

RCS High School Science Unit Plans

Subject: Chemistry

Unit: 7 (Solutions, Acids/Bases, Equilibrium)

of Days : 12-14

Essential Standards : 3.1 and 3.2

Clarifying Objective: 3.1.2, 3.1.3, 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.5, 3.2.6

<p>Big Ideas in NOUNS and ADJECTIVES (Vocabulary)</p> <p>Homogeneous Heterogeneous Solvent Solute Solution Amphoteric Colligative Electrolyte Substance Acid Base pH pOH Hydronium Hydroxide Concentration Molarity Equilibrium Le Chatelier's Titrate Titrant Titration Indicator Soluble Insoluble</p>	<p>Real World Performance in VERBS</p>
<p>Understanding(s):</p> <p>Properties of solutions Solution process Solubility diagrams Concentration of solutions Properties of acids and bases Hydronium and hydroxide concentrations, pH and pOH, Conditions of a system in equilibrium, Le Chatelier's Principle</p>	<p>Essential Questions/I Can Statements:</p> <ul style="list-style-type: none"> • I can Define chemical equilibrium for reversible reactions. • I can Distinguish between equal rates and equal concentrations. • I can Explain equilibrium expressions for a given reaction. • I can Evaluate equilibrium constants as a measure of the extent that the reaction proceeds to completion. • I can Determine the effects of stresses on systems at equilibrium. (Adding/ removing a reactant or product; adding/removing heat; increasing/decreasing pressure) • I can Relate the shift that occurs in terms of the order/disorder of the system.

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	<ul style="list-style-type: none"> • I can Distinguish between acids and bases based on formula and chemical properties. • I can Differentiate between concentration (molarity) and strength (degree of dissociation). No calculation involved. • I can Use pH scale to identify acids and bases. • I can Interpret pH scale in terms of the exponential nature of pH values in terms of concentrations. • I can Relate the color of indicator to pH using pH ranges provided in a table. • I can Compute pH, pOH, [H+], and [OH-]. • I can Identify types of solutions (solid, liquid, gaseous, aqueous). • I can Define solutions as homogeneous mixtures in a single phase. • I can Distinguish between electrolytic and nonelectrolytic solutions. • I can Summarize colligative properties (vapor pressure reduction, boiling point elevation, freezing point depression, and osmotic pressure). • I can Use graph of solubility vs. temperature to identify a substance based on solubility at a particular temperature. • I can Use graph to relate the degree of saturation of solutions to temperature. • I can Develop a conceptual model for the solution process with a cause and effect relationship involving forces of attraction between solute and solvent particles. A material is insoluble due to a lack of attraction between particles. • I can Describe the energetics of the solution process as it occurs and the overall process as exothermic or endothermic. • I can Explain solubility in terms of the nature of solute-solvent attraction, temperature and pressure (for gases).
<p>Performance Task Ideas/Activities:</p> <p>Precipitates Lab Qualitative Analysis Properties of Acids/Bases - Indicators Titration pH calculations Shifting Equilibrium</p>	<p>Websites:</p> <p>www.chem-todler.com/</p> <p>Phet Simulations</p> <ol style="list-style-type: none"> 1. "concentration" 2. "pH Scale" 3. "reversible Reactions" 4. "salts and solubility" 5. "Molarity"
<p>Literacy Shift Ideas: (Reading/writing)</p> <p>Water Contamination Articles Blood pH Articles</p>	<p>21st Century Themes</p> <ul style="list-style-type: none"> ○ Global Awareness ○ Financial, Economic, Business & Entrepreneurial Literacy

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Germ Solution http://www.bbc.co.uk/news/technology-14045387	<ul style="list-style-type: none">○ Civic Literacy○ Health Literacy○ Environmental Literacy
Assessments: Solubility Quiz pH/properties Quiz equilibrium quiz Unit test	Additional Info: