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|  | Module 4: Lesson 2 ASSIGNMENT |

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|  | Lesson 2 Assignment: Dissolving Substances |

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|  | 1. | State three contributions Arrhenius made to the understanding of solution chemistry. (3 marks) |

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|  | 2. | For each of the following, determine whether the statement is true or false. For those that are false, write a brief sentence indicating the required correction. (8 marks)   * 1. HCl(g) is a molecular compound that ionizes to become an acid upon dissolving in water.   2. Electrolyte solutions can be acidic, neutral, or basic.   3. Arrhenius’s theories are valid for all acids and bases.   4. Acetic acid is an ionic compound because it ionizes in water to form H+(aq) and CH3COO¯(aq).   5. All compounds containing OH groups are bases.   6. More energy is required to break bonds than form bonds in an endothermic reaction.   7. The principal mechanism for sugar dissolving in water is dissociation.   8. Ethanol dissolves in water primarily because of hydrogen bonding. |

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|  | 3. | Dissolving a substance can be achieved through dissociation, ionization, or dispersion. Which manner of dissolving occurs to each of the following substances? (3 mark)   * 1. acetic acid -   2. methanol -   3. copper(II) sulfate - |
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|  | 4. | Calcium chloride and sodium carbonate are two ionic solids. If the solids are placed together, nothing seems to happen. However, if they are mixed in water, the following chemical reaction occurs:  CaCl2(aq) + Na2CO3(aq) 🡪 CaCO3(s) + 2 NaCl(aq)  Explain why calcium chloride and sodium carbonate react in solution but not in solid form. (3 marks) |

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|  | 5. | A student is doing a lab to determine whether a particular white solid undergoes an endothermic or exothermic dissolving process. Suggest a procedure the student could use to complete the lab. (2 marks)     1. A cold pack is very similar to a heat pack, except for the obvious difference that it becomes cold instead of warm. Explain how a cold pack containing ammonium nitrate works. (4 marks)    * 1. Vitamins are important chemicals for survival. Vitamin A, Vitamin B6, and Vitamin C are three common vitamins. Simplified representations of their structures are given.   Based on the functional groups that you can identify, which vitamins will be soluble in water? Explain your answer. (3 marks)   * + 1. In this lesson you studied Dr. David Schindler’s research on the effect of phosphorus in lakes. Answer the following questions based on the readings you were assigned.   1. What does fertilizer do to damage the ecosystem of a lake? (1 mark)      * 1. What does it mean to say that a lake is eutrophic? (1 mark)   2. Describe the effect humans have had on the phosphorus concentration in some lakes. (1 mark)      * 1. Describe Dr. David Schindler’s experiment on the environmental impact of increased phosphorus concentrations in lakes. (2 marks)     e. What ideas currently exist to help solve this problem? (1 mark) |

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| Once you have completed all of the questions, submit your work to your teacher. | | | |