

Lab: Hot Bolt into Cold Water

Use this space to write out the 2nd Law of Thermodynamics

In this lab, students will start with a known mass of cold water. Then we will drop pieces of Hot metal into the cold water and based on the final, equilibrium temperature, we can calculate what the Specific Heat Capacity is for the metal.

Measured Data points.

1. Mass of empty container _____ grams.
2. Mass of container with cold water added _____ grams
 - a. From these two, determine the mass of cold water _____ grams of cold water
3. Using a thermometer, determine the Initial Temperature of the water _____ °C. = T_0
4. Now, return to Clark to receive two HOT CHUNKS OF METAL!
 - a. Record the temperature of the water bath the metal was sitting in.. _____ °C
 - b. Weigh the whole system again.. _____ grams.
 - c. *Determine the mass of metal.* _____ grams of hot metal.
5. Allow to sit for two minutes (more or less)..
6. Record the final, equilibrium temperature. T. _____ °C

Cold Water Heating UP (gaining joules)

Use this space to determine how much heat the Cold water gained while heating UP to the final temperature

Hot metal Cooling down (losing joules).

*Write out the Heat Equation again to describe the Heat (ΔQ) the Hot Metal Lost as it Cooled to the final temperature. Which terms do we know?
Which term is the Unknown?*

Solve for $C_{p(\text{metal})}$ = _____ joules/gram/°C

Which Law of Thermodynamics allows to solve the 2nd equation from the 1st?

Write down the 'accepted value' for $C_{p(\text{metal})}$ _____ J/g/°C

Determine your percent error here.