Experiment Title: A Tall Cold Drink of Water

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Date Experiment Submitted: October 3rd, 2019

Introduction:

Enthalpy

Enthalpy is a property of a thermodynamic system that is equal to the internal energy of the system plus the product of its pressure and volume[1]. In order to prevent mass transfer in a closed system, the heat absorbed or released is equal to the change in enthalpy for a constant pressure process. Enthalpy is an important state parameter in thermodynamics that characterizes the energy of a material system and is usually denoted by the symbol H; it is defined as:

$$H = E + PV$$

Where E is the internal energy of the substance, P is the pressure, and V is the volume.

The Types of Enthalpy

Enthalpy change is the thermal change that accompanies a chemical reaction at a constant volume or constant pressure; it indicates the amount of heat absorbed or released during the reaction[2]. It is expressed by ΔH:

$$\Delta H = H_f - H_i$$

H_f is the final enthalpy of the system (the enthalpy of the products), and H_i is the initial enthalpy of the system (the enthalpy of the reactants).

[1] Helmenstine, A. M. What Is Enthalpy Change? https://www.thoughtco.com/definition-of-enthalpy-change-605090 (accessed Sept 28, 2019).

[2] Ibid.

The three types of enthalpy changes that were focused in this experiment to find the enthalpy of a solution are the following:

- **Enthalpy of Dissolution:** the heat or thermal energy change that occurs when one mole of the substance is dissolved into water.
- **Enthalpy of Hydration:** The energy that is released when one mole of gaseous ions are turned into solutes by adding water to form aqueous ions.
- **Enthalpy of Lattice Dissociation:** The energy required to vaporize one mole of an ionic compound into its gaseous ions.

The enthalpy dissolution is seen as the sum of the enthalpy hydration and enthalpy of lattice dissociation[3]:

$$\triangle H_{\ Dissolution} = H_{\ Hydration} + H_{\ Lattice\ Dissociation}$$

Using this concept, the enthalpy for the dissolution of a salt solution of NH_4Cl was found to be:

$$H_{\ Dissolution\ of\ NH_4Cl} = H_{\ Hydration\ of\ NH_4(g)} + H_{\ Hydration\ of\ Cl(g)} + H_{\ Lattice\ Dissociation\ of\ NH_4Cl}$$

$$H_{\ Dissolution\ of\ NH_4Cl} = (-307KJ/mol) + (-381KJ/mol) + (705KJ/mol)$$

$$H_{\ Dissolution\ of\ NH_4Cl} = +17KJ/mol$$

From this calculation, it was predicted that the reaction occuring in the calorimeter was an endothermic reaction since the enthalpy of dissolution produced a positive value; meaning the system would absorb energy from its surroundings, and the solution would get colder.

Endothermic and Exothermic

- **Exothermic reaction**: The total stored energy of the reactants is greater than that of the product. The chemical reaction emits energy; ΔH is negative
- **Endothermic reaction**: The total stored energy of reactants is less than that of products. The chemical reaction absorbs energy[4]; ΔH is positive.

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[3] Libretexts. Enthalpy of Solution. https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Physical_Properties_of_Matter/Solutions_and_Mixtures/Solution_Basics/Enthalpy_of_Solution (accessed Sept 28, 2019).
[4] Helmenstine, A. M. Understanding Endothermic and Exothermic Reactions. https://www.thoughtco.com/endothermic-and-exothermic-reactions-602105 (accessed Sept 28, 2019).

Hess's Law

Hess's law is the basic law of thermochemistry and an expression of the principle of conservation of energy. It means that under constant pressure or constant volume conditions, whether it is completed in one step or several steps, the heat of reaction is the same[5]. The heat of reaction of a chemical reaction is only related to the initial state and the final state of the reaction system and is independent of the route of the reaction.

In this experiment, the enthalpy change of dissolution for the NH4Cl salt is an example of Hess's law. This is because the enthalpy of dissolution can be written as the sum of multiple other enthalpy changes[6] such as the enthalpy of lattice dissociation and enthalpy of hydration.

Calorimeter

Calorimeters are devices that aid in the measurement of heat of a chemical reaction in thermodynamic systems. It ensures an isolated environment for the reaction so that an accurate measurement of heat can be taken[7]. In the experiment, the calorimeter should enable a relatively accurate measurement of the initial and final temperatures of the water in the aluminum can (before and after the reaction started). Using this temperature change and multiplying it by the mass and specific heat capacity for water should provide the amount of energy that is released or absorbed during the reaction:

$$Q = M \cdot C \cdot \triangle T$$

In the formula, Q is the amount of transferred thermal energy in kilojoules per mole, M is the mass of the system, C is the heat capacity of water, and delta T is the change in temperature.

It is possible to get the enthalpy change of the reaction by dividing Q by the number of moles of reactant. In this case, to get the enthalpy change of the reaction, the equation is:

$$\triangle H = \frac{-Q}{n}$$

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[5] Hess's Law - Chemistry LibreTexts. https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Thermodynamics/Thermodynamic_Cycles/Hesss_Law (accessed Sep 28, 2019).

[6] Hess' Law - using three equations and their enthalpies. https://www.chemteam.info/Thermochem/HessLawIntro1a.html (accessed Sept 28, 2019).

[7] Jones, A. Z. Understanding Calorimetry to Measure Heat Transfer. https://www.thoughtco.com/calorimetry-2699092 (accessed Sept 29, 2019).

In order to determine how much mass is required to decrease the temperature of the water in the aluminum can by 5 degrees kelvin, the use of both the equations mentioned above must be used. After calculations, it was found that 13.15 g of NH_4Cl salt (refer to Calculation #1 in the appendix) was needed in order to decrease the temperature by 5 degrees kelvin.

For the experiment, the specific heat capacity of the water and NH_4Cl are the constant variables, the independent variable is the mass of NH_4Cl, and the dependent variable is the change in temperature of the water. For the results, it is expected that as the mass of NH_4Cl salt increases, the change in temperature of the water will increase as well.

Ammonium chloride was favoured over ammonium nitrate because ammonium nitrate is known to be an explosive agent. If decomposed rapidly into its gaseous ions, ammonium nitrate could deliver an explosive force[8]. As a result, using ammonium nitrate in the lab for an experiment would pose a huge risk on the lives of the students, as well as the consumers of the sports drink. Ammonium chloride, on the other hand is less dangerous than ammonium nitrate because it not known as an explosive agent; it can even be used as a food additive in some foods that humans consume such as licorice[9].

Procedure:

Independent Variable: Mass of NH_4Cl (g)

Dependent Variable: Temperature Change (ΔT) (℃)

1. Ensure required safety equipment is present (lab coat and safety goggles).
2. Obtain calorimeter, temperature probe, and an aluminum soda can.
3. Obtain 13.15g of NH_4Cl salt.
4. Use a beaker to fill the soda can with 100 ml of tap water.
5. Use a beaker to fill the calorimeter with 100 ml of tap water.
6. Measure and record initial water temperature in the aluminum can.
7. Add NH_4Cl salt to the water in the calorimeter and gently swish the mixture around to mix.
8. Place the water-filled aluminum soda can into the calorimeter.
9. Cover the top of the calorimeter with a lid and insert the temperature probe into the soda can water through the small hole in the lid of the calorimeter.
10. Allow the cooling process to occur for 5 minutes.
11. Observe and record the final temperature of the can and note the change in temperature.

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[8] What Causes Fertilizer Explosions? https://www.livescience.com/28841-fertilizer-explosions-ammonium-nitrate.html (accessed Oct 3, 2019).

[9] dalianfuture, A. the A. Ammonium Chloride Application in food/2018 information for food additives. https://www.ficchem.com/ammonium-chloride-application-in-food/ (accessed Oct 3, 2019).

12. Repeat steps 3-11 with more or less mass as necessary to achieve the desired temperature change within 5 minutes.

Discussion:

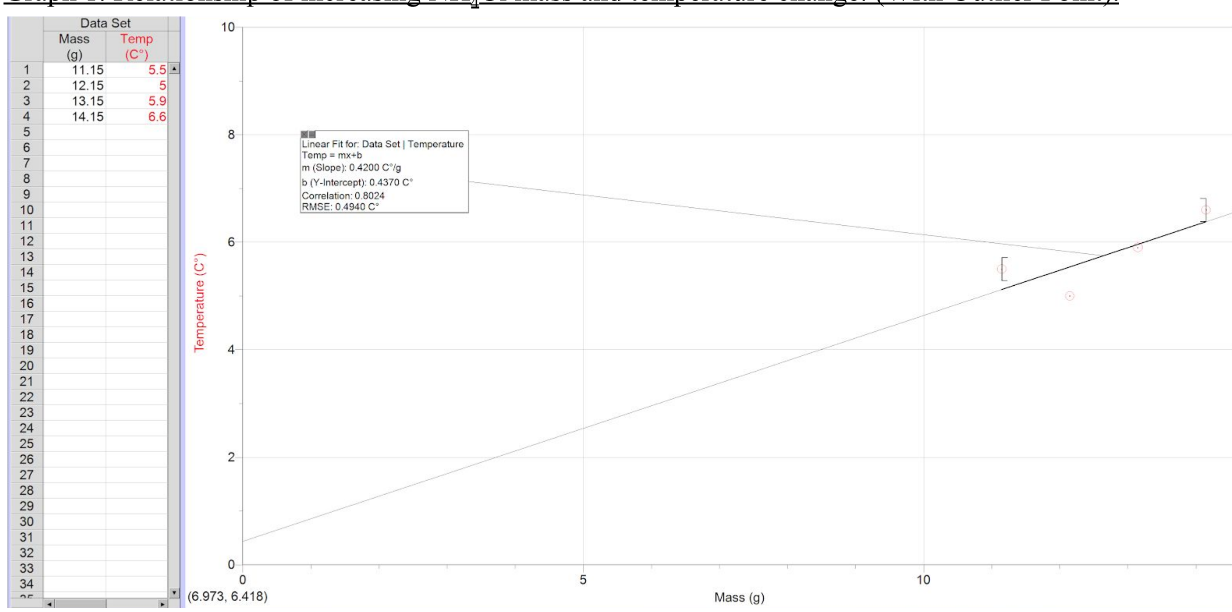
Thermochemistry plays an essential role in this experiment as there is a great example of heat energy playing a role in the chemical equation. With specific regards to this experiment, an endothermic reaction occurred where heat was used as a reagent and therefore thermal energy was taken from the surroundings which included the 100 ml of water within the soda can thus reducing its temperature. In the chemical reaction, NH_4Cl salt, water, and heat are the reactants and NH_4^+ and Cl^- in their aqueous states along with water are the products. The heat can be expressed as the enthalpy of dissolution of the ionic compound which represents the change that occurs when one mole of the NH_4Cl salt is dissolved into water.

Table 1. Effect of the addition of NH_4Cl to water on overall temperature change.

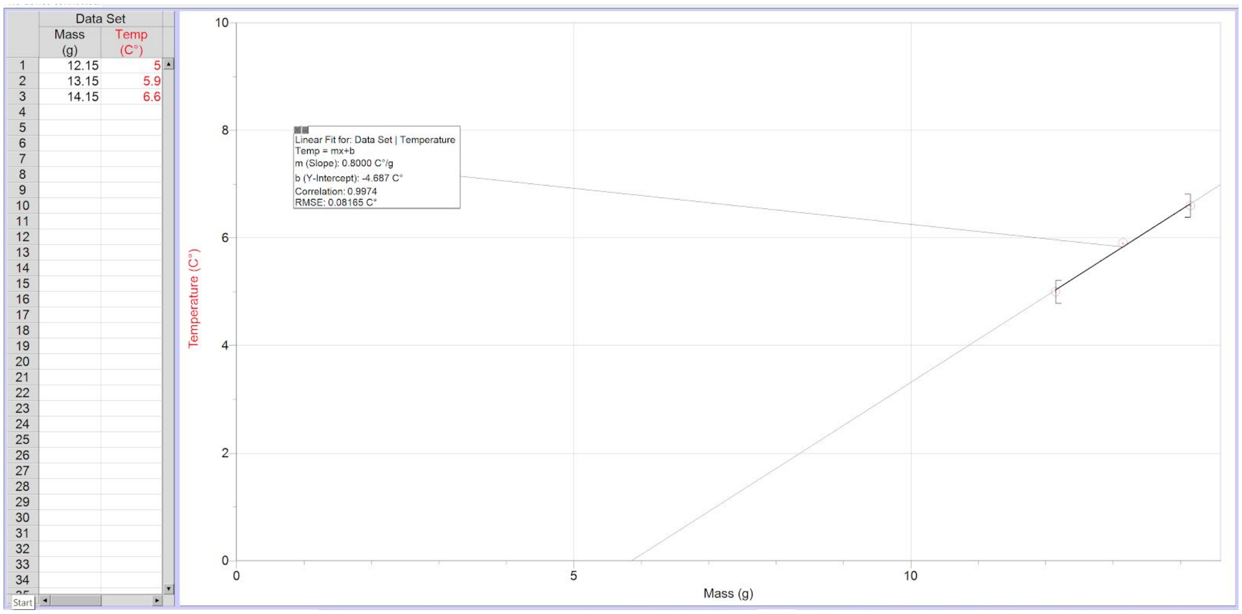
Mass of NH4Cl (g)	Initial Water Temperature (℃)	Final Water Temperature (℃)	Change in Temperature (ΔT) (℃)
* 11.15 g	23.7 ℃	18.2 ℃	5.5 ℃
12.15 g	23.3 ℃	18.3 ℃	5.0 ℃
13.15 g	23.8 ℃	17.9 ℃	5.9 ℃
14.15 g	23.8 ℃	17.2 ℃	6.6 ℃

*Outlier Point

Graph 1. Relationship of increasing NH_4Cl mass and temperature change. (With Outlier Point).



Graph 2 - Relationship of increasing NH_4Cl mass and effect of temperature change. (Without Outlier Point.)



The tabulated data along with the graphs accurately represent the linear relationship; the mass of the substance is directly proportional to the change in temperature. This means that as the mass of NH_4Cl salt added to the calorimeter increases, it will result in the water cooling more significantly and therefore increase the temperature change over the five minute time period. Through experimentation an outlying result was recorded as seen in the data set. In Graph 1, the first point from the left has a higher change in temperature with a lower mass which should not be the case. It is clear that this point does not follow the line of best fit on the graph since the line of best fit becomes skewed and still does not pass through the point. In Graph 2 where the outlier point was removed, the line of best fit accurately represents the data set; the line passes through each point and displays the positive relationship between the independent variable - mass of NH_4Cl salt, and the dependent variable - temperature change. This may have been due to some experimental errors which includes the improper cleaning of the calorimeter, the exterior of the soda can, and other components that came into contact with the NH_4Cl salt. Since the trial for the outlier point was done last, by failing to remove all of the salt would result in an excess amount of salt for the next trial which may have lead to a greater temperature change. Also, if any salt came into direct contact with the temperature probe and was mixed in with the water, it would affect the reading and give a larger difference in temperature.

Prior to performing the experiment, it was calculated that in order to achieve a temperature change of 5-°C, 13.15 g of NH_4Cl must be dissolved into the calorimeter. Table 1 shows that this was not exactly correct as the calculated mass resulted in a temperature change of 5.9 °C in 5 minutes which was 0.9 °C more than what was desired. This can be represented as a 15.3 % error between the calculated and actual temperature change. From this point, it was decided to decrease the mass by 1 g as this could provide a small decrease in temperature change needed. The 12.15 g tested next yielded the 5 °C change in temperature precisely and it was concluded that this was the exact amount required. As each of the trials had a greater actual temperature change than calculated there must have been a systematic error in the experimentation. This could have been a result of the scale's zeroing when weighing the mass of salt as it was constantly producing high results. In addition, the measurements for water volume were not perfect with a beaker, they also may have had excess solutes on their surface from previous cleaning. The tap water itself may contain excess solutes which could decrease specific heat capacity and then increase the temperature change. The sum of each of these factors may have been the lead force behind our consistent high temperature changes.

The design of the experiment was successful as the addition of NH_4Cl within the calorimeter did indeed result in a majority of the heat being taken from the water from the surroundings including the soda can to perform the endothermic reaction and result in a measured temperature change. A comparison can be drawn to a similar experiment done by LibreTexts and UC Davis to explain the cooling mechanism in some ice packs[10]. When a seal is broken that releases ammonium nitrate and allows it to come into contact with water, a similar endothermic reaction occurs. The cooling sensation is a result of heat being taken from the surroundings and used in the dissolution of the ionic compound. This relates directly to the experiment performed as the ionic compound creates a desired temperature change in order to function as needed. By placing the soda can within the mixture of NH_4Cl and water and then sealing the calorimeter, the cooling effect occurred; however some improvements could be made. One improvement that could be made would be a pressure and volume tight calorimeter. For example, within the calorimeter used there was a presence of air inside along with the water, this would result in energy being taken from the air as well and not only the water. Along with this, the seal of the top where the styrofoam lid is placed and the thermometer is inserted is not vacuum tight which may allow for the closed system to be affected.

Some limitations of the experiment that were encountered included a key factor that the actual final product that will be used will not have a styrofoam calorimeter present to create the insulated environment for the reaction to take place; a new insulator must be found that has similar effects. Plus, in our calorimeter, we did not account for the specific heat capacity of our aluminum soda can which would play another role in the actual measurement of temperature change. Also, if the product is designed to cool an actual sports drink as opposed to water, this would result in different specific heat capacity, and therefore the measurements of temperature will change and the salt requirement would also be changed.

Conclusion:

In conclusion, it can be seen that the mass of reactant is directly proportional to the change in temperature of the system. Through calculations prior to attempting the experiment it was found that 13.15 g of NH_4Cl must be added to 100 ml of water within the calorimeter in order to achieve a 5 Kelvin temperature decrease for the water in the aluminum soda can. However, upon experimentation it was discovered that in order for the water in the aluminum can to achieve an exact temperature decrease of 5 Kelvin within a five minute interval which was desired, then 12.15 g of NH_4Cl must be added 100mL of water surrounding the aluminum soda can.

[10] Libretexts. 1: Thermochemistry (Experiment). https://chem.libretexts.org/Courses/University_of_California_Davis/UCD_Chem_002BH/Chem_2BH:_Laboratory_Manual/1:__Thermochemistry_(Experiment) (accessed Oct 3, 2019).

References

1. dalianfuture, A. the A. Ammonium Chloride Application in food/2018 information for food additives. https://www.ficchem.com/ammonium-chloride-application-in-food/ (accessed Sept 28, 2019).
2. Helmenstine, A. M. Understanding Endothermic and Exothermic Reactions. https://www.thoughtco.com/endothermic-and-exothermic-reactions-602105 (accessed Oct 3, 2019).
3. Helmenstine, A. M. What Is Enthalpy Change? https://www.thoughtco.com/definition-of-enthalpy-change-605090 (accessed Oct 3, 2019).
4. Hess' Law - using three equations and their enthalpies. https://www.chemteam.info/Thermochem/HessLawIntro1a.html (accessed Oct 3, 2019).
5. Hess’s Law - Chemistry LibreTexts. https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Thermodynamics/Thermodynamic_Cycles/Hesss_Law (accessed Sep 28, 2019).
6. Jones, A. Z. Understanding Calorimetry to Measure Heat Transfer. https://www.thoughtco.com/calorimetry-2699092 (accessed Oct 3, 2019).
7. Libretexts. Enthalpy of Solution. https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Physical_Properties_of_Matter/Solutions_and_Mixtures/Solution_Basics/Enthalpy_of_Solution (accessed Oct 3, 2019).
8. Libretexts. 1: Thermochemistry (Experiment). https://chem.libretexts.org/Courses/University_of_California_Davis/UCD_Chem_002BH/Chem_2BH:_Laboratory_Manual/1:__Thermochemistry_(Experiment) (accessed Oct 3, 2019).
9. What Causes Fertilizer Explosions? https://www.livescience.com/28841-fertilizer-explosions-ammonium-nitrate.html (accessed Sept 28, 2019).

Appendix:

Calculation #1: Q and NH_4Cl Mass

Chemical Equation: $NH_4Cl + H_20 \rightarrow NH_4^{+} + Cl^{-} + H_20$

Variables: $Q = mc\Delta T \quad \Rightarrow \quad (\, m = 200g \quad c = 4.18\ J/(g\ K) \quad \Delta T = 5K\,)$

Calculation for Q: $Q = 200g \cdot 4.18J/(g\ K) \cdot 5K = 4.18\ KJ$

$4.18\ KJ\ /\ 17\ mol/KJ\ NH4Cl = 0.2459\ mol\ NH4Cl$

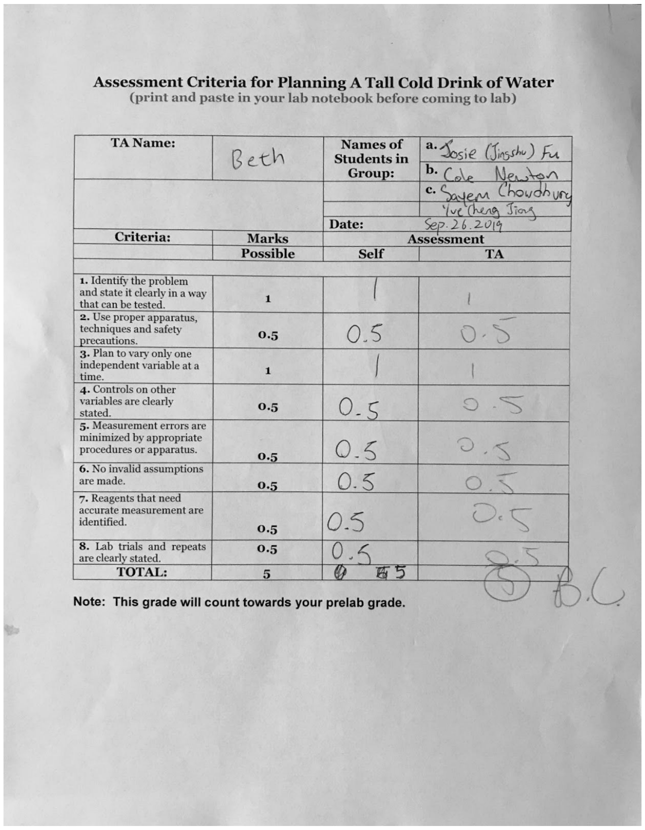
$0.2489\ mol\ NH4Cl \cdot 53.47\ g/mol\ NH4Cl = 13.15\ g\ NH4Cl$

$\therefore$ *To achieve a 5K temperature change, we must use 13.15g of NH_4Cl salt*

$\%\ error = (\ actual\ \Delta T - Calculated\ \Delta T\ /\ actual\ \Delta T\ ) \cdot 100\%$

$= (\ 5.9 - 5\ /\ 5.9\ ) \cdot 100\% = 15.3\%$

Assessment Criteria:

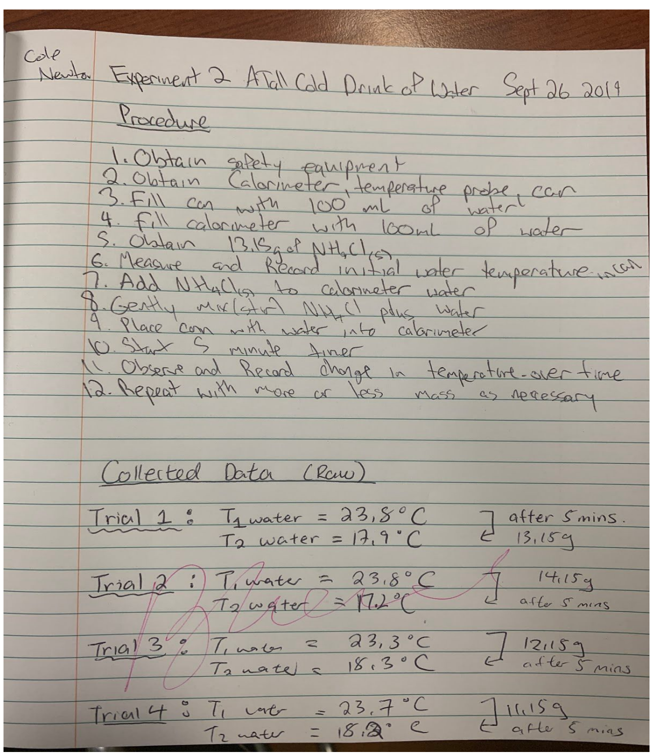


Assessment Criteria for Planning A Tall Cold Drink of Water
(print and paste in your lab notebook before coming to lab)

TA Name:	Beth	Names of Students in Group:	a. Josie (Jinsshu) Fu
			b. Cole Newton
			c. Sayem Choudhury
			Yue Cheng Jiang
		Date:	Sep. 26. 2019
Criteria:	**Marks Possible**	**Assessment Self**	**Assessment TA**
1. Identify the problem and state it clearly in a way that can be tested.	1	1	1
2. Use proper apparatus, techniques and safety precautions.	0.5	0.5	0.5
3. Plan to vary only one independent variable at a time.	1	1	1
4. Controls on other variables are clearly stated.	0.5	0.5	0.5
5. Measurement errors are minimized by appropriate procedures or apparatus.	0.5	0.5	0.5
6. No invalid assumptions are made.	0.5	0.5	0.5
7. Reagents that need accurate measurement are identified.	0.5	0.5	0.5
8. Lab trials and repeats are clearly stated.	0.5	0.5	0.5
TOTAL:	5	5	5 B.C.

Note: This grade will count towards your prelab grade.

Raw Data:



Cole Newton Experiment 2 A Tall Cold Drink of Water Sept 26 2019

Procedure

1. Obtain safety equipment
2. Obtain Calorimeter, temperature probe, can
3. Fill can with 100 mL of water
4. Fill calorimeter with 100mL of water
5. Obtain 13.15g of $NH_4Cl_{(s)}$
6. Measure and Record initial water temperature in can
7. Add $NH_4Cl_{(s)}$ to calorimeter water
8. Gently mix (stir) NH_4Cl plus water
9. Place can with water into calorimeter
10. Start 5 minute timer
11. Observe and Record change in temperature over time
12. Repeat with more or less mass as necessary

Collected Data (Raw)

Trial 1: T_1 water = 23.8°C, T_2 water = 17.9°C — after 5 mins. 13.15g

Trial 2: T_1 water = 23.8°C, T_2 water = 17.2°C — 14.15g after 5 mins

Trial 3: T_1 water = 23.3°C, T_2 water = 18.3°C — 12.15g after 5 mins

Trial 4: T_1 water = 23.7°C, T_2 water = 18.2°C — 11.15g after 5 mins

Creative Aspect:
Title: 5K GeeGee Drink
Slogan: The Drink that Cools while you Think!
Can Design : Sayem's responsibility

Script - funny, cringy, sarcastic, wholesome.

Introduction

[Title Page]

GReEtings Fellow GEEGEES! Yearning for a nice cool drink after a long day of work? Are you tired of drinking perfectly cold water right out of the fridge? Do you have nothing better to do other than to invest your hard-earned money on some questionable product created by a couple of sad and sleep-deprived first years?

Well, whether or not all of that applies to you…! [fake silly company name] PResents to you, the newly innovated, never seen before… 5K GEEGEE DRINK! It's the drink that cools... while you think!
Now this is no ordinary sports drink.. oh no, in fact, it's not a sports drink at all! This is a sweet cool self-cooling drink that's capable of cooling down 100ml of **water (remember, water)** down by 5 degrees celsius in less than 5 Minutes!! Just press that button on the bottom of the can and shake it!

[a series of lame, forced "WOW!"s in the background] ******

So What's the science behind this amazing product?? Well for one, this is all thanks to our best friend CHEmisTRy. ['Chemistry' is a character in the animation] Chem: "Hi, I'm ChEmISTRY their favourite subject! I'm totally **not** the reason for their eternal pain and sleep deprivation! Like... How would they have created this incredible, life changing, super significant product without me?! [show scene of sad, sleep deprived first years, with thumbs up being threatened with toy gun that's labelled "BAD GRADES - F"]"

Chemistry: Anyway, moving on, let's go deeper into the theory behind this 5K GEEGEE Drink!
[I point to P1 to speak]
P1: Huh? Oh uh, um… For one, it all starts with Enthalpy. So What IS enthalpy?? Simply put, enthalpy is the measure of energy in a thermodynamic system. It's the sum of the internal energy and the product of pressure and volume:

$$H = E + pV$$

where E is the internal energy of the substance, p is the pressure, and V is the volume.
In our case, the thermodynamic system used for our expiremention was a closed system; the calorimeter provided an isolated environment to prevent energy from escaping, AND it kept the

pressure and volume constant. With the calorimeter, we were able to measure the change in enthalpy!

P2: Now, enthalpy change is the thermal change that accompanies a chemical reaction at a constant volume or constant pressure. It indicates the amount of heat absorbed or released during the reaction. It is expressed by ΔH.

$$\Delta H = H_f - H_i$$

Where Hf is the final enthalpy of the products, and Hi is the initial enthalpy of the reactants.

For this experiment, we focused on 3 types of enthalpy changes:

- Enthalpy of dissolution
  - The enthalpy change when 1 mole of salt is dissolved in a solvent (in our case it was NH4Cl into water)
- Enthalpy of hydration
  - The enthalpy change when one mole of gaseous ions dissolve in water to form a solution
- Enthalpy of lattice dissociation
  - The energy released to create gaseous ions from one mole of salt (NH4Cl)

We found that the enthalpy of dissolution is the sum of the enthalpy of hydration and lattice dissociation.

$$\Delta H_{NH4Cl} = \Delta H_{LatticeEnergyNH4Cl} + \Delta H_{HydrationNH4Cl}$$

$$\Delta H_{NH4Cl} = 705 KJ/Mol + (-307\ KJ/Mol) + (-381\ KJ/Mol)$$

$$\mathbf{\Delta H_{NH4Cl} = +17\ KJ\ /Mol}$$

P3: Two of the three changes in enthalpy were exothermic, meaning energy was released: the lattice enthalpy of dissociation, and the enthalpy of hydration. The overall enthalpy of dissolution was endothermic, meaning overall, energy was absorbed into the system during the reaction.

Something to point out here is Hess's Law. Under constant pressure or constant volume conditions, whether it is completed in one step or several steps, the heat of reaction is the same; in other words, the heat of reaction of a chemical reaction is only related to the initial state and the final state of the reaction system and is independent of the route of the reaction.

Chem: So! My fellow first year friends, Why did you choose the salt NH4Cl (ammonium chloride) over NH4NO3 (ammonium Nitrate)?

P1: Well… I mean it's simply because we didn't want to risk our lives dying in an explosion creating this incredibly trivi---- I mean, incredible life-changing product!

P2: Yeah, you see, NH_4NO_3 is actually known as a deadly explosive agent and we didn't want to get sued or anything if someone were to get injured as a result of using our product.

P3: On the other hand, ammonium chloride can be used as an additive to some of the foods we eat, like licorice. Its health effects on humans is milder than that of what ammonium Nitrate can do, and it's not known as a deadly explosive oxidizing agent!

P1: NH_4Cl is also cheaper than NH_4NO_3; $62.40/500g for NH_4Cl and $64.62/500g for NH_4NO_3. So in terms of safety and cost wise, NH_4Cl just seemed like a better option overall.

P2: So what was our procedure for testing this product? In simple terms

1) We took a calorimeter, an empty aluminum can, and filled both with 100ml of water
2) We then added a secret* amount of NH_4Cl salt into the 100mL of water in the calorimeter and mixed the solution
3) Afterward, we placed the aluminum can into the calorimeter's salt solution and we placed a lid on top to ensure it was a closed system, then stuck a thermometer inside.
4) After 5 minutes, we checked to see if the drink cooled down by 5 degrees celsius.

We applied a very similar method of our procedure to our end product!

Chem: hey why did you keep the amount of NH4Cl added to the water a secret? I want to know how much you put in there! Also what were your results like?? Any errors and stuff?? C'mon spill it!

P3: Well, you can consider all that as part of our "secret formula" that we don't want to share to the public... So if you want to know the details of the procedure and how much mass we used or any other more detailed information for that matter, just refer to our report!

P1: Yeahhhh this is getting too long, let's end it here. The animator's animations are getting crappier by the second [animations are stick figures and poorly drawn].

P2: Oh no, where did my feet go??

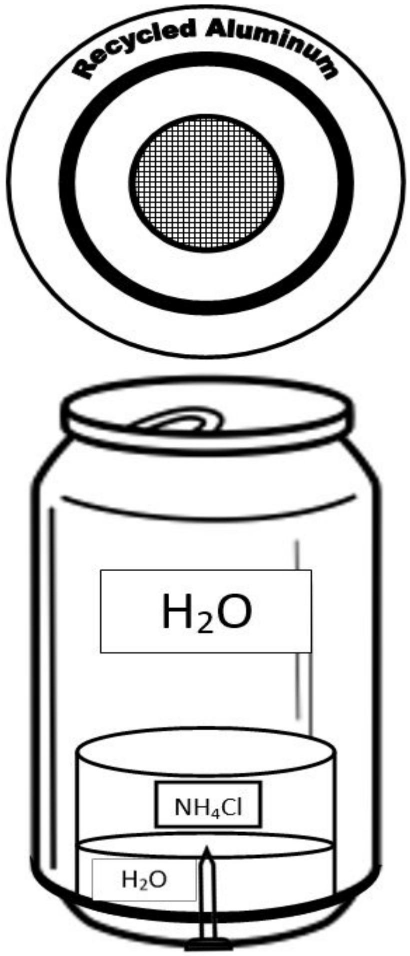
P1: MmmhMHMHhmMH !?!?!?!?!?!?! [mouth is gone]

P1 & P2 & P3 & Chem: AHHHhhhHhhh….!!! [disappear into blackness]

Catchy Jingle + super cool announcer voice
THE 5K GEEGEE DRINK! THE DRINK THAT COOL… WHILE YOU THINK!!
GET ONE NOW WHILE THE NON-EXISTENCE SUPPLIES LAST!

[END]

Creative Design:



Separate compartments for water and ammonium chloride at the bottom of the can which is independent from the drink itself. By applying pressure on the bottom of the can a pin punctures the ammonium chloride section allowing it to mix with water and thus create the cooling effect. Additional shaking/mixing may be required for maximal cooling.