Worksheet goal: Practice your understanding of colligative properties.

1. Assume you dissolve 45.0 g ethylene glycol, C$_2$H$_4$(OH)$_2$, in 0.500 L of water. Calculate the molality and weight percent of ethylene glycol in the solution. Assume the density of water is 1.00 g/cm$^3$.

2. Arrange the following aqueous solutions in order of decreasing freezing point: (a) 0.20 m ethylene glycol, (b) 0.12 m K$_2$SO$_4$, (c) 0.10 m NaCl, (d) 0.12 m KBr.

3. Arrange the following aqueous solutions in order of increasing boiling point: (a) 0.20 m ethylene glycol, (b) 0.12 m Na$_2$SO$_4$, (c) 0.10 m CaCl$_2$, (d) 0.12 m KBr.

4. Boiling occurs when the vapor pressure of a liquid equals the atmospheric pressure. In the high altitude city of Denver, the boiling point of water is

   a. $> 100^\circ$C  
   b. $100^\circ$C  
   c. $< 100^\circ$C

5. If you use only water and pure ethylene glycol, C$_2$H$_4$(OH)$_2$, in your car's cooling system, what mass (in g) of the glycol must you add to each quart of water to give freezing protection down to -31.0$^\circ$C?