**[The Enthalpy Change of a Chemical Reaction](http://66.246.168.133/csp/lab/UserOptions.csp?CSPToken=ppWuE32W5tao63oCxSzNe4EgpQbeD1qM4Ynf4R2QVQDoPUjqdRksBus9ZCzk112msDxuCOsl9pp7wMUOT6dyUprY3JFhA2joSI6yiEPaLwfTdFch7M8$ZN94jkALtJVjz4m7vaN3lgtpoGTlyDv_Mn18z5MSfreYBJDz0vd3Py4-" \t "mainFrame)**

**Procedure #1**:  
  
1. Take a calorimeter from the Glassware shelf and place it on the workbench.   
  
2. Take a balance from the Tools shelf and drop it on the calorimeter. Record the mass of the empty calorimeter.   
  
3. Take a thermometer from the Tools shelf and drop it onto the calorimeter. Record the temperature of the calorimeter.  
  
4. Add 50 mL of 1.0M hydrochloric acid (HCl) to the calorimeter.  
  
5. Add .15g of magnesium (Mg) to the calorimeter.  
  
6. Immediately measure and record the MAXIMUM temperature displayed by the thermometer in the calorimeter.   
  
7. Measure and record the mass of the calorimeter and its contents.   
  
8. Repeat the experiment with a new calorimeter, using 50 mL of HCl and .25g of magnesium. Record the MAXIMUM temperature displayed by the thermometer in the calorimeter.  
  
9. Repeat the experiment with a new calorimeter, using 50 mL of HCl and .35g of magnesium. Record the MAXIMUM temperature displayed by the thermometer in the calorimeter.

**Results:**

Mass of empty calorimeter → 11.600g

Temperature of the calorimeter → 21.00 °C

Maximum temperature displayed by the thermometer in the calorimeter after adding .15g of magnesium → 29.27 °C

Mass of calorimeter and its contents → 61.557g

Maximum temperature displayed by the thermometer in the calorimeter after adding .25g of magnesium → 34.78 °C

Mass of calorimeter and its contents → 61.649g

Maximum temperature displayed by the thermometer in the calorimeter after adding .35g of magnesium → 40.29 °C

Mass of calorimeter and its contents → 61.741g

**Question #1:**   
  
1. Record the following for each of the three experiments:  
  
(a) Mass of the empty calorimeter (g):  
  
(b) Initial temperature in the calorimeter (C):  
  
(c) Maximum temperature in the calorimeter from the reaction (C):  
  
**(d) Calculate deltaT as Tmaximum - Tinitial (C):**  
  
(e) Mass of the calorimeter and its contents after the reaction (g):  
  
(f) Calculate the mass of the contents of the calorimeter (g):  
  
**(g) Calculate the moles of Mg reacted (MW=24.305 g/mole):  
  
2. Calculate the heat released into the solution for the 3 reactions, according to:  
  
q(reaction) = Ccal \* Delta T + mass(contents) \* Cp (contents) \* deltaT  
  
(If you have not measured the calorimeter constant yet, assume that it is zero for this experiment.)  
  
3. Find the molar heat of reaction for each experiment in units of Joules / (mole of Mg) by dividing the heat of reaction by the moles of Mg used.  
  
4. Calculate and record the average molar heat of reaction from the three results.**