

Oh, The Difference An “O” Makes!



V.S.



County: Bremer
Club: Tri-Rivers Trendsetters 4-H Club
Dept: Statics
Division: 104: Family & Consumer Sciences
Class: 10445: Food and Nutrition
Name: Willem Potter
Senior, 10th grade

a. What was your exhibit goal(s)?

(For the sake of avoiding confusion while reading, the word **macaron** will be green and the word **macaroon** will be orange.)

Both my mom and I really like baking. Not only do we bake together, but we also watch the show *The Great British Baking Show* together. My mom has taught me almost everything I know about baking, and we have a lot of fun baking together, learning about what we're making, and watching *The Great British Baking Show*. That's why when she decided to make **macarons** this summer, I became interested in them as well. Another factor in why I was interested in **macarons** is directly because of *The Great British Baking Show*. Watching it has made me more interested in trying out more difficult foods. It inspired me to make a French pear tarte last year for the fair, and **macarons** sounded like a fun challenge. In fact, when my mom and I looked up what the most difficult pastries to bake are, **macarons** were listed as number one.

Macarons are a very interesting pastry and cookie, but they can be annoying. Often times they will simply not work when you're baking them for no apparent reason, even though you seem to be making them in a way that has worked before. That, however, is not the most confusing part about the **macaron**. The confusion lies in the fact that there is another type of cookie called the **macaroon**. The two cookies have one letter difference, but they are drastically different cookies. When I tried looking up **macaroons** I was met with information about **macarons**. This really made me wonder what the differences were between **macarons** and **macaroons**. My goal for this project was to learn about the many aspects of **macarons** and **macaroons**, like their ingredients, difficulty to make, taste, etc., and how the two cookies were different. It was really interesting to learn about the similarities and differences the two cookies have. Then, I wanted to put the information I learned about them onto a tri-fold so that I could teach other people what the difference is between **macarons** and **macaroons**. That way they would know which cookie they're talking about when met with either a **macaron** or a **macaroon**.

b. How did you go about working towards your goal(s)?

After my mom made her first batch of **macarons**, I decided to try looking up some basic information about **macarons** and **macaroons**. However, when I tried looking up “**macaroons**” I was met with pictures and information about **macarons**. This just made me more interested in the subject as even Google didn’t seem to know the difference. Google wasn’t the only thing that got the two cookies confused. When I looked up **macaroons**, lots of people listed recipes or pictures of **macarons** and called them **macaroons**. I eventually learned that in order to find information about **macaroons**, one should look up “coconut **macaroons**”, because more people and websites consistently meant and had information about **macaroons** when the word coconut is used. That was helpful as it allowed me to do some more in-depth research on the difference between **macarons** and **macaroons**.

I found many websites that were helpful in learning the difference between the two cookies. (the websites I used will be listed later under “Sources” and is also located on my trifold). The information I wanted to learn included what the main difference is when it comes to ingredients, preparation, and baking of the cookies. A major step in my process of learning this information was actually making both **macarons** and **macaroons**. I made both **macarons** and **macaroons** several times to make observations about them. Based on making them myself, I learned the following:

SIMILARITIES

- Both cookies called for just the egg white, and both recipes can call for a meringue.
- Both had fairly similar ingredients, overall, except for coconut and almond flour.
- Both were a similar size.

DIFFERENCES

Difficulty:

- **Macarons** are a far more difficult cookie to make correctly.
- **Macaroons** required far less precision.

Time:

- **Macaroons** took far less time to make.

Ingredients:

- **Macarons** focused on almond flour, while **macaroons** focused on coconut.

Texture:

- **Macaroons** seem far chewier.

I also made a batch of **macarons** and a batch of **macaroon**s that I donated to a family friend who recently had surgery. She said that she really appreciated them and enjoyed them.

After I had made a couple of batches of both types of cookie, I began my internet research to see what other information there was. A really great website I found was Sherri's Berries as it had a very helpful and easy to follow graphic of some the basic differences between the two cookies. Once I had acquired some of the basic information about the cookies, I chose what would be the most important information to be on my tri-fold, namely, the ingredients and difficulty in baking, some of the aspects of the cookies like flavor and texture, and some other bits of information people might like to know like calorie count and cost.

Following my gathering of information about the making of the cookies and their qualities, I started searching for information about their histories. This was a much more difficult process, as I found conflicting information on different websites. For example, when I searched on Wikipedia for **macarons**, I found information about how **macarons** were created and brought to popularity by French nuns seeking refuge during the French revolution who were called the **Macaron** Sisters. Then, when I tried looking up information on the history of the **macaroon**, I found the same story, but it had been changed the nuns' names to the **Macaroon** Sisters. Because of this confusion, I decided not to use Wikipedia as a source and to use other websites. The history of the **macaron** was fairly consistent across multiple websites, and I later realized that the Wikipedia page on **macarons** likely had the correct history, but I still didn't count Wikipedia as a source. The history of the **macaroon** had more discrepancies across different websites, but I did end up finding a history that seemed to be consistent across many websites.

Once I had all of the information that I needed, I started to design my tri-fold in Google Slides. To do so, I looked up what the standard dimensions are of a tri-fold display board. I tried checking the Elmer's website, but I couldn't find a specific answer because there were so many sizes and types of boards. Instead, I tried measuring some of the extra tri-fold board that I had, and the dimensions I got matched up with one of the board's dimension I found online. I then went to the page setup for the Google Slides I was working on and changed it to match the dimensions of the board I had just measured. Then, I added lines in the locations of where the tri-fold bends so I knew exactly where everything would be. I then began putting the information I had found and organized into the Google Slides in a way that looked nice and conveyed the information well. I used Google Images with the labeled for reuse search tool to find the pictures I used. While I did this, I made sure to put accent colors behind all of the

information because I knew when I printed out the information, I would glue the paper onto an accent color, and I wanted to make sure that everything would still fit on the tri-fold. I chose to have my accent color be purple because I have been making lavender macarons, and the purple worked nicely with the black and was visually appealing.

The way I approached designing my tri-fold was that I wanted to make it almost like a Venn diagram with macaron information on the left side of the board and with macaroon information on the right side of the board. This was to make it so that when someone is looking at the tri-fold they wouldn't get the information confused. Because I wanted to directly compare the two cookies, I made the two sides have the same format so it would be easy to compare the information at a glance. It also gave the tri-fold a good visual balance as well as a balance of information. I approached the center section of my tri-fold with the same idea. The center is designed to be a quick summary that covers the basic information about the two cookies in a simple and easy to understand way.

When I had my tri-fold fully designed in Google Slides, I began to convert the information from my trifold over to a Google Doc at the same size as it was in the Google Slide and printing my information. This made sure that the information matched the size it was on the Google Slides so I knew that the font size would work. I had a little bit of trouble with the title fitting on my real tri-fold, so I reduced the font size a bit, but everything else fit exactly like it was supposed to. I did have to trim down the size of the accent colors for it to fit on the tri-fold, but I did eventually get it to fit. Once everything was printed and trimmed down to the correct size, I began to glue the information with its accent color down. I used a ruler to try and make sure that the information was as centered as possible on the tri-fold.

While I used comparison information that I found online for the two cookies, I made both kinds and found the following:

	Cost	Calories	Time to Make
Macaron	\$0.16/cookie	103/cookie	4 hours
Macaroon	\$0.07/cookie	49/cookie	30 min

After I finished my trifold, I wrote up my project in Microsoft Word.

c. What were the most important things you learned as you worked towards your goal(s)? I learned:

1. That **macarons** are made specifically using almond flour as it gives it a **macaron** its unique flavor and texture. The amount in the batter also affects the moisture in the cookie.
2. That **macarons** are considered one of the most complex pastries to make because of how exact and precise you have to be making it.
3. That **macarons** were a French variation of an Italian cookie called a “macarone”. The **macaron** was a variation as it used almond flour and later became a sandwich cookie.
4. That **macaroons** were a U.S. variation on the **macaron**, that used coconut as the main ingredient instead of almond flour.
5. That overall, **macarons** and **macaroon** are very different cookies.
6. That a lot of people confuse these two cookies.
7. That many things can go wrong when making a **macaron**, such as them not having feet, being too runny, being hollow, being not smooth on top, or exploding. This happens because there are many variables to control, including the meringue consistency, time, temperature, etc.
8. How easy it is to make **macaroons**. In one recipe I used, it only had two steps: mix ingredients together and bake. It only took about a half an hour.
9. That lavender can be used in baking. It comes as a dried flower that gets ground up into a finer consistency and sifted.
10. How to use a piping bag. I had to pipe both the batter and the butter cream.
11. That cream of tartar and vinegar are used to stabilize egg whites.
12. That there are different types of peaks a meringue can be.
13. What a French meringue is, and how to make a French meringue.
14. What an Italian meringue is and how to make an Italian meringue.
15. That the base of the **macaron** is called its foot.
16. That **macarons** cost more to make because almond flour is expensive.
17. How to condense and organize information in a comparison format that is easy to take in and understand.
18. That both cookies are delicious and more economic to make at home than to buy.

Sources

- Shari's Berries: <https://bit.ly/2C5IS8L>
- Food Network: <https://bit.ly/2YYsG2e>
- ChefSteps: <https://bit.ly/38FywsF>
- The Spruce Eats: <https://bit.ly/2ZEnnE3>
- Taste of Home: <https://bit.ly/2DFGBIn>
- Mildly Meandering: <https://bit.ly/3jbNXxA>
- Indulge with Mimi: <https://bit.ly/3fB2ZdR>
- Google Images, Labeled for Reuse

Recipe for Lavender Lemon Macarons, Meringue Recipe Adapted from the website “Indulge with Mimi”, Lemon Buttercream Recipe Adapted from the website “Mildly Meandering.” My changes to the recipes are shown in red and are in parentheses. A blue strikethrough indicates that this was part of the original recipe, but was removed, not changed.:

Lavender Lemon Macarons

For the meringue:

2 tsp lavender buds
65g (130g) almond flour
55g (110g) powdered sugar/icing sugar
45g (90g) granulated sugar
50g (100g) egg whites, room temperature
1/8 tsp (1/4 tsp) cream of tartar
Purple gel food coloring

For the lemon (honey) buttercream:

1/2 cup unsalted butter (salted butter)
1 3/4 cup powdered sugar
(1 tsp honey)
(2 tsp lemon zest)
1/2 tsp (2 tsp) fresh lemon juice
(a pinch of salt)
Yellow gel food coloring (2 drops liquid yellow food coloring)
(1 Tbsp water)

To pipe the meringue and the buttercream:

Large piping bag
Size 12 piping tip

To make the meringue: Prepare three pieces of parchment paper by drawing a 4x6 of circles about an inch in diameter. Separate the whites from the yolks from eggs until you have 100g. Let sit out so they can come to room temperature. Pulse lavender buds in a coffee or spice grinder until fine. Sift lavender, almond flour, and powdered sugar together in a medium sized bowl. Make sure that there are no large clumps present. Discard any large pieces of almond if necessary. Once egg whites are room temperature, put them in a large bowl and whip on a low-medium speed. Add cream of tartar to egg whites when they become foamy, then increase speed to medium. Once the whisk starts to leave tracks in the egg whites, add granulated sugar a little at a time. Turn the speed up to a medium-high and whip until firm peaks, stop mixer and add gel food color if desired. Continue whipping on medium-high until stiff peaks. Fold the dry mix and

meringue together until the batter becomes a “lava” or honey-like consistency. Transfer batter into a piping bag fitted with a #6 (#12) round piping tip. Pipe batter onto the parchment paper on the opposite side of the parchment paper as then the circles were drawn on; keep the piping bag vertical and to make each shell a consistent size and without a defined point as you pull the piping bag away. Rap the tray hard on the counter to remove excess air bubbles. Wait until the shells become completely dry before baking. (This can be anywhere from 20-40min. It changes every time you make them.) This is a critical step to prevent the batter from escaping from the center. Bake at 325°F (250°F) for 12-14 min (for approx. 17 min, then rotate the pan and put back in for 5 min.) (Oven temperatures do vary from oven to oven, this is what I found to work for me.) Macarons should have a distinct foot, the top doesn't wiggle, and the bottom is not brown. Once baked, let cool completely before removing from the baking mat/parchment paper.

To make the lemon buttercream: While macarons are cooling, start on the filling. In a large bowl, whip butter using a mixer. Add in the powder sugar, salted butter, lemon zest, lemon juice, water, and food coloring and continue to whip until well combined. If the buttercream needs to be thickened, add more powdered sugar. If the buttercream needs to be thinned, add more water or lemon juice.

To assemble cookies: Find cookies of similar size and shape and put them in pairs together. Put lemon buttercream into a piping bag with a size 12 piping tip. Pipe a layer of buttercream onto one shell, starting in the middle and spiraling outward. Place the other shell on top of the frosting, pressing together enough to get the two shells to stick together. Repeat for the rest of the shells.

While macarons do taste very good immediately after being baked, they do not have their ideal texture immediately. The buttercream is often too soft and the macaron shells might be hard after being baked. This can lead to the frosting mushing out of the cookie as you bite into it. Instead, let the macarons sit in the refrigerator, anywhere from an hour to a day. This will firm up the buttercream and give the macaron shells a bit more moistness, ensuring the buttercream doesn't burst out when eating.

Cost Per Serving:

	Ingredients	Quantity/ Batch	Cost
Lavender Lemon Macarons	Lavender buds	2 tsp	\$0.21
Makes 30 macarons	Almond flour	130g	\$2.01
	Powdered sugar	260g	\$0.46
	Granulated sugar	90g	\$0.11
	Egg whites (on sale)	100g	\$0.30
	Cream of tartar	1/4 tsp	\$0.04
	Salted butter	1/2 cup	\$0.92
	Lemon (on sale)	1	\$0.79
	Purple gel food coloring	1 smear	\$0.04
	Yellow liquid food coloring	2 drops	\$0.02

TOTAL/BATCH		\$4.90
Cost per serving		\$0.16

Nutrition from www.Sparkpeople.com:

Nutrition Facts	
30 Servings	
Amount Per Serving	
Calories	103.2
Total Fat	5.6 g
Saturated Fat	2.1 g
Polyunsaturated Fat	0.7 g
Monounsaturated Fat	2.4 g
Cholesterol	8.3 mg
Sodium	27.4 mg
Potassium	47.5 mg
Total Carbohydrate	12.8 g
Dietary Fiber	0.6 g
Sugars	11.7 g
Protein	1.5 g
Vitamin A	1.9 %
Vitamin B-12	0.1 %
Vitamin B-6	0.0 %
Vitamin C	0.5 %

Vitamin D	0.5 %
Vitamin E	0.3 %
Calcium	0.1 %
Copper	0.0 %
Folate	0.0 %
Iron	0.0 %
Magnesium	0.0 %
Manganese	0.0 %
Niacin	0.0 %
Pantothenic Acid	0.1 %
Phosphorus	0.1 %
Riboflavin	0.2 %
Selenium	0.1 %
Thiamin	0.0 %
Zinc	0.0 %

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Recipe for **Macaroon**, from “TasteofHome.com”:

Coconut Macaroons

Ingredients:

1 1/2 cups shredded coconut (The recipe from the website “Taste of Home” calls for 1 1/3 cups, but I found more success using 1 1/2 cups)

1/3 cup granulated sugar

2 Tbsp all-purpose flour

1/8 tsp salt

2 large egg whites, room temperature

1/2 tsp vanilla extract

To make the macaroons:

1. In a small bowl, combine the coconut, sugar, flour and salt. Add egg whites and vanilla; mix well.
2. Drop by rounded teaspoonfuls onto greased [baking sheets](#). Bake at 325° for 18-20 minutes or until golden brown. Cool on a wire rack.

Cost Per Serving:

		Quantity/	
	Ingredients	Batch	Cost
Macaroons	Shredded coconut	1 1/2 cups	\$1.33
Makes about 24 macaroons	Granulated sugar	1/3 cups	\$0.08
	All-purpose flour	2 Tbsp	\$0.02
	Salt	1/8 tsp	\$0.01
	Egg whites (on sale)	2	\$0.06
	Vanilla extract	1/2 tsp	\$0.08

TOTAL/BATCH		\$1.58
Cost per serving		\$0.07

Nutrition from www.sparkpeople.com:

Nutrition Facts	
24 Servings	
Amount Per Serving	
Calories	49.3
Total Fat	2.5 g
Saturated Fat	0.0 g
Polyunsaturated Fat	0.0 g
Monounsaturated Fat	0.0 g
Cholesterol	0.0 mg
Sodium	31.7 mg
Potassium	5.5 mg
Total Carbohydrate	6.8 g
Dietary Fiber	0.5 g
Sugars	2.8 g
Protein	0.9 g
Vitamin A	0.0 %
Vitamin B-12	0.0 %
Vitamin B-6	0.0 %
Vitamin C	0.0 %

Vitamin D	0.0 %
Vitamin E	0.0 %
Calcium	0.0 %
Copper	0.0 %
Folate	0.0 %
Iron	0.1 %
Magnesium	0.0 %
Manganese	0.0 %
Niacin	0.2 %
Pantothenic Acid	0.0 %
Phosphorus	0.0 %
Riboflavin	0.1 %
Selenium	0.0 %
Thiamin	0.2 %
Zinc	0.0 %

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Top: Some of the accidents I had when trying to separate the yolks from the whites of my eggs when making my first batch of **macarons**.



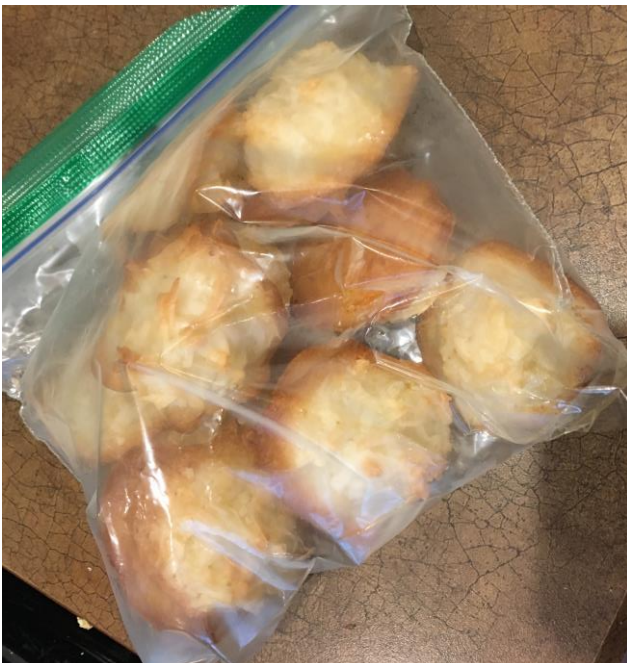
Bottom: The first batch of **macarons** I made that called for meringue.



Top: The first batch of **macaroons** I made. This recipe used a meringue, which is the reason they were so light and fluffy.



Bottom: My second batch of **macaroons**. I used a different recipe that didn't call for meringue. However, there was too much liquid and not enough solids so there was a slight puddle around



Top: Beginning my third batch of **macarons** by separating the white from the yolk because the recipe calls for only egg white. I did this first as the egg whites should be room temperature.



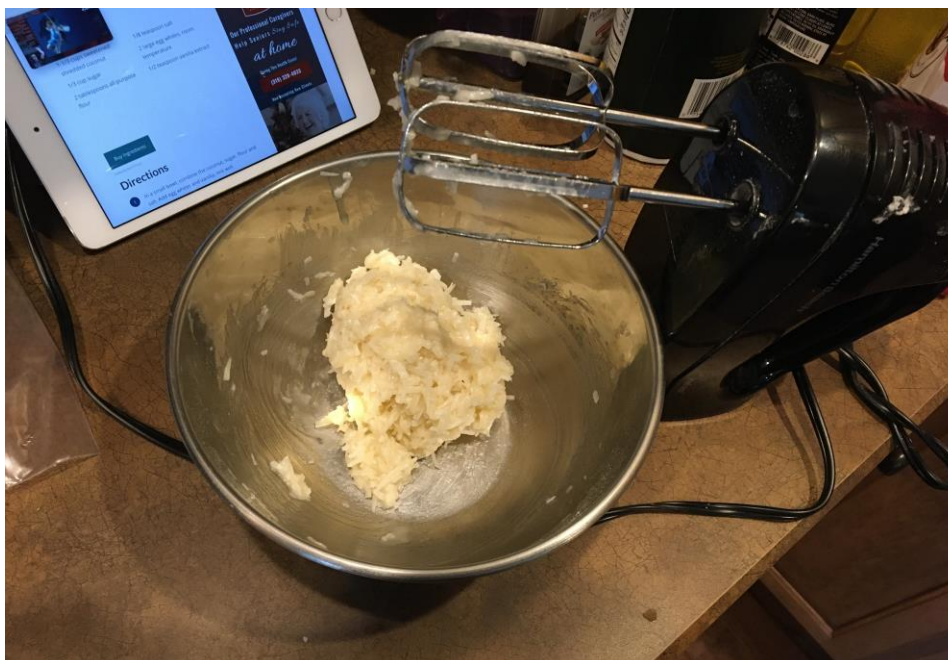
Bottom: Mixing the dry ingredients together. I decided to use more coconut to make the coconut stand out more and to help absorb more of the liquids.



Top: Mixing the wet ingredients into the dry ingredients.



Bottom: Finished cookie dough after mixing wet ingredients into dry ingredients.



Both Pictures: Scooping out rounded teaspoons of dough onto a cookie sheet. I didn't have enough dough to make all the cookies even, so I tried making two of the cookies bigger to see if they would bake different.



Top: Macaroons in the oven to bake.



Bottom: My finished third batch of macaroons.



Top: One of my first batches of **macarons**, waiting to bake so they can form a skin.



Bottom: The same batch as picture above after baking. This was the biggest failure I had when making **macarons**.



Top: Preparing the parchment paper by drawing on an 8x10 of 1-inch diameter circles.



Bottom: Grinding the lavender buds in a coffee grinder.



Top: Sifting the lavender buds after they were grinded in the coffee grinder.



Bottom: Sifting the almond flour to prevent clumps and measuring the sifted almond flour using an electric scale.



Top: Sifting the dry ingredients together to prevent clumps.



Bottom: Starting to whip the egg whites into meringue.



Top: The meringue firming up as it is whipped.



Bottom: Folding the dry ingredients into the meringue.



Top: Piping **macarons** onto a baking sheet using the grid on the parchment paper as a guide.



Bottom: **Macarons** in the oven baking.



Top: Peeling the zest off a lemon for the lemon buttercream frosting that goes in a macaron.



Bottom: Piping in the lemon buttercream into the macarons.

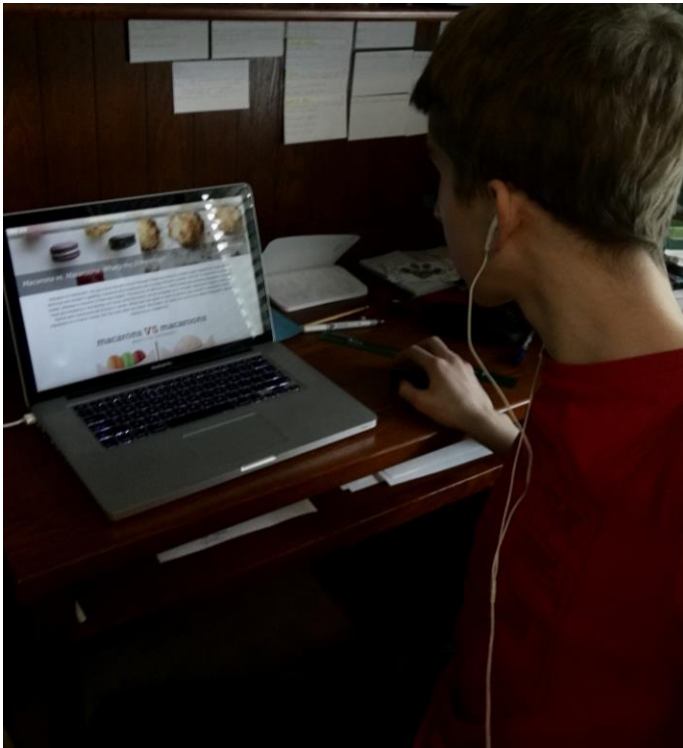




Top: Putting the top half onto a **macaron**.



Bottom: Doing research online about **macarons** and **macaroons**.



Top: My tri-fold completed in real life on a black tri-fold board. I used the fonts and measurements from the digital version to make the real life one. I used rubber cement to glue the pictures/information to the purple paper, and then more rubber cement to glue the combined paper to the tri-fold.

