Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_

**Hot Stuff WS**

Fill in the following blanks.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a temperature scale in which the boiling point of water is 212 degrees.

2. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a unit of energy that is often found on food nutritional labels.

3. The lowest possible temperature is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a form of energy associated with the kinetic energy of the molecules of an object.

5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a temperature scale where the freezing point of water is at 0 degrees.

6. It takes 4.18 joules to raise one gram of water by one degree Celsius because the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of water is 4.18 J/gºC.

7. Temperature is measured with a/an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

8. Gas, liquid, and solid are the three most commonly encountered \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of matter.

9. The \_\_\_\_\_\_\_\_\_\_\_\_\_ theory of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the connection between the microscopic behavior of collections of particles and their macroscopic properties, such as temperature.

10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an absolute scale for temperature.

11. A(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a unit commonly used in science used to measure changes in the thermal energy of a given mass that cause the temperature to change.

12. The amount of energy that must be used to heat 1 kg of a substance 1ºC is called the:

a) heat. b) specific heat. c) temperature. d) thermal energy.

13. More than a century ago, it was common for people to use hot water bottles to heat the sheets in their beds before climbing in. Why didn't they use hot metal objects of similar mass instead?

14. For each of the following, state whether it is a correct report of a temperature (it must be physically

possible and using correct notation). If it is not correct, explain why:

a) −322.1 ºC

b) −25 K

c) 230.0 ºC

d) 293ºK

15. At 25ºC, oxygen is a gas, but aluminum is a solid. Why are they in different phases even though they are at the same temperature?

16. A large pitcher contains one liter of water at 10°C. How would the total heat (or thermal energy) of the water change if you:

a) doubled the amount of water at the same temperature?

b) changed the temperature from 10°C to 20°C?

c) switched the liquid from water to gasoline, but it has the same mass and temperature? (Specific heat of gasoline is 2.220 J/(g°C)).



17. Compare a 20 kg block of ice to a 200 g cup of hot tea. If you poured the hot tea into an indentation on the top of the ice block, would you expect the ice to melt or the tea to cool to the freezing point? Why?

To convert temperatures:

°F🡪ºC , use °C = (ºF - 32)/1.8 ºC🡪ºF, use ºF = (1.8 °C) + 32 K🡪ºC, use °C = K – 273

18. Which feels hotter, 100 °F or 40 °C? Prove it.

19. The hottest temperature ever recorded in the continental United States was 56.7 °C. What does this correspond to in degrees Fahrenheit?

20. Your lab supervisor tells you to heat a chemical until it is 165 ºF. What should your thermometer (which

measures in ºC) read when it reaches the correct temperature?

21. Hugh Ginhot heats 10.0 kg of aluminum [with a specific heat of 0.900 J/(g°C)] from 15ºC to 55ºC. how

much thermal energy is gained? (Mass units must be the same.)

22. A 0.500 kg ball of an unknown metal absorbs 5775 J of energy when it heats up from 23.0°C to 53.0°C.

Calculate the specific heat capacity of the material.

BONUS: What type of metal is the ball probably made of? Why?

23. A hot, 100.0-gram glass prism is placed in an insulated 300.0-milliliter sample of water at room tempera- ture (22.0°C), causing the temperature of the water to come to equilibrium at 35.0°C. What was the initial temperature of the hot glass prism? [The specific heat of glass is 0.664 J/(g°C)].

BONUS: What would 195 °F be in K?