Physics

Name_____

Date_____Period____#_____

Ingrum 11/96

Topic 12 Review Worksheet

1. If 6500 J of heat are absorbed by 101 g of aluminum at 15.0°C, what is the final temperature?

1._____

2. What is the mass of copper if 1500 joules of heat are absorbed and the temperature rises from 25°C to 75°C?

2._____

3. A 25.0 g copper calorimeter contains 90.0 g of water at 25.0°C. Into this is poured 50.0 g of substance X, heated to 100.0°C. If the final temperature of the mixture is 45.0°C, what is the specific heat of substance X? (Specific heat of copper = 385 J/kg K)

3._____

4. A waterfall is 98 m high. What is the temperature change in the water due to its drop over the falls? Assume no heat loss to the surroundings.

4._____

5. A 70.0 g mass of brass at 70.0°C is placed in 110 g of water at 5.0°C. The water is in a copper calorimeter that has a mass of 55 g. What is the final temperature of the mixture? (Specific heat of copper = 385 J/kg K)

5._____

6. A brass ball of mass 1.5 kg is dropped from a height of 35 m. If 50 percent of the heat generated stays in the ball, what will be the temperature rise of the ball? (Specific heat of brass = 376 J/kg K)

6._____

7. Calculate the energy needed to raise the temperature of 185 g of copper from 151°C to 201°C. (Specific heat of copper = 385 J/kg K)

7._____

8. 75 g of water at 81°C are mixed with 45 g of water at 21°C. Calculate the equilibrium temperature of the mixture. Assume no heat is lost or gained by the surroundings.

8._____

9. A 50.0 g piece of aluminum is heated in boiling water, then transferred into 150.0 g of water at 19.5°C. After several minutes, the temperature of the water reaches equilibrium at 25°C. Assuming no heat is lost or gained by the surroundings, what is the specific heat of aluminum expressed in J/kg°C?

9._____

10. How many joules of thermal energy must be applied to a 2.00 kg block of ice, initially at 0.0°C, to melt it and raise its temperature to 20.0°C? ($H_f = 3.34 \times 10^5$ J/kg; $C_w = 4.18 \times 10^3$ J/kg K)

10._____

11. How many kilograms of water at 100.0°C can be converted to steam by the addition of 1.13×10^7 joules of thermal energy? ($H_v = 2.26 \times 10^6$ J/kg)

11._____

12. Calculate the energy needed to change 25 g of ice at -15.0°C to steam at 130.0°C. The specific heat of ice is 2.06×10^3 J/kg°C and of steam is 2.02×10^3 J/kg°C.

12._____

13. You throw a snowball having a temperature of 0°C against a brick wall. If all of the energy of the snowball turns into thermal energy upon striking the wall, how fast must you throw the snowball to melt it completely?

13._____

14. A revolutionary new diet advertises that one can lose weight simply by eating ice!! When one eats ice, the chemical energy in the body is used to melt the ice and then raise the temperature of the melted ice to the temperature of the body which is 37°C. Past scientific studies have confirmed that the expenditure of 1.806×10^7 J of energy is necessary to metabolize 0.50 kg of body fat. How many grams of ice 0°C would one have to eat to lose 0.50 kg of body fat?

14._____

15. The term entropy is a measure of an increasing state of disorder. Hence, the disorder of the universe is constantly increasing. If you remove a partition separating two different gases from one another, they will mix spontaneously, thus becoming more disordered. They will not spontaneously separate. However, living creatures have developed showing complex organization. In fact, maintaining life depends on the organism's ability to maintain the proper degree of organization among its atoms and molecules. Explain why this fact is not really an argument against the law of increasing entropy.

15._____