Specific Heat Lab Introduction:

Specific Heat is the amount of heat required to raise the temperature of a unit mass by one degree. It can be expressed in terms of calories/gm-°C or Joules/ kg -°K . Water has a relatively high specific heat of 1cal/gm-°C. Metals usually have a low specific heat, for example lead has a specific heat of .03 cal/gm-°C.

A calorimeter is an instrument for determining the amount of heat evolved, transferred or absorbed. In our case it will consist of a closed insulated vessel with a thermometer.

The amount heat "Q" transferred to or from a mass "m" with a specific heat "c" and a temperature change of ΔT is: $Q = mc\Delta T$ or Heat Transferred = (mass) x (specific heat) x (temperature change)

In this experiment we will measure the specific heat of several metals by warming them to a know temperature and adding them to a known quantity of water in a calorimeter and measuring the resulting rise in temperature.

Heat is transferred between the heated metal and the water, such that the heat loss by the metal is equal to the heat gained by the water. We can also express this as:

(Mass metal)x(Specific heat of metal)x(Initial temp of metal - Final temp of metal) =
(Mass of water)x(Specific heat of water)x(Initial temp of water - Final temp of water)

Note: Final Temp of Water = Final Temp of Metal.

Using this we can determine the specific heat of an unknown metal. This can also be used to determine the atomic weight of a pure metal by using the law of Dulong and Petit, where :

(Specific heat of metal)(atomic weight) $\approx$ 6 cal/mole, degree