**Types of Separations Worksheet Answer Key**

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| **Distillation** |
| |  |  | | --- | --- | | **Materials needed** | | | 1 500 mL beaker  1 graduated cylinder  250 mL water  15 g salt  1 glass stirring rod  4 pH strips | sheet of foil that fits atop beaker hot plate  1 Styrofoam cup  1 digital scale  1 weigh boat  1 spatula |   **Instructions:**   1. Pour 250 mL of water into a 500 mL beaker using a graduated cylinder. 2. Dip a pH strip into the water and record the pH value below. 3. Measure out 15 g of table salt and add it to the beaker. 4. Use a glass stirring rod to stir the mixture until the salt completely dissolves. 5. Dip another pH strip into the saltwater solution and record the pH value below. 6. Shape a sheet of foil into a lid that fits securely on top of the beaker. 7. Place the beaker on a hot plate set to high and heat until boiling. 8. Allow the solution to boil for two minutes. 9. Carefully lift the foil lid horizontally to capture any condensation, then turn it over to collect droplets. 10. Wipe the water droplets from the foil with the spatula into a Styrofoam cup. 11. Put the foil lid back on the beaker and continue boiling and collecting distilled water. 12. Once you have enough distilled water, use a pH strip to measure its pH and record this value below.   **pH measurements:**  pH of water \_\_\_\_\_\_\_\_\_7.0\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  pH of saltwater mixture \_\_\_\_\_ 7.5 to 8.5\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  pH of collected water droplets \_\_\_\_\_\_7.0\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **Answer the following:**  Compare the pH values recorded for the initial water, the saltwater solution, and the collected distilled water. Does the distilled water have a different pH from the saltwater? Why?  The distilled water will have a different pH than the saltwater mixture. The saltwater is typically slightly basic due to the presence of dissolved sodium ions and chloride ions, while distilled water is neutral (pH 7) because it contains no dissolved salts or impurities. Thus, the pH of the distilled water will be lower than that of the saltwater solution. |

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| **Crystallization** |
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| **Adsorption** |
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| **Membrane** |
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| **Absorption and Stripping** |
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| **Extraction** |
| **Instructions:** Watch this video (10:08 minutes): <https://www.youtube.com/watch?v=N96JaRnE7n0>  **Describe how this method works:**  Generally, extraction techniques separate mixture components by utilizing their different solubilities in two immiscible liquids, often water and an organic solvent. By adding the solvent, the desired compound dissolves preferentially, creating two distinct layers. This method is common in chemistry labs for purifying compounds, often followed by techniques such as evaporation to isolate the target substance.  Extraction using a separatory funnel involves mixing a compound with two immiscible solvents, typically an organic solvent and water, which separate based on their densities. When the mixture is shaken in the funnel, the compound distributes between the two layers based on its solubility in each solvent. By opening the stopcock, the denser liquid drains out, allowing separation. This process can be repeated to improve purity and is useful in isolating compounds in organic chemistry. |