OPRFHS-NGSS Curriculum Alignment **Chemistry 577** **Unit: Chapter 12 Solutions 13 Ions in Aq Solutions & Colligative Prop.**

Big Idea(s)/ Unifying Q(s):	
DCI-NGSS	•
SEP-NGSS	
CCC-NGSS	

12.	12.	13.	13.
• Suspensions, colloids, solutions • Electrolytes, nonelectrolytes • Soluble • Homo and heterogeneous • Solvent, solute • Alloy • Tyndall effect • Rates of dissolution factor	• Solubility, saturated, unsaturated, supersaturated • Solution equilibrium • "Like dissolves like" • Immiscible, miscible • Henry's Law (pressure & solubility) • Enthalpy of Solution • Endo and exothermic • Molarity and molality • Dilution (M1V1=M2V2)	• Dissociation • Soluble, insoluble • Precipitate • Net Ionic Equations • Spectator Ions • Ionization • Hydronium Ion • Strong and weak electrolytes	• Colligative Properties • Volatile and nonvolatile • Freezing point depression • Molal freezing-point constant • Molal boiling-point constant • Boiling point elevation • Colligative Properties

DCI, EOB and	Student Learning Targets (coded to DCI, EO or OPRF Objectives)
1.	• I can classify things as homogeneous and heterogeneous • I can give examples of solute/solvent combinations involving solids, liquids and gasses • I can describe how to make alloys • I can categorize solutions, suspensions, and colloids based on the results of filtering and the Tyndall effect • I can describe how to test to see if a solute is an electrolyte or a non-electrolyte • I can write ionization (disassociation) equations • I can write net ionic equations • I can use a solubility chart to determine the precipitate in a double replacement reaction • I can describe ways to increase the rate that a solute dissolves in a solvent • I can use a solubility chart to classify solutions as unsaturated, saturated and supersaturated. • I can explain what the phrase "like dissolves like" means when referring to solutes and solvents • I can determine the polarity of molecules by drawing structural formulas and by mixing with known solvents • I can describe the flow of energy in endothermic and exothermic reactions/processes • I can describe ways to increase the solubility of liquids and gasses • I can calculate molarity and molality • I can calculate how solutions should be diluted to obtain new molarities • I can predict boiling points and freezing points of water using molal boiling and freezing point constants

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Classroom Instructional Activity Bank	**Resource Bank**
Labs/Lab Activities/Videos/Demonstrations • Making gold pennies • Molar Enthalpy ($CaCl_2$ and $NaNO_3$ solution lab) • Tyndall effect-reflection relay • Dissolving speed contest? (rates of dissolution) • Supersaturated pop demo (Henry's Law) • Sodium acetate demo • Mystery solid identification-solubility • Polarity minilab-solubility • Temp. solubility pop demo in test tubes (fig 15 pg414) • Paper chromatography (pg 432) • Light bulb demo, Baby Two • Freezing point depression/molal boiling point constant lab • Chromatography lab • Making Alloys (golden penny) lab	Worksheets/Reading Guides/Formative Assessments/On-line Homework • PHET-Solutions • PHET Concentration • PHET Molarity (With handout from Chris Bires) • Review original Vernier lab with ions and sugar solution conductivity • Bozeman AP Science • Khan Academy • Geek solubility vocabulary • Geek-solubility curves
Investigations/Engineering Projects: •	Summative Common Unit Assessment: • Chapter 12-13 test