Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pd: 3 Week 3 Distance Learning

**Thermal Energy**

***Use the resources found on Mr. Hanna’s website to help you respond to the following items.***

**VOCABULARY:**

1. TEMPERATURE
2. THERMAL ENERGY
3. HEAT
4. CONDUCTION
5. CONDUCTOR
6. INSULATOR
7. CONVECTION
8. RADIATION

**SHORT ANSWER:**

1. Explain the relationship between “thermal energy,” “temperature,” and “heat.”
2. Compare the three common temperature scales in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Temp. Scale** | **FAHRENHEIT** | **CELSIUS** | **KELVIN** |
| **Metric System? (Y or N)** |  |  |  |
| **Freezing Point of Water** |  |  |  |
| **Boiling Point of Water** |  |  |  |

1. How does the kinetic energy of the molecules in a substance relate to the temperature/phases?
2. Describe possible effects of adding thermal energy to a substance (*or removing it from the substance*)?
3. How is the energy required to raise the temperature of a substance related to the specific heat of the substance?
4. The specific heat of water is 4.18 J/g⁰C. If you are heating 500g of water from a temperature of 20⁰C to a temperature of 100⁰C, how many Joules of thermal energy will be required? (*show your work*)
5. Compare the three types of heat, convection, conduction, and radiation (*how they are similar/different*).
6. Differentiate conductors and insulators (*how they are different*). (*note – your answer should address density*)
7. What causes a convection current? (*note – your answer should address density*)
8. What evidence do we have that radiation can transfer thermal energy through empty space?
9. If I hand you a can of soda that I got from the refrigerator, explain why your hand would feel cold when you touch the can.
10. Explain the expression, “There’s no such thing as cold.”

**INTERPRETING A GRAPH:**  Use the phase change graph below to answer the following questions.



1. Label the state of matter present at each position below:
	1.
	2.
	3.
2. What is happening to the substance during each interval below?
	1. Between positions 1 and 2 –
	2. Between positions 2 and 3 –
	3. Between positions 3 and 4 –
	4. Between positions 4 and 5 –
	5. Between positions 5 and 6 –
3. Is thermal energy being added to this substance or removed from this substance between positions 1 and 6? What evidence do you have?
4. Which positions on this graph would you use the equation “Q=mcΔT” to determine how much thermal energy transfer is required?
5. Which positions on this graph would you use the equations “Q=mLf” or “Q=mLv” to determine how much thermal energy transfer is required?