

Experiment 06

Calorimetry Report Form

Name: _____

Date: _____

Data

Class Ticket: _____

Table 1

Data		Time (s)	Temp (°C)
Mass 50 mL beaker	g	0	
Mass 50 mL beaker + Na ₂ CO ₃	g	30	
Mass 250 mL beaker	g	60	
Mass 250 mL beaker +water	g	90	
T _i	°C	120	
T _f	°C	150	
<i>Mass of Na₂CO₃</i>	g	180	
<i>Mass of water</i>	g	210	
<i>Mass of solution</i>	g	240	
<i>Moles of Na₂CO₃</i>	moles	270	
<i>Δ Temperature</i>	°C	300	
Calculate the heat of dissolving of Na₂CO₃ (ΔH _{dissolving} , the units will be: J/mole, specific heat of water:4.186 joule/gram °C)		330	
		360	
		390	
		420	
		450	
		480	
		510	
Your answer will be used in question number two.		540	

Table 2

Data		Time (s)	Temp (°C)		
Mass 250 mL beaker	g	0			
Mass 250 mL beaker + water	g	30			
Mass 250 mL beaker + water + ice	g	60			
T_i	°C	90			
T_f	°C	120			
<i>Mass of water</i>	g	150			
<i>Mass of ice</i>	g	180			
<i>Mass of solution</i>	g	210			
<i>Moles of ice</i>	moles	240			
Δ Temperature	°C	270			
Calculate the heat of fusion of water (ΔH_{fusion} , the units will be: J/mole, specific heat of water: 4.186 joule/gram °C)		300			
		330			
		360			
		390			
		420			
		450			
		480			
		510			
		<i>Your answer will be used in question number three.</i>		540	

Table 3

Data		Time (s)	Temp (°C)
Mass of metal (coins)	g	0	
Type and number of coins	<i>x pennies*</i>	30	
Mass 250 mL beaker	g	60	
Mass 250 mL beaker + water	g	90	
T _i	°C	120	
T _f	°C	150	
<i>Mass of metal</i>	g	180	
<i>Mass of water</i>	g	210	
<i>Mass of solution</i>	g	240	
<i>Δ Temperature</i>	°C	270	
Calculate the specific heat capacity of a metal (C _s , the units will be: J/g°C, specific heat of water:4.186 joule/gram °C)		300	
		330	
		360	
		390	
		420	
		450	
		480	
		510	
Your answer will be used in question number four.		540	

* This may change depending upon which coin you used at the beginning of the experiment.

remember your significant digits and units

Questions

1. Usually in General Chemistry labs, this experiment is done as “Coffee Cup Calorimetry” using Styrofoam coffee cups instead of a plastic beaker. Styrofoam is a better insulator than the plastic beaker. How would using Styrofoam coffee cups instead of a plastic beaker affect your results. Be specific: *what would happen to your temperature change for parts A, B, and C of the procedure.*

2. Use the conversion and equation sheets or Google to *calculate the correct value for the heat of dissolving of Na_2CO_3* (ΔH for $\text{Na}_2\text{CO}_3(\text{s}) \rightarrow 2\text{Na}^+(\text{aq}) + \text{CO}_3^{2-}(\text{aq})$, just like you did in class). Calculate the *percent error* in your experimental value.

3. Use the conversion and equation sheets or Google to *calculate the correct value for the heat of fusion of water* (ice). Calculate the *percent error* in your experimental value.

4. Determine the *average specific heat capacity for the coins you used*. Use the tables below, the composition of each coin you used and, how many of each type of coin you used to determine their average specific heat capacities. This value will be known as your theoretical/correct value. Calculate the *percent error* in your experimental value.

Coins			
Value	Mass	Composition	Minted
1¢	3.11 g	copper 95%, tin/zinc 5%	1909–1942, 1947-1982
	--	steel/zinc	1943
	--	salvaged brass composition	1944–1946
	2.50 g	zinc 97.5%, copper 2.5%	1982–present
5¢	5.000 g	copper 75%, nickel 25%	
10¢	2.268 g	copper 91.67%	
25¢	5.670 g	nickel 8.33%	

Specific Heat	
Metal	J/g°C
Copper	0.385
Zinc	0.338
Nickel	0.444