

## **HW answers for page 75 and 81 in the textbook**

8H and 8R1-8R3

#'s 1b, 2b, 3a (75) and 1a, 2b (81)

(75)

1B. How do crystalline solids differ from amorphous solids?

Crystalline solids differ from amorphous solids based on their internal particle pattern. Crystalline solids have particles that form regular, organized patterns. They tend to have high melting points at specific temperatures. Amorphous solids have particles that form random patterns. They also tend to have lower melting points with no particular temperature as a melting point. They can be fluid (like glass and rubber.)

2B. How do the positions and movements of particles in a liquid help to explain the shape and volume of the liquid?

While the particles in a liquid are packed closely together like in a solid, the particles flow around one another, unable to hold their shape rigidly together. Therefore, a liquid has the freedom to flow into different shapes, based on its container. The container has no effect on the substances volume, for no matter what container you put your liquid into, you still have the same amount of it.

3A. What determines the shape and volume of a gas inside a container?

Since gas has no definite volume or shape, the only way to determine these quantities is by somehow capturing the gas so it cannot escape. By capturing the gas, it then takes on the shape and the volume of whatever container it is in.

(81)

1A. What happens to the particles of a solid as it becomes a liquid?

As the particles of a solid become a liquid, they vibrate at such a high speed that they begin to break free from their stationary positions.

2B. Name the two types of vaporization. Tell how they are similar and how they differ.

The two types of vaporization are evaporation and boiling. They are similar in that both require energy to transform liquid into gas. They differ in that evaporation takes place at the surface of a liquid while boiling takes place beneath the surface.

## **HW answers for page 89 and 98 in the textbook**

8H and 8R1-8R3

#'s 1c, 2b, 2c (89) and 11, 13, and 20 (98)

(89)

1C. Why does pumping more air into a basketball increase the pressure inside the ball?

Gas particles constantly collide with one another and with the walls of their container. Essentially, the more particles we put into a container, the more crowded it becomes and the more the gas particles bump into one another. As more and more particles of gas go into a container, the pressure increases because of the greater concentration (number of) gas particles. Mathematically this makes sense because in a fraction, when the denominator remains the same and the numerator increases, our calculation gets bigger.

2B. Explain why increasing the temperature of a gas in a closed, rigid container causes the pressure in the container to increase.

According to Charles's Law, when the temperature of a gas is increased, the volume increases. This would be similar to being on a crowded, hot subway train in NYC. As you and everyone on the train are packed into the train, the temperature begins to increase. It gets gross and hot. As soon as the doors open, people want to move away from one another to get their own personal space and to cool off. Gas particles behave similarly- needing their own personal space. If they get hotter, they want to move away from one another, thus increasing the volume of their container!

2C. Suppose it is the night before a big parade and you are in charge of inflating the parade balloons. You just learned that the temperature will rise  $15^{\circ}\text{C}$  between early morning and the time the parade starts. How will this information affect the way you inflate the balloons?

Because of Charles's Law, we have to be mindful of how much the volume will change as the temperature increases. We may, therefore, not fill the balloons as much because nature will see to it that the volumes of the balloons increase. We potentially could save money that way! (The less gas we use, the more money we save.)

(98)

11. Describe the motion of particles in a solid.

Though we think that particles in a solid are stationary, they are actually vibrating.

13. Compare and contrast liquids with high and low viscosities.

While liquids that have both high and low viscosities flow, those with a higher viscosity flow slower due to their density. Viscosity is the resistance to flow. Substances like honey or ketchup have higher viscosities while substances like water and orange juice have lower viscosities.

20. Explain why placing a dented table-tennis ball in boiling water is one way to remove the dent in the ball.

By heating the water to a boiling point, it is gaining enough energy to evaporate. The heating of the water actually transfers some energy into the gas particles in the ball, increasing the temperature. We know from Charles's Law that as the temperature of a gas increases, its volume increases. Therefore, as the particles in the ball increase, they begin to push out and pop out the dent. In the ping pong ball.