

Unit 9 - It's Part of the Break-Up: Solutions

Content Area: **Science**
Course(s): **Chemistry Honors**
Time Period: **March**
Length: **6 weeks**
Status: **Published**

Transfer Skills

How is it that our cars do not overheat in the summer or freeze in the winter? Why do they throw rock salt on the icy roads? Why won't all the sugar dissolve in my iced tea? These questions and many more can be answered by the properties of solutions and colligative properties

Enduring Understandings

Water is vital to life because of its unique properties.

Solutions concentration can be described mathematically in a variety of terms.

Adding solute to a pure solution will have an effect on the properties.

Essential Questions

How can you quantify the concentration of a solution?

Why is predicting the solubility of a substance difficult?

Of what use is a solubility curve in describing the effect of temperature on solubility and the saturation level?

To what extent does the polarity of a substance determine its solubility in a particular solvent?

How are Colligative properties useful?

Content

Colloid, suspension, Tyndall effect, Solute, solvent, saturated, supersaturated, unsaturated, molarity, molality, mole fraction, net-ionic reaction, spectator ion, colligative properties, vapor pressure, Raoult's Law, volatile, osmosis, semi-permeable membrane, van't Hoff Factor,

Skills

Identify the factors that affect the rate of dissolving.

Describe the equilibrium in a saturated solution.

Describe the factors that affect the solubility of a substance.

Compare the properties of solutions, colloids and suspension.

Calculate the concentration of a solution using molarity, molality, mole fraction mass percent, mole fraction.

Determine the formation of a precipitate and write the net ionic reaction.

Describe the colligative properties vapor pressure, osmosis, boiling point and freezing point

Perform calculations relating freezing point depression and boiling point elevation.

Use colligative properties to determine the molar mass of unknown substances.

Evaluate the effect a solute has on the vapor pressure in a solution.

Resources

Standards

SCI.9-12.5.1.12.A.2	Develop and use mathematical, physical, and computational tools to build evidence-based models and to pose theories.
SCI.9-12.5.1.12.B.1	Design investigations, collect evidence, analyze data, and evaluate evidence to determine measures of central tendencies, causal/correlational relationships, and anomalous data.
SCI.9-12.5.1.12.B.2	Build, refine, and represent evidence-based models using mathematical, physical, and computational tools.
SCI.9-12.5.1.12.B.3	Revise predictions and explanations using evidence, and connect explanations/arguments to established scientific knowledge, models, and theories.
SCI.9-12.5.2.12.A.2	Account for the differences in the physical properties of solids, liquids, and gases.
SCI.9-12.5.2.12.A.5	Describe the process by which solutes dissolve in solvents.
SCI.9-12.5.2.12.B.1	Model how the outermost electrons determine the reactivity of elements and the nature of the chemical bonds they tend to form.
SCI.9-12.5.2.12.C.1	Use the kinetic molecular theory to describe and explain the properties of solids, liquids, and gases.