

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Colligative Properties

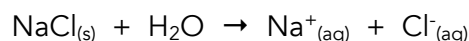
### Homework Unit 10 - Topic 5 (Regents)

**Colligative Properties** are properties of solution that **depend only on how much solute** is dissolved **NOT** on what type of solute is dissolved.

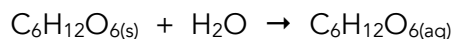
Some of these properties are:

- FREEZING POINT DEPRESSION
- BOILING POINT ELEVATION (ebullimetry)

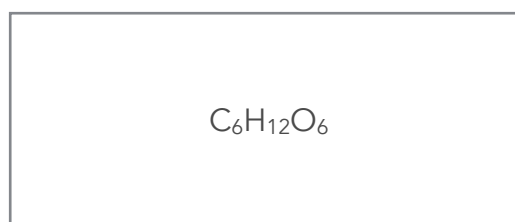
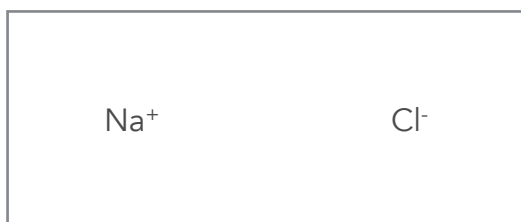
When NaCl, an ionic compound, is dissolved in water it forms two particles, a Na<sup>+</sup> cation and a Cl<sup>-</sup> anion, each surrounded by water.



When sugar, a *polar molecule*, is dissolved in water it remains as only one particle, a molecule surrounded by water.



1. Draw a diagram for each of these compounds dissolved in water.



- (a) When CaCl<sub>2</sub> is dissolved in water, how many particles are formed? \_\_\_\_\_
- (b) When AlBr<sub>3</sub> is dissolved in water, how many particles are formed? \_\_\_\_\_
- (c) When Na<sub>2</sub>(SO<sub>4</sub>)<sub>2</sub> is dissolved in water, how many particles are formed? \_\_\_\_\_
- (d) When CO<sub>2</sub> is dissolved in water, how many particles are formed? \_\_\_\_\_
2. On an equal mole basis, which of the above (a – d) is most effective in lowering the freezing point or raising the boiling point of water? Explain. \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
3. Which of the following solutions will lower the freezing point the most? Explain why in the space to the right.
- (1) 3.0 M NaCl
  - (2) 3.0 M CaCl<sub>2</sub>
  - (3) 1.0 M NaCl
  - (4) 1.0 M CaCl<sub>2</sub>
  - (5) pure water