

# Chemistry 12

# Unit III: Solubility Learning Log

The following table contains all the prescribed learning outcomes for the Solubility unit of Chemistry 12. Use this table to help you stay organized and on track throughout the unit. Use it along with the Solubility Study Guide to determine your level of competence and understanding of each learning outcome. Once you are confident that you completely understand each learning outcome, place a check mark in the square provided.

| Essential Learning Goals   | Achievement Indicators   | Practice   | Evidence                 | Study Guide Equivalent   | Status                   |                          |                          |                          |                          |
|--|--|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <b>C1:</b> Determine the solubility of a compound in aqueous solution                | Classify a solution as ionic or molecular, given its conductivity or the formula of the solute                             | Review:<br>III.1<br>p.73-76<br>#1-7<br><br>Solubility & [ion]:<br>III.2<br>p. 77-81<br>#8-20               | Quiz #1<br><br>Unit Test | G1                       | <input type="checkbox"/> |                          |                          |                          |                          |
|  | Describe the conditions necessary to form a saturated solution   |  |                          | G2                       | <input type="checkbox"/> |                          |                          |                          |                          |
|  | Describe the solubility as the concentration of a substance in a saturated solution  |  |                          | G3                       | <input type="checkbox"/> |                          |                          |                          |                          |
|  | Use appropriate units to represent the solubility of substances in aqueous solution  |  |                          | G4                       | <input type="checkbox"/> |                          |                          |                          |                          |
| <b>C2:</b> Describe a saturated solution as an equilibrium system                    | Describe the equilibrium that exists in a saturated aqueous solution   | Predicting Solubility:<br>III.3<br>p. 81-84<br>#21-24<br><br>Writing Equations:<br>III.4<br>p.84-87<br>#25 |                          | Quiz #2<br><br>Unit Test | G6                       | <input type="checkbox"/> |                          |                          |                          |
|  | Describe a saturated solution using a net ionic equation   |  |                          |                          | G7                       | <input type="checkbox"/> |                          |                          |                          |
| <b>C3:</b> Determine the concentration of ions in a solution                         | Write dissociation equations   |  |                          |                          | N/A                      | G8                       | <input type="checkbox"/> |                          |                          |
|  | Calculate the concentration of the positive and negative ions given the concentration of the solute in an aqueous solution |  |                          |                          |                          |                          | <input type="checkbox"/> |                          |                          |
| <b>C4:</b> Determine the relative solubility of a substance, given solubility tables | Describe a compound as having high or low solubility relative to 0.1 M by using a solubility chart                         |  | H1                       |                          |                          |                          | Unit Test                | <input type="checkbox"/> |                          |
|  | Use a solubility chart to predict if a precipitate will form when two solutions are mixed, and identify the precipitate    |  |                          |                          |                          |                          |                          | H2                       | <input type="checkbox"/> |
|  | Write a formula equation, complete ionic equation, and net ionic equation that represent a precipitation reaction          |  |                          |                          |                          |                          |                          | H3                       | <input type="checkbox"/> |

|   |  |  |                          |    |                          |
|---|--|--|--------------------------|----|--------------------------|
| <b>C5:</b> Apply solubility rules to analyse the composition of solutions             | Use a solubility chart to predict if ions can be separated from solution through precipitation, and outline an experimental procedure that includes <ul style="list-style-type: none"> <li>○ Compound added</li> <li>○ Precipitate formed</li> <li>○ Method of separation</li> </ul> | Separating Ions:<br>III.5<br>p. 88-91<br>#26-39<br><br>Common Ion:<br>III.10<br>p.105-108<br>#81-86<br><br>Pollution:<br>III.9<br>p. 102-104<br>#76-80 | Quiz #3<br><br>Unit Test | H4 | <input type="checkbox"/> |
|   | Predict qualitative changes in the solubility equilibrium upon the addition of a common ion or the removal of an ion   |  |                          | H5 | <input type="checkbox"/> |
|   | Identify an unknown ion through experimentation involving a qualitative analysis scheme  |  |                          | H6 | <input type="checkbox"/> |
|   | Devise a procedure by which the calcium and/or magnesium ions can be removed from hard water   |  |                          | H7 | <input type="checkbox"/> |
| <b>C6:</b> Formulate equilibrium constant expressions for various saturated solutions | Describe the Ksp expression as a specialized Keq expression  | Solubility Product:<br>III.6<br>p.91-95<br>#40-41  | Quiz #4<br><br>Unit Test | I1 | <input type="checkbox"/> |
|   | Write a Ksp expression for solubility equilibrium  |  |                          | I2 | <input type="checkbox"/> |
| <b>C7:</b> Perform calculations involving solubility equilibrium concepts             | Calculate the Ksp for a compound given its solubility  | Ksp calculations:<br>III.6<br>p.91-95<br>#42-55  |                          | I3 | <input type="checkbox"/> |
|   | Calculate the solubility of a compound from its Ksp  |  |                          | I4 | <input type="checkbox"/> |
|   | Predict the formation of a precipitate by comparing the trial ion product to the Ksp value using specific data   | Trial Ksp:<br>III.7<br>p.96-99<br>#56-69   |                          | I5 | <input type="checkbox"/> |
|   | Calculate the maximum allowable concentration of one ion given the Ksp and the concentration of the other ion just before precipitation occurs   |  |                          | I6 | <input type="checkbox"/> |
| <b>C8:</b> Devise a method for determining the concentration of a specific ion        | Determine the concentration of chloride ion (by titration or gravimetric methods) using a precipitation reaction with silver ion   | Titrations:<br>III.8<br>p.99-102<br>#70-75   | Unit Test                | I7 | <input type="checkbox"/> |
| <b>End of Unit Test</b>   |  |  |                          |    |                          |

**Note: The Chemistry 12 Study Guides are based on OLD PLO's. Use the "Study Guide Equivalent" column to match up old PLO's to the new ones.** For example, essential learning goal C1: "Determine the solubility of a compound in aqueous solution" matches up to G1-G4 on study cards and review questions.