Flamin' Hot Chip Lab

Goal: Compare the energy released by combusting a chip to the expected energy content from the label.

Quantitative Analysis: Each group will provide a percent yield of energy produced per gram of chip combusted.

Safety Considerations: Obviously, fire is hot. You must always wear goggles. Beware that foil, ring stands, beakers, and water may become hot. Ventilation is required as burning chips will make smoke. If possible, use the fume hood. You may only burn one chip at a time.

Materials:

150 mL beaker	Digital thermometer
Ring stand	Wire gauze
30 cm x 30 cm foil	10 cm x 10 cm foil
Evaporating dish	Clay triangle
Graduated cylinder	Lighter

Methods:

You will be recording your own methods as well as documenting the design of your system. Since you will be calculating the heat absorbed by the water using $q=mc_{sp}\Delta T$, make sure that your methods allow you to measure the following:

1. Mass of the water.
2. Initial temperature of the water (in C or K).
3. Final temperature of the water.

You will be comparing the energy content that you observed in the chip in terms of calories per g of chip burned. Therefore, you will also need to measure the following:

4. Initial mass of chip and small foil holder.
5. Final mass of chip and small foil holder. (You will want to measure the mass with the foil since ash and grease may end up on the foil after burning.) Use the small foil to hold the chip vertically to maximize the surface available for oxygen to react.

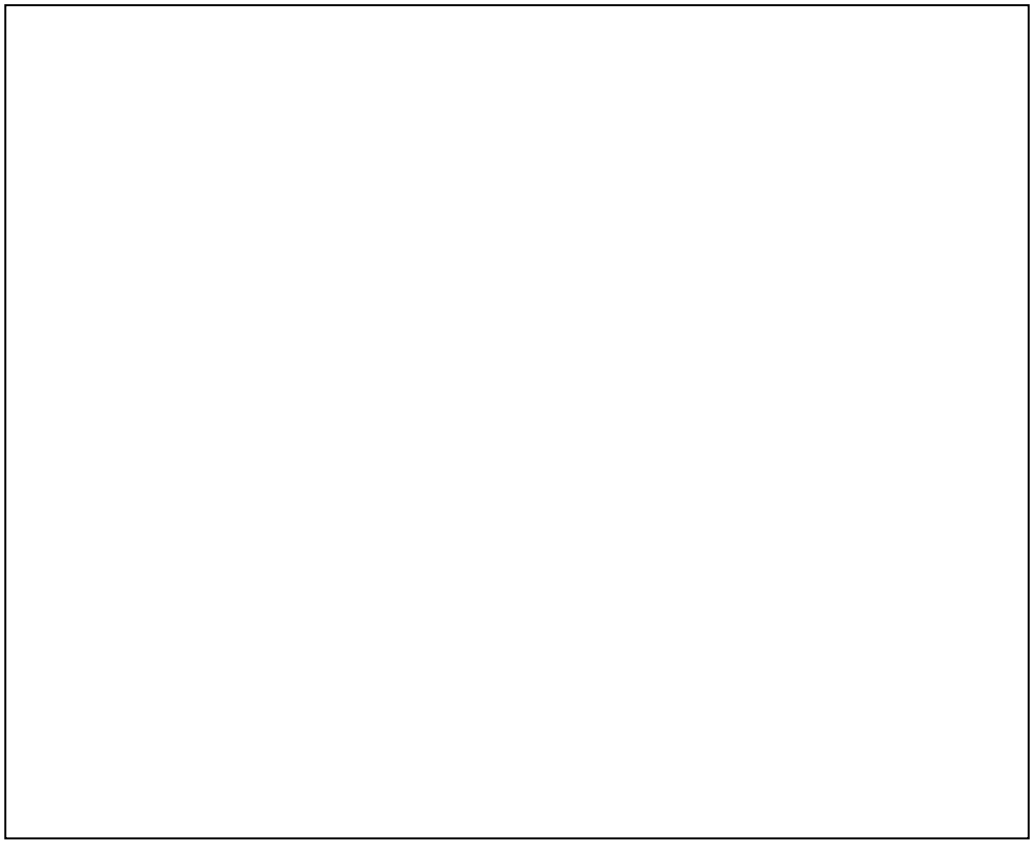
Write your methods below using numbered steps and including any measured values written to the correct number of significant figures.

_____

_____

_____

Draw a diagram of your calorimetry system.



Results:

When using $q=mc_{sp}\Delta T$, use 1.00 cal/gC for the specific heat capacity of water.

Chip	m_{chip} Initial	m_{chip} Final	Δm_{chip}	T_{water} Initial	T_{water} Final	ΔT_{water}	q_{cal}	q_{kcal} converted	$\frac{qkcal}{g\ burned\ Actual}$	$\frac{qkcal}{g\ burned\ Theoretical\ from\ label}$	% yield $\frac{Actual}{Theoretical}$

Analysis:

1. Why were your percent yields significantly below 100%?
   _____
   _____
   _____
2. What are three ways that you could improve the accuracy of your experimental design?
   _____
   _____
   _____
3. What would have happened to the change in temperature if you had used a larger volume of water?
   _____
   _____
   _____
4. A student suggests that burning two chips at a time would have increased the energy released and therefore improved results. Do you agree with this suggestion? Why or why not?
   _____
   _____
   _____
   _____
   _____