

**NOTES*****PART A: Thermal Energy and Heat Transfer***

Vocabulary	Definition	Example
Energy -		
Kinetic Theory of Matter -		
Kinetic Energy -		
Potential Energy -		
Thermal Energy -		
Temperature -		
Heat -		
Law of Conservation of Energy -		
Specific Heat -		

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1. Add examples to the table above.
  2. How would you explain to a 4th grader the difference between Thermal Energy and Temperature?

3. How do you determine if one object has more thermal energy than another?

4. Do cold objects contain thermal energy? Explain.

5. Give an example of two objects that have different thermal energies but are made of the same material. What makes them have different TE?

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6. Specific heat is an important concept in science. What is specific heat and how does it connect to the real world?

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**BONUS: Specific Heat Calculations**

The formula for determining how much energy it takes to change the temperature of an object is

$$q = m \bullet c \bullet \Delta T :$$

$q$  = amount of heat (Joules)

$m$  = mass (grams)

$c$  = specific heat (J/g°C)

$\Delta T$  = change in temperature (°C)

1. Gold has a specific heat of 0.129 J/(g×°C). How many joules of heat energy are required to raise the temperature of 15 grams of gold from 22 °C to 85 °C?	
2. Graphite has a specific heat of 0.709 J/(g×°C). If a 25 gram piece of graphite is cooled from 35 °C to 18 °C, how much energy was lost by the graphite?	
3. Copper has a specific heat of 0.385 J/(g×°C). A piece of copper absorbs 5000 J of energy and undergoes a temperature change from 100 °C to 200 °C. What is the mass of the piece of copper?	
4. If 335 g of water at 65.5 °C loses 9750 J of heat, what is the final temperature of the water? Liquid water has a specific heat of 4.18 J/(g×°C).	

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2a: CW3

\*1 calorie = 4.2 Joules of energy

When you read calories on a food label, it is actually kilocalories or 1000 calories. So a typical 2000 calories per day diet is actually 2,000,000 calories or 8,400,000 joules of energy needed each day!