Ch. 17 Change of Phase; 11th edition
Review Questions pg. 311

1. What are the four common phases of mater?
Ans. Solid, liquid, gas and plasma

2. Do all of the molecules in a liquid have the same speed?
Ans. No. They have a large variety of speeds.

4. Why does warmer water evaporate faster than cooler water?
Ans. The average kinetic energy of the warmer water molecules is greater than that of the cooler water molecules.

5. What is sublimation?
Ans. Ask and answer this question in class for plus two points.

7. Why is a steam burn more damaging than a burn from boiling water of the same temperature?
Ans. When water goes from gas to liquid, it must give off the stored heat of vaporization. So you get an extra 540 calories/gram of energy deposited on your skin. Ouch!

8. Why do you feel uncomfortably warm on a hot and humid day?
Ans. Ask in class for +1 point

14 Why doesn't water boil at 100˚C when the air pressure above its surface is increased?
Ans. Water, or any liquid, will only boil when the vapor pressure from its molecules is equal to the pressure over the surface. When we increase the pressure over the surface, the molecules must on average, have more kinetic energy (higher temperature) in order to boil.

16. Why is the boiling temperature lower at higher altitudes?
Ans. There is less air pressure at higher altitudes. Water, or any liquid, will only boil when the vapor pressure from its molecules is equal to the pressure over the surface. When we decrease the pressure over the surface, the liquid molecules will produce enough vapor pressure to escape (boil) at lower temperatures.

17. What happens to the pressure at the bottom of a geyser when some of the water above gushes out?
Ans. Since the pressure at the bottom of a column of water is directly proportional to the depth, when water gushes out, pressure at the bottom is reduced .

19. When will water boil at less than 100 ˚C?
Ans. When the air pressure above it is reduced to less than 1 atmospheric pressure.

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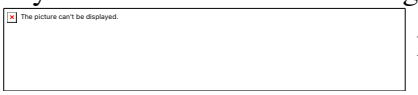
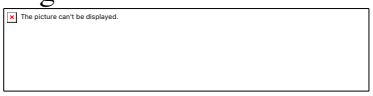
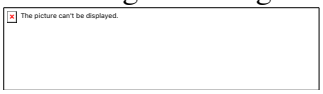
29. How many calories are needed to change the temperature of 1 gram of water by 1 °C?

Ans.  1 calorie.

To melt 1 gram of ice?

Ans.  80 calories.

To vaporize one g of boiling water at 100 °C?

Ans.  540 calories.

30. Cite two reasons firewalkers don't burn their wetted feet when walking barefoot on red-hot coals?

Ans. Ask and answer in class for plus two.

Extra: Why do foods cook faster in a pressure cooker?

Ans. The boiling water in the pressure cooker is at a higher temperature than normal.

Extra: The temperature of boiling water doesn't increase when you add more heat. Why not?

Ans. In order to boil, water must receive 540 calories of energy per gram that boils. So instead of continuing to warm the liquid water, the energy goes into to changing its state from liquid to gas-boiling

Pg. 314 Problem 1 Ask in class- if you dare!