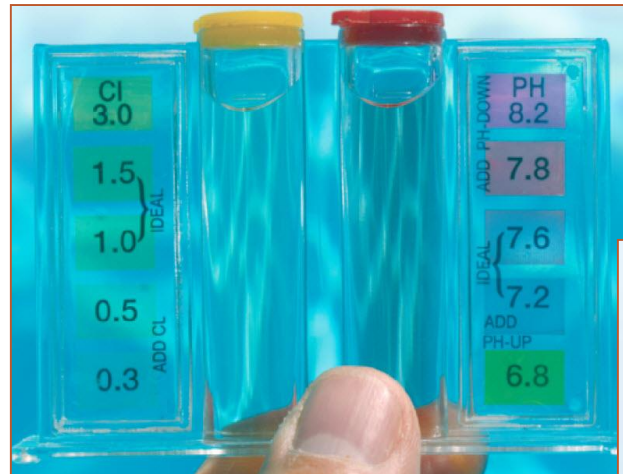


**Chapter 6: Acids and
Bases**

The pH Scale

The pH scale:

*The **pHs** of a variety of solutions (pool water, foods and beverages, and solutions from industrial processes) are regularly monitored.*



The pH Scale

A **pH** (Power of Hydrogen) value relates to the **concentration of hydrogen ions** in a solution.



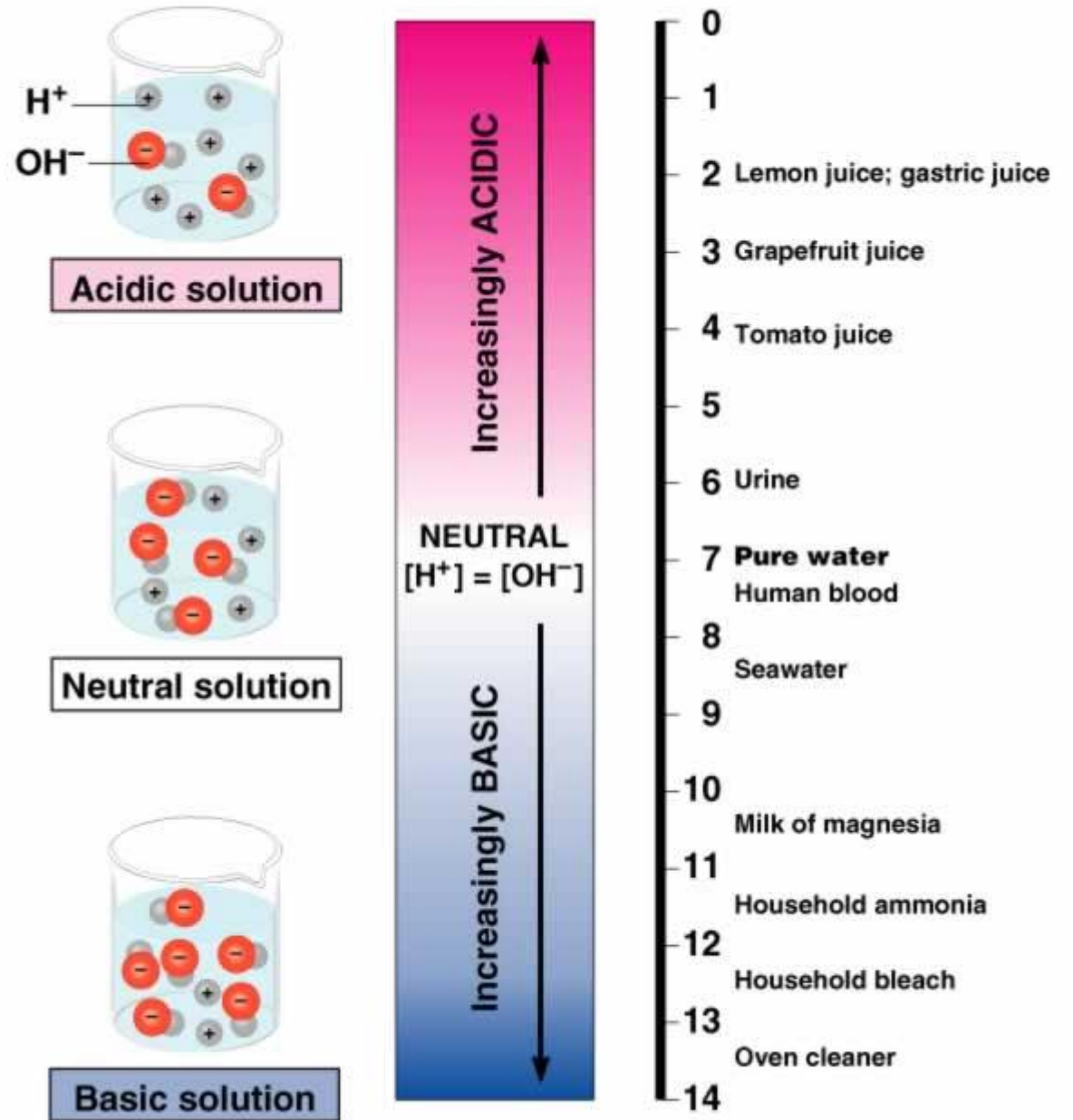
Values increase or decrease exponentially (by a power of 10) as you move up or down the scale.

The pH Scale

*The more H^+ ions there are in the solution, the smaller the pH value (<7).
(_____)*

*The more OH^- ions present in the solution, the greater the pH value (>7).
(_____)*

*If the number of H^+ and OH^- ions are equal, the solution has a pH value of 7.
(_____)*



Checking for Understanding - The pH Scale

How much more concentrated are the hydrogen ions in a solution that has a pH of 7 than the hydrogen ions in a solution that is pH 10?

Determining the pH of a Solution

pH Indicators:

Examples of pH indicators:

- *pH meters*
- *Litmus paper*
- *Specific indicators*
- *plants*

Determining the pH of a Solution

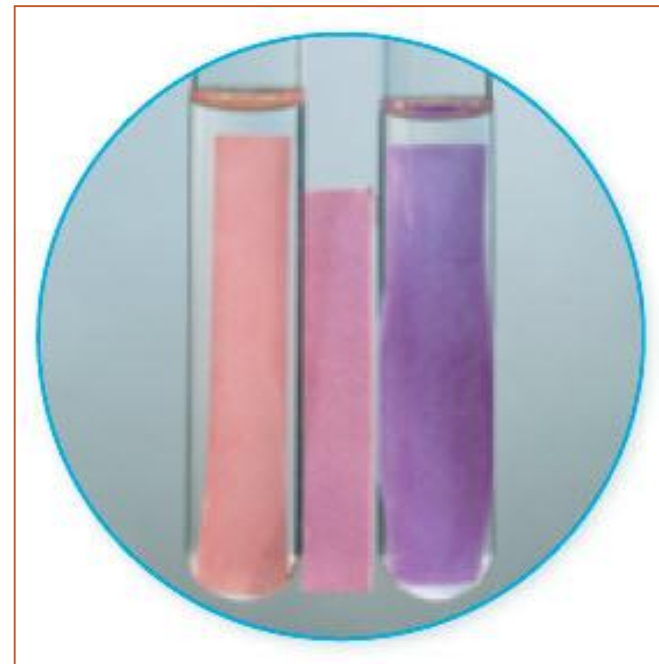
1) pH Meters :have a sensor or probe that electronically produces a precise (real time) reading of the pH of a solution that is displayed digitally on the meter.



Determining the pH of a Solution

2) **Red and Blue Litmus Paper** – A chemically treated indicator paper. **Blue litmus turns red in acids. Red litmus turns blue in bases.**

This simple indicator can determine whether a solution is acidic, basic, or neutral.

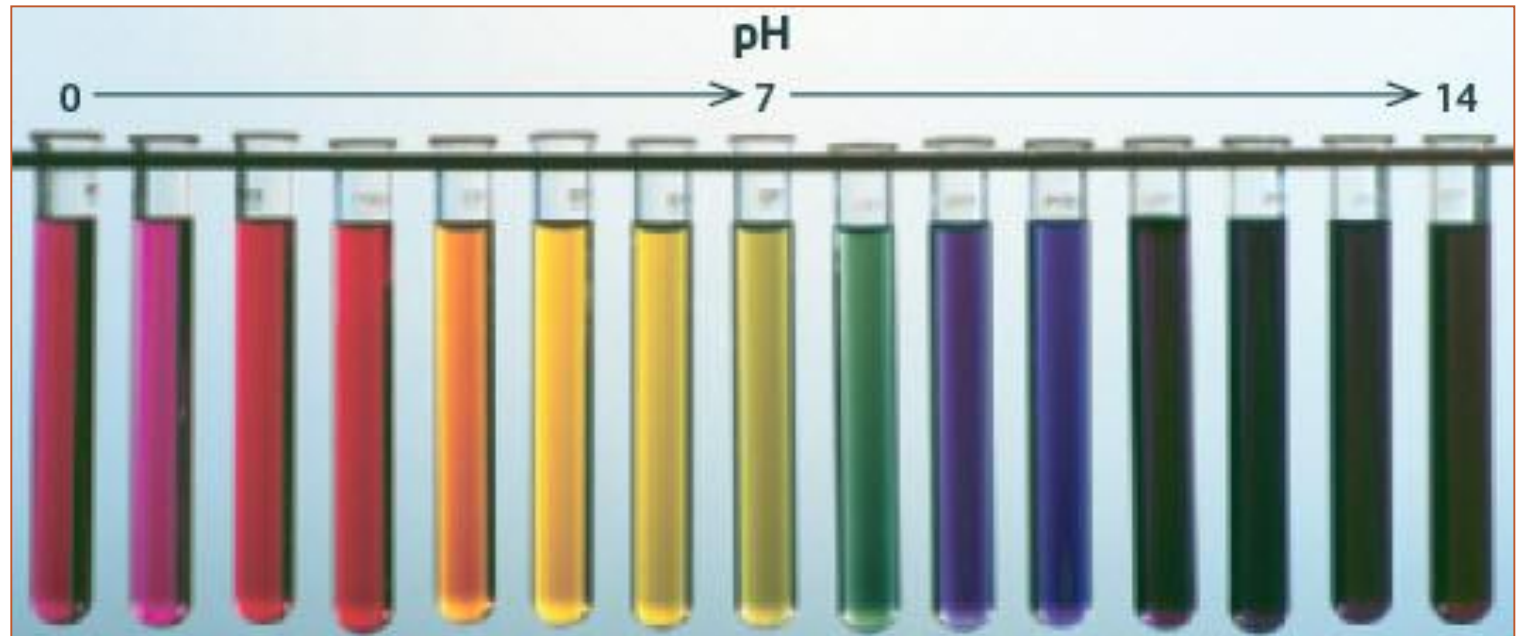


Determining the pH of a Solution

3) Universal Indicator and pH Paper: are composed of a mixture of indicators that change to different colours under different pH conditions. These indicators cover the entire pH range from 0-14.



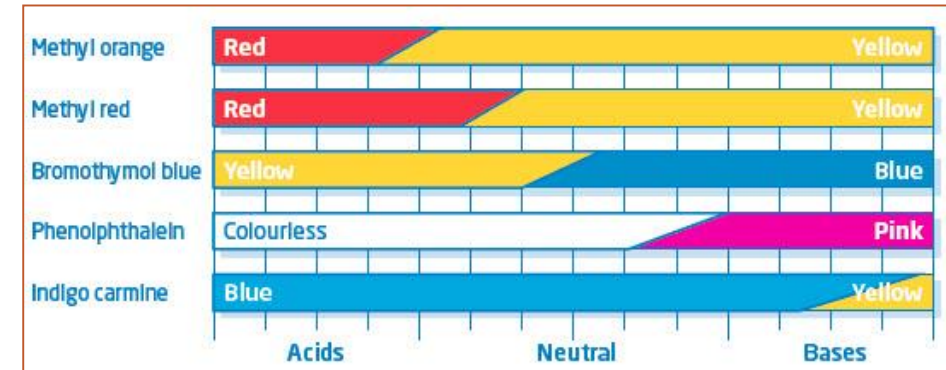
A key or legend of the colours and the pHs they represent is used to analyze the changes in the colour of the indicator.



Determining the pH of a Solution

3) Specific indicators that change colour within a very small range of pHs may be used to monitor small changes in pH within that range.

Indicator	pH Range In Which Colour Change Occurs	Colour Change as pH Increases
Methyl orange	3.2-4.4	red to yellow
Methyl red	4.8-6.0	red to yellow
Bromothymol blue	6.0-7.6	yellow to blue
Phenolphthalein	8.2-10.0	colourless to pink
Indigo carmine	11.2-13.0	blue to yellow



Determining the pH of a Solution

4) A variety of plants contain juices that can act as natural acid-base indicators. A few of these are listed below.

Plant	Colour of Indicator		
	Acid	Neutral	Base
Apple	red	grey-purple	green
Blackberry	red	purple	blue-green
Blueberry	red	purple	blue
Cherry	red	red-purple	blue-green
Mountain cranberry	red	pale purple	pale green
Grape	red	purple	blue-green
Plum	red	pale purple	pale green
Pomegranate	red	purple	blue-green
Raspberry	red	red purple	pale green

Comparing Acids and Bases

Property	Acid	Base
Taste CAUTION: Never taste chemicals in the laboratory.	Acids taste sour.	
Touch CAUTION: Never touch chemicals in the laboratory with your bare skin.		Bases feel slippery and many bases will burn your skin.
Indicator tests		Bases turn red litmus paper blue.
Electrical conductivity	Solutions of acids conduct electricity.	
pH		
Production of ions		Bases form hydroxide ions, OH^- (aq), when dissolved in water.

Homework

Textbook:

Complete pg. 235 # 1,2, 4, 6, 7 & 8