Trial Notes:

1. To determine whether control was acceptable.
    a. Used all measurements in grams, weighed each ingredient.
    b. Whisked dry ingredients together in large bowl. Did 19 whips and one complete swirl around the bowl.
    c. Followed recipe exactly. Beat 129 grams of butter and 193.5 grams of sugar using electric beater. Started at power 3 for 56 seconds and moved power down to 2 and blended for 2 minutes and 59 seconds. We blended our wet ingredients into a smaller bowl. This made using an electric mixer more difficult and we lost product due to blender speed and the short height of the sides of the bowl.
    d. The recipe called for two large eggs; however, our lab facilities only provided small eggs. Therefore we changed our standardized recipe to two small eggs. We added these next and blended at power level 2 for 1 minute and 14 seconds. We added our wet ingredients into our bowl of dry ingredients because this bowl was larger. We learned that a big bowl was necessary for blending the wet ingredients because of the power of the electric mixer. A larger bowl was also necessary because adding dry ingredients into wet ingredients saved more product from sticking to the bowl during transfer. We had also been using a whisk to combine wet and dry ingredients because we used it to whisk the dry ingredients. However, we soon discovered that this was not an appropriate tool. Much of the product got stuck inside the whisk making the control of the number of strokes difficult as well as preserving the same amount of product. This tool was also ineffective at stirring the ingredients together.

e. Used standardized portioning tool that was too large. We only had what was available to the lab and this was the smallest one. Our cookies spread a lot so we had to pull them apart, which was not accurate because it was done by eye measurement. This pulling apart also aerated the cookies, creating a larger product. All cookies were different sizes.
f. The amount of sugar and cinnamon that was needed by the recipe to coat the dough balls before going into the oven was too large of a quantity and we wasted after this batch. We made a note to cut the quantities in half.
g. Used two ovens, experienced no problems.
h. Because these cookies were larger and different ovens were used, the cookies took longer than the stated time on our standardized recipe. We checked them at 12 minutes (what the recipe stated); however, they needed 6 additional minutes to achieve our chosen optimal color of golden brown. Since our lab was only open for a specific time frame we had to take the cookies out even though we felt they had not achieved optimal color and therefore were not fully cooked. We also needed to get to our next class on time and had packed our cookies into plastic containers and did not allow them to sit long enough. Since they did not sit out to cool for as long as we would have liked, we believe it contributed to them being too soft.
i. Tested tasting acceptability with 10 students as compared to 100% honey replacement. Found all students preferred 100% honey replaced over the control (regular table sugar). Students expressed that 100% honey replacement was softer

and more tender, without an overwhelming sweetness. But did think the 100% honey cookies were sweeter.

2. To attempt to bake cookies using honey as 100% of replacement for sugar. And to compare this with a control recipe.
    a. Used all measurements in grams, weighed each ingredient.
    b. Whisked dry ingredients together in large bowl. Did 19 whips and one complete swirl around the bowl.
    c. Performed the same steps as with the control recipe:
        i. Followed recipe exactly. Beat 129 grams of butter and 193.5 grams of sugar using electric beater. Started at power 3 for 56 seconds and moved power down to 2 and blended for 2 minutes and 59 seconds. We blended our wet ingredients into a smaller bowl. This made using an electric mixer more difficult and we lost product due to blender speed and the short height of the sides of the bowl.
        ii. The recipe called for two large eggs; however, our lab facilities only provided small eggs. Therefore we changed our standardized recipe to two small eggs. We added these next and blended at power level 2 for 1 minute and 14 seconds. We added our wet ingredients into our bowl of dry ingredients because this bowl was larger. We learned that a big bowl was necessary for blending the wet ingredients because of the power of the electric mixer. A larger bowl was also necessary because adding dry ingredients into wet ingredients saved more of the product from sticking to the bowl during transfer.

d. Once again had leftover sugar and cinnamon mixture for coating outside of dough. Even though we already learned through the control recipe that less sugar and cinnamon mixture was needed, we followed the original recipe exactly to keep as much control as possible.
e. Used two additional ovens to what was used in making the control. One of these ovens cooked significantly faster than the rest. The batch of cookies in this oven was overcooked to our standards: the texture was hard and the color was too dark. From this we learned that ovens in lab cook at different temperatures and therefore we need to use only one oven, even though it takes longer.

3. To re-make 100% honey cookies to optimal color and texture.
    a. Used all measurements in grams, weighed each ingredient.
    b. Whisked dry ingredients together in large bowl. Did 19 whips and one complete swirl around the bowl.
    c. While combining the sugar and butter to be blended, we accidently added the two small eggs to the mixture before blending. From this point forward we decided to continue adding the eggs first, before blending, because we knew that we had to re-make our control. This changed our routine for blending, the time that it took to blend the ingredients decreased. We also started at a lower power level to lose less product from the powerful beater speed. Set beater to power level 2 and beat for 2 minutes and 9 seconds. Previously we had made note of the electric beater we used, therefore during this trial we labeled and stored a beater in our designated storage cabinet for use in future trials. We also beat wet ingredients in a larger bowl.

d. When combining wet and dry ingredients. We added the dry ingredients to the wet ingredients and used a serving spoon (un-slotted) to mix them together, this made it easier and more precise when measure strokes and therefore controlling our product. We mixed them with 50 strokes.
e. In an attempt to control portion size we used a new portioning tool in lab. However, once we started we saw that the dough balls were still too large. In order to make a smaller cookie, we again pulled the dough balls apart with our hands. In this batch of cookies, we made sure that there was equal spacing between dough balls on the cooking sheets and that there was the same number on all sheets. Some cookies were slightly different sizes. Instructor approved our use of these for subjective trial, but made clear that we needed to use a controlled portioning tool for our objective tests.
f. Used half of original recipe portion of sugar and cinnamon as to not waste extra ingredients.
g. Scraped out dough, manually rolled into balls, coated two sides of ball with cinnamon and sugar mixture. Placed 3 rows of 4 dough balls on 16” x 14” flat baking sheet. Used only one oven. The cookies took 10 minutes to cook. They reached a golden brown color and optimal texture that we were striving for. These were the cookies used in subjective tests. Froze batch in sealed container, heated for 20 seconds in microwave wrapped in damp paper towel to add tenderness for final subjective tests.

4. To remake control because previous batch was undercooked.
    a. Used all measurements in grams, weighed each ingredient.

b. Whisked dry ingredients together in large bowl. Did 19 whips and one complete swirl around the bowl.
c. Followed previous trial routine of adding two small eggs to before blending and beating them with sugar and butter. Set beater to power level 2 and beat for 2 minutes and 9 seconds.
d. Scraped out dough, manually rolled into balls, coated two sides of ball with cinnamon and sugar mixture. Placed 3 rows of 4 dough balls on 16" x 14" flat baking sheet. Baked for 10 minutes in same oven.
e. Had not acquired proper portioning tool yet. Used same scooper as with previous trial, pulled apart dough balls. Some cookies were slightly different sizes. Instructor approved our use of these for subjective trial, but made clear that we needed to use a controlled portioning tool for our objective tests. Therefore these were the controls used in subjective tests.
f. Froze this batch in sealed container, tested tenderness after microwaving in a damp cloth for 20 seconds. Found successful. Decided to freeze all final products for subjective testing.

5. To try 50% honey in replacement of any sugar in a batch of cookies, test acceptability.
    a. Used all measurements in grams, weighed each ingredient.
    b. Whisked dry ingredients together in large bowl. Did 19 whips and one complete swirl around the bowl.
    c. Combined 2 small eggs, butter, and sugar. Set beater to power level 2 and beat for 2 minutes and 9 seconds.

d. Got properly sized portioning tool. Tool broke in that the metal piece that scoops the dough out no longer worked. We continued to use this tool because it allowed us to measure out each dough ball. After the dough balls cooked, they did not spread at all. We realized that when we were pulling apart each of the previous dough balls, air was going into the dough which allowed them to spread. Therefore when doing all of the subsequent trials we rolled the dough into balls, then patted down the tops when placed on baking sheet. This batch was overcooked because the dough balls were too small and they did not spread. We also when tasting decided it would not be acceptable and decided to use 75% honey, 100% honey, and our control in our final subjective and objective tests.

6. To try 75% honey in replacement of any sugar in a batch of cookies, test acceptability.
    a. Used all measurements in grams, weighed each ingredient.
    b. Whisked dry ingredients together in large bowl. Did 19 whips and one complete swirl around the bowl.
    c. Combined 2 small eggs, butter, and sugar. Set beater to power level 2 and beat for 2 minutes and 9 seconds.
    d. Used broken portioning scoop. We continued to use this tool because it allowed us to measure out each dough ball. After the dough balls cooked, they did not spread at all. We realized that when we were pulling apart each of the previous dough balls, air was going into the dough which allowed them to spread. Therefore when doing all of the subsequent trials we rolled the dough into balls, then patted down the tops when placed on baking sheet. This batch was overcooked because the dough balls were too small and they did not spread. We

needed to remake them because they were going to be part of our final objective and subjective tests.

7. To remake 75% because previous batch was overcooked.
    a. Used all measurements in grams, weighed each ingredient.
    b. Whisked dry ingredients together in large bowl. Did 19 whips and one complete swirl around the bowl.
    c. Combined 2 small eggs, butter, and sugar. Set beater to power level 2 and beat for 2 minutes and 9 seconds.
    d. Used broken portioning scoop to measure out balls. Scraped out dough, manually rolled into balls, coated two sides of ball with cinnamon and sugar mixture. Placed 3 rows of 4 dough balls on 16” x 14” flat baking sheet, gently stretched dough 2 cm to give slight aeration. Baked for 10 minutes in same oven. Instructor gave permission to use different portioning tool than 100% honey trial and control trial in subjective tests, as long as we used this portioning tool for the objective tests. Froze batch in sealed container, heated for 20 seconds in microwave wrapped in damp paper towel to add tenderness for final subjective tests.
8. Make ½ of recipe of control in order to do objective testing, using standardized portioning tool.
    a. Used all measurements in grams, weighed each ingredient.
    b. Whisked dry ingredients together in large bowl. Did 19 whips and one complete swirl around the bowl.
    c. Combined 2 small eggs, butter, and sugar. Set beater to power level 2 and beat for 2 minutes and 9 seconds.

d. Used broken portioning scoop to measure out balls. Scraped out dough, manually rolled into balls, coated two sides of ball with cinnamon and sugar mixture. Placed 3 rows of 4 dough balls on 16” x 14” flat baking sheet, gently stretched dough 2 cm to give slight aeration. Baked for 10 minutes in same oven. These were used for objective tests only.

e. Performed wetability and line spread test, both on baked product. When measured on its own, the control weighed 17.0 grams, then when soaked in 1 cup of water held down by finger for 10 seconds, the cookie weighed 23.4 grams more than its original weight, weighing 40.4 grams. For the line spread test, we measured the diameter of a randomly chosen cookie. Given the diameter, we calculated the area using the equation Area= πr^2. The diameter was 7.5 cm, therefore the area is 44.158 cm. We decided to measure the cooked cookie instead of the dough because we thought the spread of a cooked cookie was more significant to its acceptability than the spread of the dough.

9. Make ½ of recipe of 75% honey in order to do objective testing, using standardized portioning tool.
    a. Used all measurements in grams, weighed each ingredient.
    b. Whisked dry ingredients together in large bowl. Did 19 whips and one complete swirl around the bowl.
    c. Combined 2 small eggs, butter, and sugar. Set beater to power level 2 and beat for 2 minutes and 9 seconds.
    d. Used broken portioning scoop to measure out balls. Scraped out dough, manually rolled into balls, coated two sides of ball with cinnamon and sugar mixture.

Placed 3 rows of 4 dough balls on 16” x 14” flat baking sheet, gently stretched dough 2 cm to give slight aeration. Baked for 10 minutes in same oven. These were used in objective tests.

e. Performed wetability and line spread test on the baked product of 75% honey. In the wetability test, we weighed at 18.5 grams and after holding in a cup of water for 10 seconds by finger, it weighed in at 35.0 grams, which means it absorbed 16.5 grams of water. In the line spread test, the diameter of the cookie was 6.7cm, the area of the cookie using $A= \pi r^2$, was 35.2 cm.

10. Make ½ of recipe of 100% honey in order to do objective testing, using standardized portioning tool.
    a. Used all measurements in grams, weighed each ingredient.
    b. Whisked dry ingredients together in large bowl. Did 19 whips and one complete swirl around the bowl.
    c. Combined 2 small eggs, butter, and sugar. Set beater to power level 2 and beat for 2 minutes and 9 seconds.
    d. Used broken portioning scoop to measure out balls. This batch of dough was much runnier and stickier than any other batch thus far. We could not figure out why this had happened but used 1 tsp of flour for each cookie to stop them from spreading and oil leakage. This was still accurate because we knew that cookies with 100% honey spread significantly more than other cookies. Scraped out dough, manually rolled into balls, coated two sides of ball with cinnamon and sugar mixture. Placed 3 rows of 4 dough balls on 16” x 14” flat baking sheet,

gently stretched dough 2 cm to give slight aeration. Baked for 10 minutes in same oven. These were used in objective tests only.

e. Performed wetability and line spread test on 100% honey replaced baked cookies. We weighed one cookie in at 20.2 grams, and recorded an increase of 21.3 grams after submerging it in 1 cup of water by finger for 10 seconds. For the line spread test, we measured the diameter to be 8.1cm, using $A = \pi r^2$, we found the area of the cookie to be 51.5 cm.