Thermal Energy Practice Name:_____

Reflection and Self-Assessment

Part 1: Circle the statement that best describes how you completed the practice:

- I answered all questions without using the online solutions. I checked my answers against the key at the back of the practice and was able to determine my mistakes and correct them without referring to the online solutions.

- I answered most questions correctly without using the online solutions. I used the online solutions to help me with some questions and was able, with help from the online solutions, to understand every question and answer them correctly.

- I used the online solutions to help me with most of the questions. I was able, with help from the online solutions, to understand each question and answer them correctly.

- Even using the online solutions, I was not able to fully understand the solution to some problems. The questions I had trouble with were:

  _____

- I did not attempt all the questions on the practice.

Part 2: Circle the statement that best describes your confidence in answering questions of this type in the future.

- I am confident I can answer nearly any question of this type correctly without using notes or other assistance.

- I am confident I can answer **MOST** questions of this type correctly without using notes or other assistance.

- I am **NOT** confident I can answer most questions of this type correctly without using notes or other assistance.

Part 3: Circle the statement below that best describes the total amount of time you spent actively working on this practice:

Less than an hour	Between one and two hours	Between two and three hours	Between three and four hours	More than four hours

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1. Explain in terms of atomic and molecular interactions why the mercury rises in a thermometer when it is placed in a beaker of hot water. Remember that the mercury is enclosed in a glass tube.

Material	Specific Heat Capacity (J/(kg·C))
Water	4200
Ice	2040
Alcohol	2380
Concrete	880
Aluminum	900
Copper	430
Iron	450
Steel	480
Lead	130

2. What will the change in temperature be if a 3.5 kg ball of lead has 2500 J of heat energy added to it?

3. How much energy does it take to raise the temperature of 10.0 Liters of water from 5.0° C to 95° C? Assume density of H_2O is 1.0 g/mL

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4. If 2.5×10^4 J of energy are absorbed by 5.0 kg of a substance to raise its temperature by 20.0^{o} C, what is the specific heat of the substance?

5. If 1.5×10^4 J of heat are absorbed by a 2.0 kg block of copper initially at a temperature of 20.0^{o}C, what is the final temperature reached?

6. An 0.032 kg bullet travelling at 452 m/s is stopped by a 3.0 L pool of water. How much will the water heat up as it stops the bullet?

7. Through a complex set of machinery, thermal energy is used to lift a 25.0 kg block. Through the process a 5.0L container of water, initially at 95°C cools to 45°C. How high is the block lifted?

8. A turkey is considered "cooked" when it has an internal temperature of 82°C. Assuming wildly that a turkey has the same specific heat capacity as water, you, a brilliant physics student, suggest an alternative to cooking the Thanksgiving turkey in the oven. Instead, if you dropped the turkey from a high enough place, the potential energy would convert into kinetic energy which would then convert into thermal energy when the bird hit the ground, instantly raising the temperature to the required 82°C. How high must you drop a 10.0 kg turkey, initially at 22°C from to cook it in this manner?

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Answer Key				
1) As the mercury heats up the molecules move around more, and like a wild dancer on a dance floor take up more space. The only place for the mercury to expand is upwards, so the mercury goes up.	2) 5.5°C	3) 3.8×10^6J	4) 250 $\frac{J}{kg \cdot °C}$	5)37°C
6) 0.26°C	7) 4300 m	8) 26 000 m		