State Functions

Purpose: To become familiar with Hess.

Materials/equipment: solid NaOH, water, styrofoam cup, 1M HCl, 1M NaOH, .5M HCl, weighing paper

CAUTION: • TOUCH NO CHEMICALS----the NaOH is VERY CAUSTIC.
WEAR GOGGLES at ALL TIMES
        • USE CLEAN GLASSWARE!!!
Procedure:

Part ONE
1. Measure the temperature of 100.0 grams of water
2. Put enough solid NaOH in 100.0 grams of water to make a .5 M solution.
3. Record the final temperature after the NaOH has dissolved.
DO NOT TOUCH THE NAOH or LET IT TOUCH THE METAL OF THE SCALE-- USE WEIGHING PAPER

Part TWO
1. Record the temperature of 50.0 ml of 1M HCl
2. Mix 50.0 ml of 1 M HCl and 50.0 ml of 1 M NaOH in a styrofoam cup
3. Record the final temperature.

Part THREE
Predict the heat change for this reaction. (based on 1 & 2)
NaOH (s) + H+(aq)   ----->   Na+(aq) +   H2O (l)

Part FOUR
1. Record the temperature of 100 ml of .5 M HCl.
2. Add 2.0 grams of solid NaOH.
3. Record the final temperature of the solution.

Conclusion:
1. Calculate the heat change in parts 1,2, and 4
2. How did your answer to part three and the heat change in part four compare?
3. Assume the heat change in part three was expected and calculate a % yield.
4. Explain why ΔH of 1 + 2 should equal ΔH in 4.

Assumptions: Density of soln. = water;   Cp of soln. = water