The "C" of "Cu" name: _____

Objective: to calculate the specific heat of copper and then compare it to the actual value.

Background: Heat is never lost, but it can be transferred. In this lab heat will be transferred from hot copper to cool water. The Joules of energy gained by the water will be equal to the joules of energy heat lost by the copper.

By calculating the heat gained by the water will allow us to determine how many Joules were lost by the copper. Using the basic heat formula we can then determine the specific heat constant of copper. Finally we will compare that measured "C" to the known "C" of Cu, which is 0.39 J/g·K.

Procedure: Your teacher has already measured out tubes of copper pellets (45-55 g), which are heating up in boiling water baths. After 8-10 minutes in the boiling water, the temperature of the water and copper shot will be the same (transfer of kinetic energy water to copper).

You need to set up a device to measure heat gain by water. In a large Styrofoam cup, measure the exact mass of about 50 mL of deionized water. Get the top cup and thermometer in place and measure the temperature to the tenth of a degree. Then bring cups to the hot copper. Have teacher shoot the copper into the cup, close top and gently swirl. Measure the HOTTEST water temperature. The mass of the copper in your cup will be written on a slip of tape and handed to you when you get your copper.

When done with experiment: spill out water into sink, save copper on paper towels to dry. Wipe up and clean up station.

Data Table	Start temp of water
Mass of cup	Temp of hot copper
Mass cup & water	Mass of copper
Mass deionized water	Hottest water temp

The "LUCKY 7" - "C" of "Cu" Calculations: (that's 6 " " 's in one short sentence. "wow!" - now it's 8)

1 Determine the heat gain in joules by the water in your sample [3]
2 Explain where this heat gain by the water comes from [3]
3 Calculate the specific heat of copper, show all work. [3]
4 Determine your percent error actual "C" vs. calculated "C". (show all work). [3]
5 On another day, in a different room, unrelated to the work above, if you happen to have 25,200 Joules of energy, how many grams of ice can you phase change into water at the melting point (no ΔT)? [1]
6 If you didn't melt that ice but instead used your 25,200 J to heat water from 315 to 317 Kelvin, how many grams of water could you warm up with that exact amount of energy? [1]
7 Finally, if you took that same amount of Joules, the 25,200 J, how much water could you vaporize into water gas at 373 K instead?. [1]

This lab report requires...	this material	worth these points
cover page	title and intro paragraph	1 + 3
2	data table (you create)	2
3	Lucky 7 calculations	3 + 3 + 3 + 3 + 1 + 1 + 1 = 15
conclusion	what is the point of this lab, what did you measure, what did you calculate, what is your % Error and where did it come from, and what did you learn? Write a real conclusion, complete and perfect!	4
report due on: _____ 40 minutes lab time		25 total

$$q = mC\Delta T$$