

Mixtures & Solutions Unit Design - Grades 5

Chemistry is the study of the structure of matter and the changes or transformations that take place in it. Learning about the makeup of substances gives us knowledge about how things go together and how they can be taken apart. Learning about changes in substances is important for several reasons: changes can be controlled to produce new materials; changes can be used to give off energy to run machines. The **Mixtures and Solutions Module** has four investigations that introduce students to these fundamental ideas in chemistry.

RI Statements of Enduring Knowledge - (Established Goals):

PS1- All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).

Related Rhode Island GSE's (Understandings)	RI Assessment Targets Assessment Evidence-High Priority**
<p>PS1 (5-6)-2 Students demonstrate an understanding of characteristic properties of matter by...</p> <p>2a recognizing that different substances have properties which allow them to be identified regardless of the size of the sample.</p> <p>2b classifying and comparing substances using characteristic properties (e.g., solid, liquid, gas).</p> <p>PS1 (5-6)-3 Students demonstrate an understanding of conservation of matter by...</p> <p>3a explaining that regardless of how parts of an object are arranged, the mass of the whole is always the same as the sum of the masses of its parts.</p> <p>PS1 (5-6)-5 Students demonstrate an understanding of the structure of matter by...</p> <p>5a distinguishing between solutions, mixtures, and "pure" substances, i.e., compounds and elements</p>	<p>PS1 (5-8) – INQ + POC–2 <i>Given data about the characteristics of matter (e.g., melting and boiling points, density, solubility) identify, compare, or classify different substances.**</i></p> <p>Mixtures and Solutions Investigation 2, Part 4, pp. 26-28</p> <p>PS1 (5-8) – INQ + SAE–3 <i>Collect data or use data provided to infer or predict that the total amount of mass in a closed system stays the same, regardless of how substances interact (conservation of matter).</i></p> <p>Mixtures and Solutions Investigation 1, Part 2, pp. 16-20</p> <p>PS1 (5-8) –MAS–5 <i>Given graphic or written information, classify matter as atom/molecule or element/compound (Not the structure of an atom).</i></p> <p>Mixtures and Solutions Investigation 1, Parts 1-2, pp. 8-20 Investigation 4, Parts 1-3, pp. 8-24 Science Stories, pp. 1-6, 11-12, 28, 32-42</p>

Investigation-Time (45min. periods)	Investigation	Focus Questions (Essential Questions)	Big Ideas (Understandings)
1-(4)	Separating Mixtures	<p>What is a Mixture?</p> <p>What is a Solution?</p> <p>How does evaporation affect liquids and solids in a solution?</p>	<ul style="list-style-type: none"> ▪ A mixture combines solids and liquids to make mixtures and solutions. ▪ A solution forms when a material dissolves in a liquid (solvent) and cannot be retrieved with a filter. ▪ Evaporation can separate a liquid from a solid in a solution. ▪ The solid material separated by evaporation from a solution forms distinctive patterns.
2-(3)	Reaching Saturation	<p>What is solubility?</p> <p>What is saturation?</p> <p>How do we measure a concentrated solution?</p>	<ul style="list-style-type: none"> ▪ Solubility is the property that substances have of dissolving in solvents. Solubility is different for different materials and can change with temperature and different solvents. ▪ A solution is saturated when as much solid material as possible has dissolved in the liquid. ▪ When equal volumes of two solutions made from the same ingredients are compared, the heavier one is the more concentrated solution.
3-(3)	Concentration	<p>What is a concentration?</p> <p>How does the amount of material dissolved in a solution affect concentration?</p> <p>How do we dilute a solution?</p>	<ul style="list-style-type: none"> ▪ Concentration expresses a relationship between the amount of dissolved material and the volume of solvent. ▪ The more material dissolved in a liquid, the more concentrated the solution.
4-(2)	Fizz Quiz	<p>What is a chemical reaction?</p> <p>What kinds of changes occur in chemical reactions?</p>	<ul style="list-style-type: none"> ▪ When a change results from mixing two or more materials, that change is a chemical reaction. A reaction results in new materials. ▪ Formation of a gas is one change that occurs in some reactions. ▪ Formation of a precipitate occurs in some chemical reactions. ▪ Not all chemicals react when they are mixed.