Name: _____ Section: _____

Data and Calculations

	Trial 1		Trial 2
Mass of empty calorimeter	_____	=	_____ g
Mass of calorimeter + water	_____		_____ g
Mass of calorimeter + water + solid (final mass)	_____		_____ g
Mass of solution	_____		_____ g
Mass of solid (solute)	_____		_____ g
Initial temperature	_____		_____ °C
Final temperature	_____		_____ °C
ΔT	_____		_____ °C
$Q_{solution} = (m\ s\ \Delta T)_{solution}$	_____		_____ J
$Q_{rxn} = -Q_{solution}$	_____		_____ J

Calculate the heat of reaction, ΔH, per gram of solid

$$\Delta H_{reaction} = \frac{Q_{rxn}}{mass_{solute}}$$

_____J / g (trial 1)* and _____J / g (trial 2)*

* *Note*: These values should be within 5% of each other or another trial should be done.

Average ΔH per gram _____ J / g

Molecular Formula of Solid _____ Molecular Weight _____

Calculate the molar heat of solution, ΔH, for this solid. Use the average ΔH value.

$\Delta H_{reaction}$ _____ kJ / mol

Calculate the % error for the above value.
(Literature values: Na_2CO_3 $\Delta H_{reaction} = -28.1$ kJ / mol; NH_4NO_3 $\Delta H_{reaction} = +25.7$ kJ / mol)

Theoretical $\Delta H_{reaction}$ _____ kJ / mol % error _____

Name: _____ Section: _____

Post-Lab Questions: Heat of Solution

1. A metal sample weighing 63.2 g with a temperature of 100.0 °C was placed in a calorimeter containing 41.0 g of water at 24.5 °C. The equilibrium temperature of the water and metal was found to be 35.0 °C.

   A. What was ΔT for the water? ($\Delta T = T_{final} - T_{initial}$) _____ °C

   B. What was ΔT for the metal? _____ °C

   C. Taking the specific heat of water to be 4.184 J / g °C, calculate the specific heat of the metal using Eq. 5.

   _____ J / g °C

2. When 5.00 g of KNO_3 were dissolved in 49.00 g H_2O at 24.00 °C inside a calorimeter, the temperature of the resulting solution fell to 15.60 °C.

   A. Is this reaction endothermic or exothermic? _____
   Explain:

   B. Calculate the heat lost or gained by the solution chemicals (this is Q_{soln}) in the calorimeter.

   Q_{soln} = _____ Joules

   C. What is Q_{rxn} for the reaction that occurred?

   Q_{rxn} = _____ Joules

   D. Calculate the heat of this reaction, ΔH, in Joules/g KNO_3.

   ΔH_{rxn} = _____ Joules / g

   E. Calculate the molar heat of this reaction, ΔH, in kJ/mol KNO_3.

   ΔH_{rxn} = _____kJ / mole