

Section 15.3 Colligative Properties of Solutions

In your textbook, read about electrolytes and colligative properties, vapor pressure lowering, boiling point elevation, and freezing point depression.

Use the table to answer the following questions.

Solution	Density (g/L)	Boiling Point (°C)	Freezing Point (°C)
1.0m C ₂ H ₅ OH(aq)	1.05	100.5	-1.8
1.0m HCl(aq)	1.03	101.0	-3.7
1.0m NaCl(aq)	1.06	101.0	-3.7
2.0m NaCl(aq)	1.12	102.1	-7.4

- Which properties in the table are colligative properties?

- What can you conclude about the relationship between colligative properties and the number of ions in solution from the 1.0m NaCl(aq) and 2.0m NaCl(aq) solutions?

- What can you conclude about the relationship between colligative properties and the type of ions in solution from the 1.0m HCl(aq) and 1.0m NaCl(aq) solutions?

Suppose that in a simple system, a semipermeable membrane is used to separate a sucrose-water solution from its pure solvent, water. Match the descriptions of the system in Column A with the terms in Column B.

- | Column A | Column B |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| _____ 4. Cannot cross the semipermeable membrane | a. osmotic pressure |
| _____ 5. Can cross the semipermeable membrane | b. water molecules |
| _____ 6. The side that exerts osmotic pressure | c. semipermeable membrane |
| _____ 7. The diffusion of the solvent particles across the semipermeable membrane from the area of higher solvent concentration to the area of lower solvent concentration | d. sugar molecules |
| _____ 8. The barrier with tiny pores that allow some particles to pass through but not others | e. osmosis |
| _____ 9. The side from which more water molecules cross the semipermeable membrane | f. solution side |
| _____ 10. A colligative property of solutions | g. pure solvent side |