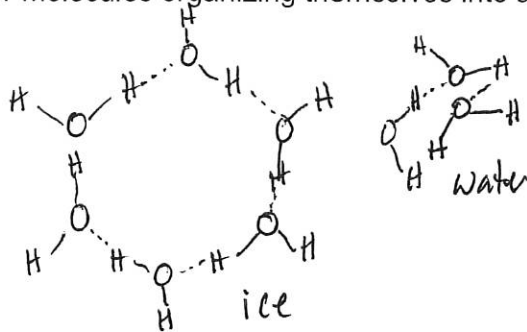
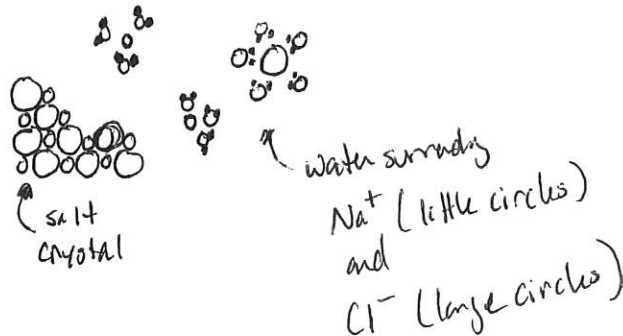


Problem Set #1 Solutions

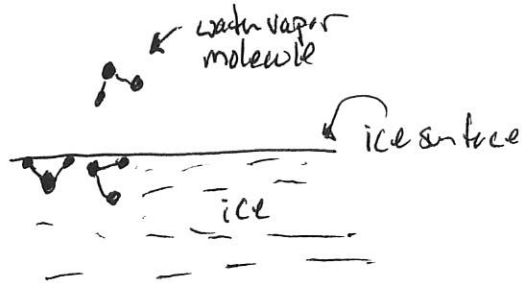
1. "Everything is made of atoms" is the key part of the hypothesis and everything that happens in our universe can be understood from the point of view that everything is made of atoms acting according to the laws of physics.
2.
 - a. Water molecules in the liquid phase still experience the electrostatic attraction and repulsion that they do in the solid phase, but in the liquid phase they have enough energy to overcome the repulsion and they are able to be closer to each other. There is still attraction as well, but the molecules have enough energy to move away from the bonds and are not held there.
 - b. The water doesn't all leave because it doesn't have enough energy yet to overcome the surface tension energy which is due to the electrostatic attraction between the positive and negative poles of the water molecules.
 - c. The water molecules would begin to move around more and more of the water molecules would be able to break free of the water's surface and enter the gas (water vapor phase)
3. When water freezes the water molecules slow down and no longer have enough energy to overcome the electrostatic attraction and repulsion between its poles. This leads to the water molecules organizing themselves into a crystal structure with hydrogen bonds.



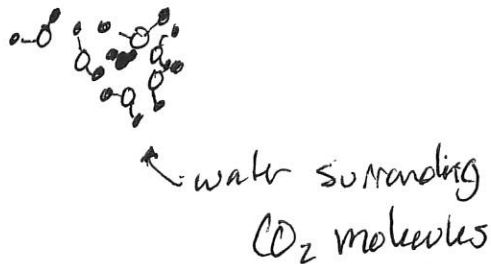
The salt (NaCl) molecules on the edges of the salt crystal begin to dissociate from the crystal and their ions due to the water molecule's positive poles pulling the chlorines away and the water molecule's negative poles pulling the sodiums away. In this way the water slowly begins to incorporate the salt into the liquid structure.



When water sublimates it moves directly from the solid phase (ice) to the gas phase (water vapor). This happens when water molecules on the edge of the ice crystal obtain enough energy or are under the right temperature and pressure conditions to break their hydrogen bonds and move into the vapor phase.



Carbonated water is water that has CO_2 gas molecules dissolved in it. The carbon dioxide is forced into the water at high pressure, pushing more carbon dioxide into the water, than it would normally dissolve. When the carbonated water is exposed to the outside air pressure the extra carbon dioxide will escape the water to enter the surrounding air. Eventually most of the dissolved carbon dioxide will escape if exposed to the outside air long enough.



4. units of density : g/cm^3

Equation : $\rho = \frac{m}{V}$ ← mass
← volume

Symbol : ρ