

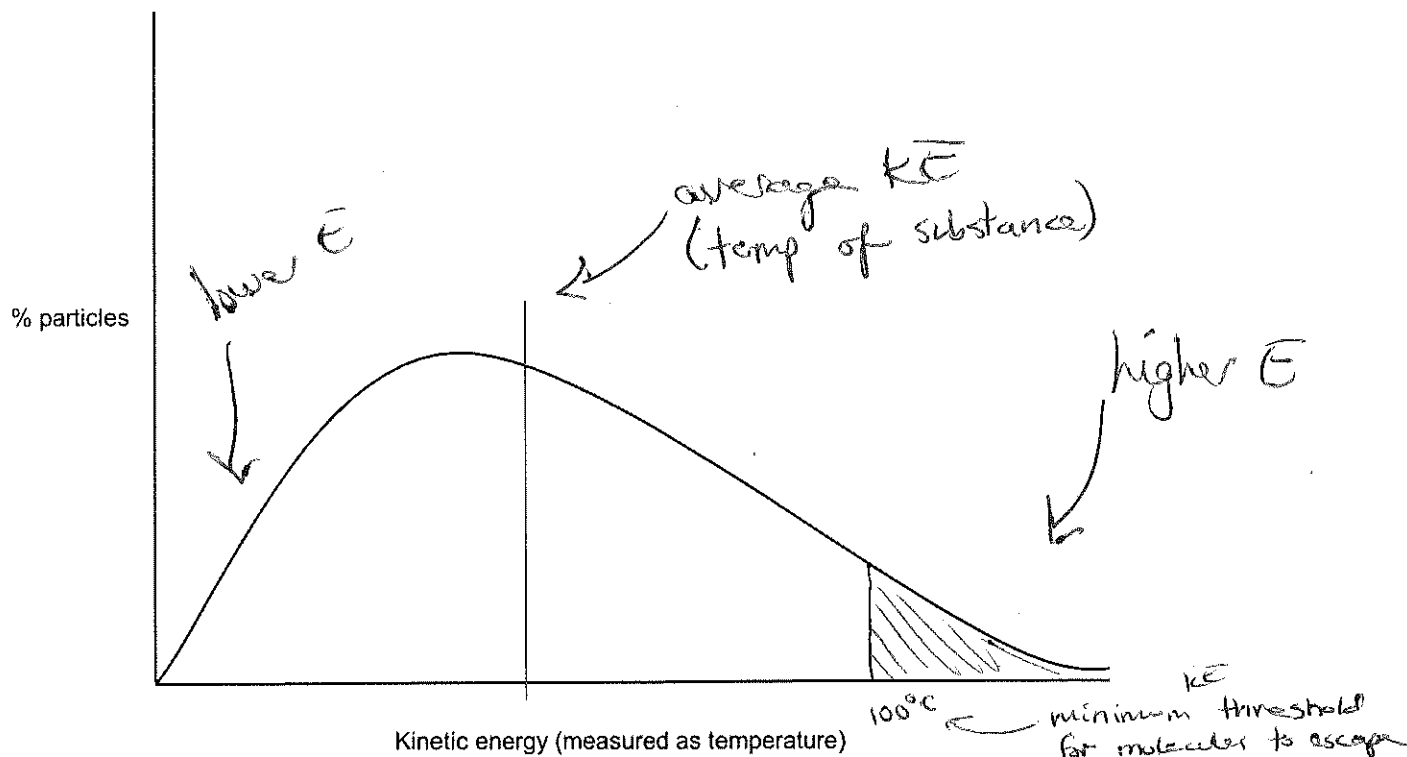
Name: SOLUTIONS

Chem B Unit 8, Day 3: Liquids and Solids

Hour: _____ Date: _____

Bellwork:

Identify where the lower energy molecules are in this diagram, the highest energy and the average kinetic energy of the system.



1. What are some of the physical properties that distinguish a liquid from a gas and from a solid?

liquids - Can flow like gases (due to lower IMFs than solids)
- Definite volume (liquids are densely packed)
- Indefinite shape (due to lower IMFs than solids) but won't fill container like gases (due to higher IMFs than gases).
2. Using your knowledge of the average kinetic energy of gases' relationship with temperature, consider how the increase of average kinetic energy of the liquid's molecules affect the temperature of the system.
 - i. What other factors need to be considered in order to determine how much energy is needed to cause a change in state to occur?

IMFs and difference in boiling of the substances

3. What is meant by *vapor pressure*? What happens to vapor pressure as temperature increases? Explain.

Vapor pressure is the pressure exerted by the molecules of the substance that have escaped from the liquid and are in the gas phase. As we ↑ temperature, the KE of the liquid will ↑ thus giving more molecules the KE needed to break

4. Evaporation and boiling. IMFs in the liquid and escape to vapor phase.

Read the section for one of these concepts and write down your key take-aways. Once you've completed this, construct a story board of the evaporation or boiling process. You will explain this process to a new partner.

More molecules → more collisions with wall → more vapor pressure.

Evaporation notes:

Boiling notes

Work as a small group to answer these questions.

With a dropper, you drop a small amount of rubbing alcohol on your friend's hand. With another dropper, you drop a small amount of water on their other hand. The rubbing alcohol evaporates first.

i. Why is this the case?

The rubbing alcohol has lower IMFs, so a little heat added breaks IMFs so it can go into vapor phase. Water has much higher IMFs so more Δ is required.

ii. Your friend complains that his hand that had the rubbing alcohol on it is now cold. Why is this the case?

The KE required for rubbing alcohol to evaporate was taken from his hand.

6. You've recently travelled out west to go trekking high up in the mountains and you notice that your spaghetti noodles are taking a long time to cook, even though the water is boiling. Your friend suggests that your fire isn't hot enough. Another suggests that you got a bad box of noodles. Are either right? How could you explain the situation to them?

The ~~Boiling~~ B.P. is the temperature at which a liquid's vapor pressure is equal to (or greater than) the atmospheric pressure (pressure exerted on surface of liquid by the air around the container). The B.P. of water will lower ~~to~~ at higher altitudes where atmospheric pressure is lower.

This is because the vapor pressure will not need to be as high as at sea level and thus less KE is needed to make enough water molecules vaporize to equal atmospheric pressure.

Thus the water will boil at lower temperatures and the noodles will need to cook longer as a result.

