Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **GC Colligative Properties Lab**

Background: Colligative properties are properties of certain chemicals that are dependent on the amount that is used. Two types of colligative properties include boiling point elevation and freezing point depression. Boiling point elevation occurs when a substance dissolves in water and the boiling point of the new solution is higher than the boiling point of pure water. The more solute that is added, the higher the boiling point of the solution will be.

Pre-Lab Questions:

1. Define the following words:
   1. Solute: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Solvent: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the boiling point and freezing point of water?

Boiling point: \_\_\_\_\_\_\_ Freezing Point: \_\_\_\_\_\_

1. Based on the information provided in the passage, explain what you hypothesize will happen to the freezing point of a solution created when a solute is added to water. (Will it be higher or lower than pure water?)

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Procedure:

1. Each group will obtain three **large** empty baggies labeled A, B, and C.
   1. In baggie A, add ice up to the line on the bag.
   2. In baggie B, add ice up to the line on the bag and then add 20g of salt to the ice.
   3. In Baggie C, add ice up to the line on the bag, and then add 50g of salt to the ice.
2. Each person will obtain one **small** baggie filled with a mysterious liquid. DO NOT OPEN THE SMALL BAGGIES! Make observations about the liquid inside the small baggies in the before column of the data table. Include the temperature of the large baggies.
3. Each person on the group will place their sealed **small** baggie into one of the **large** baggies, so that each **large** baggie has a **small** sealed baggie. Baggie 1 in baggie A, Baggie 2 in Baggie B, and Baggie 3 in Baggie C. Additional baggies can go in large baggie C.
4. Seal the large baggie and shake for 5 minutes.
5. Open the large baggies and make observations about the small baggies without opening them. Write observations in the after column of the data table. Include the temperature of the large baggies.

**Data Table**

|  |  |  |
| --- | --- | --- |
|  | **Before** | **After** |
| Baggie 1 |  |  |
| Baggie 2 |  |  |
| Baggie 3 |  |  |

Questions:

1. Identify the solute in the large baggies.
2. Identify the solvent in the large baggies.
3. Which conditions resulted in the lowest freezing point? Explain why this occurs.
4. Summarize what occurred in this lab.