Thermochemical Reactions Lab
Heat of Solutions

Writeup directions: ***Write*** *the theory, purpose, prelab (answer them in complete sentences), calculations (show your work for numbered parts in the data table)*
paste *in: background info, procedure and data table)*

Theory: q=mcΔT, heat of solution, exothermic, endothermic
Purpose: In this lab you will calculate the heat of solution for a physical change that involves the heat released or absorbed by a salt as it dissolves in water.

Background Information: You will measure this indirectly by recording the maximum increase or decrease in the temperature of 100 g of water in a calorimeter at a constant atmospheric pressure. The heat flow for the water is calculated by the formula: q=mcΔT. The specific heat of water is 4.18 J/g ^{o}C or 1.00 cal/ g ^{o}C and the ΔT is the change in temperature (T_f - T_i). The enthalpy change for the reaction ΔH is equal but opposite in sign to the heat flow to or from the water. If the water temperature increases, the compound is exothermic, releasing heat into the water. If the water temperature decreases, the compound is endothermic, absorbing heat from the water. **The heat of solution per gram is calculated by taking the total heat (q) and dividing the number of grams dissolved**.

Prelab:
1. What do all the symbols in: q=mcΔT represent? Include the units of measurement.
2. What are the chemical formulas of calcium chloride and sodium bicarbonate.
3. What type of compounds are these?
4. Why do they dissolve in water?

Procedure:
Part I. Heat of solution for calcium chloride
1. Measure 100 mL of water with a graduated cylinder and place it in a calorimeter.
2. Place a thermometer in the water through one slit in the calorimeter. In the other slit, put a stirring rod.
3. Mass our 5.0 g of calcium chloride and add the calcium chloride to the water in the calorimeter, and stir gently with the stirring rod.
4. White stirring, monitor the change in temperature until the temperature stops changing. If it doesn't change for 4-5 minutes, your experiment is finished.
5. Record the final temperature in the data table.
6. Calculate the heat lost or gained from the water by using the formula q=mcΔT. The specific heat capacity of water is 4.18 J/g ^{o}C. The change in temperature can be represent by the equation: $\Delta T = T_f - T_i$ (final-initial)
7. Calculate the heat of solution in kJ/g by taking the calculated heat (q), dividing by 5.0 g, and multiplying by 1 kJ/1000J to convert to kJ/g.

Part II. Heat of solution for sodium bicarbonate
Repeat steps above for sodium bicarbonate and record data in the table.

Data Table:

Compound	Mass	appearance	Final temperature	Initial temperature	1. ΔT	2. q=mcΔT	3. Heat of solution
Calcium chloride							
Sodium bicarbonate							

Calculations: Show all work for 1-3 in the data table.

Conclusion:
Compare and contrast the two compounds and their heat of solution.