Comparing Vapor Over Sugar and Salt Models

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A classroom model puts 90 water particles in each of two containers. The solutes remain in the liquid. At the fixed temperature in this model, the water-vapor pressure equals 10 kPa multiplied by the fraction of independently moving liquid particles that are water.

Container	**Solute added (formula units or molecules)**	**Independently moving particles per solute unit**
Sugar solution	10	1
Salt solution	10	2

1 Which solution has fewer water particles per 100 independently moving liquid particles?

(1) The sugar solution only

(2) The salt solution only

(3) They have the same water fraction.

(4) Neither contains water particles.

2 Calculate the water-vapor pressure in the sugar model. Show how the liquid-particle fraction is used. [1]

Answer and work

3 A student says adding the same number of solute units must give the same vapor pressure. Use both particle records to evaluate the claim. [1]

Answer and work

The class can change the number of salt formula units while keeping 90 water particles and the same temperature.

4 Find the number of salt formula units that would match the sugar solution’s predicted vapor pressure. [1]

Answer and work