

# Angel Food Cake



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Class 10445 - Food and Nutrition: Educational Display

# Project Write-Up

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**Project Area:** Food and Nutrition: Educational Display - Family and Consumer Sciences

**Project Name:** Angel Food Cake

**Goal:** My goal was to find the best, most consistent angel food cake recipe. I wanted to not only find a great tasting recipe, but also a recipe that provided consistent, reliable and eye appealing results. I also wanted to understand and learn more about the science behind making an angel food cake. I hoped to add to my baking knowledge as I know there are several types of cakes in addition to angel food, that use egg whites to achieve their rise. In addition, although I have baked a lot, I had never made an angel food cake before I started this project.

**Process:** I looked online for angel food cake recipes to try. At first, I followed the recipes word for word in order to test out different “theories” regarding the best way to make an angel food cake. Although most angel food cakes are very similar in their ingredients: egg whites, flour, sugar, salt, cream of tartar, flavoring (vanilla, almond or lemon) not all include water or mix the ingredients in the same order. I tried recipes that were all different from each other, to determine what recipe made the best angel food cake.

## **What I learned:**

- I learned that when making angel food cake you always use egg whites because it gives the cake the lift it needs. If you were to use the yolks it would make the cake too dense.
- I learned that it is better to use cake flour because it has a lower protein content, so the cake will be more tender. There are recipes that call for all-purpose flour that make fine angel food cakes, but they tend to be less tender. My grandmother uses all-purpose flour and although she is a great baker, I think my angel food cake with cake flour is a little better than hers.
- I learned to run a small knife through the batter in the pan before placing it in the oven, this pops any air bubbles that may be in the batter.
- I learned that angel food cakes need to cool upside down. This is because the spongy structure of the cake will collapse if it is flipped before it has completely cooled. Many angel food cake pans have “feet” just for this purpose. These feet allow you to cool the cake upside down without the cake touching the table, plate etc. This allows for air to circulate around the cake helping it to cool. I also learned that it takes about 2 hours for an angel food cake to cool completely.
- I learned that you do NOT grease the angel food cake pan because it needs to be able to cling to the sides of the pan in order to rise properly. Although some angel food cake pans are non-stick, pans that are aluminum allow the cake to cling to the sides of the pan when rising. Other types of cakes require pans to be greased and floured in order for the cake to not stick to the pan.
- I learned that the eggs need to be at room temperature, because if the eggs are too cold they won't whip as well. The room temp of the eggs helps it to whip to a greater volume.

- I learned that a common tip for separating egg whites is to use eggs right out of the refrigerator as it makes it easier to separate the yolk from the egg white. This is also important if you plan to use the egg yolks at a later time, as you would not want to place room temperature yolks back in the fridge, they would need to be used right away.
- I learned that you need to be careful not to over whip the egg whites, if you do the cake will be chewy and dense. By testing how the meringue “peaks” you can determine if the egg whites have been adequately beaten. If the peaks of the egg whites lean or drip down it is too soft, you want the egg whites to stand up. However, you need to also make sure that the egg whites are still glossy, once the egg whites lose their glossiness you know they have been beaten too long.
- I learned that instead of stirring the egg whites when you add the dry ingredients, you need to need to fold the dry ingredients into the egg whites. Otherwise you will ‘deflate’ the egg whites and prevent the cake from rising. Folding is when you bring the bottom of the batter up and over the top, similar to a “J” shape.
- I learned that you shouldn’t open the oven while your cake is cooking, because the temperature changes can cause the cake to fall and not cook evenly.
- I learned that you want to sift your dry ingredients to ensure that there are no clumps in the batter, it helps to keep the volume of the batter consistent. Be sure to read the instructions, for example one cup of sugar sifted means you measure the sugar and then sift it. If the instructions say one cup of sifted flour, it means you sift and then measure the flour.
- I learned that the angel food cake rises because the heat is trapped inside the bubbles formed when whipping the egg whites. This is why it is crucial that you whip your eggs the right amount, if you are off, evenly slightly on either side the cake will not turn out as nicely.
- I learned that the cream of tartar acts as a stabilizer in the cake. It helps to lower the pH of the egg whites, making it more acidic. This helps the eggs to maintain their shape and volume.
- I learned that when you make an angel food cake, there are lots of egg yolks left over. Instead of throwing them away, I decided to find something else to make with them. I know that you can make lemon curd with egg yolk, however, my family does not care for lemon curd, so I decided to look for something else. I came across a recipe for “Twelve Yolk Pound Cake”, so I decided to make that with my leftover yolks. (I have the recipe for this cake along with a couple pictures in the back of my write-up.)
- I learned that angel food cakes are not “perfect” in their appearance. I generally like to make foods that look “perfect” when they are finished baking. Because angel food cakes need to stick to the pan in order to rise, this means that the outside of the cake will not be completely smooth. In addition, unlike other cakes that are frosted, you can’t just cover up an angel food cake with frosting to disguise any imperfections. However, I did learn that you can “beautify” an angel food cake, by sprinkling it with powdered sugar to give it a more polished or finished appearance. I also learned that you can take a pastry brush to brush off any crumbs that remain on the cake after you remove it from the pan.
- I learned that my family loves angel food cake. It didn’t matter to them if the texture was slightly off due to over or under whipping the eggs. It didn’t matter to them if the cake was a little denser because I didn’t let it cool as long. To my family, the taste itself was the most important thing in choosing an angel food cake. (However, I still preferred the angel food cake with the perfect texture and color.)
- I learned that although most angel food cakes are made of very similar ingredients including egg whites, flour, sugar, salt, cream of tartar and flavoring the way in which the ingredients were combined created the biggest difference in the recipes.

- Some recipes called for sifted flour, others did not, I found that sifting the flour before measuring it provided the best results.
- Some recipes called for superfine sugar, others for sifted sugar, powdered sugar or just plain sugar, I found that sifted sugar provided the best results. (Note: due to the COVID Pandemic and the lack of some baking supplies in store, I was not able to test the recipes using superfine sugar.) Although I liked the taste of the cakes made with powdered sugar, I felt that the cake had a stickier texture.
- Some recipes called for room temperature water, others warned that adding water could affect the egg whites. I found that adding a little water (1 Tbsp to the egg whites, helped provide a consistent whip to the eggs.)
- Some recipes called for adding the salt directly to the egg whites, others called for adding the salt with the other dry ingredients. I chose to add the salt with the dry ingredients.

**Results:** I was very happy with the results of my project. After experimenting several with several recipes, I believe I found a recipe that makes a great tasting, consistent and reliable angel food cake. The cake held its shape, had a soft, airy, light, spongy texture and tasted wonderful.

**Conclusion:** I plan to use what I learned from this project to make more cakes in the future. I would also like to try flavored angel food cakes. I would like to make other sponge cakes and try making meringue cookies or pies. I was happy that I learned some additional skills regarding baking.

# Angel Food Cake Recipe

## Ingredients:

- 1  $\frac{3}{4}$  cups egg whites
- 1 tbsp. Water
- 1  $\frac{1}{2}$  tsp. Cream tartar
- $\frac{1}{2}$  tsp salt
- 2 tsp. Vanilla extract
- 1  $\frac{1}{2}$  cups sugar (Divided,  $\frac{3}{4}$  cup for egg whites,  $\frac{3}{4}$  cup for dry ingredients)
- 1 cup sifted cake flour

## Directions:

1. Combine egg whites and room temp. Water in a mixer and start on medium speed.
2. As the eggs get frothy, add cream of tartar, salt, and vanilla extract. Beat until you see soft peaks.
3. Increase the speed to medium-high and add sugar one tablespoon at a time. Beat until you see stiff peaks.
4. Transfer to a bigger bowl. Sift the sugar and flour at least 3 times previously to avoid clumps. Sift over your batter in batches then fold the sugar/flour mixture into the batter.
5. Transfer into a tube cake pan. Spread the batter evenly with an offset spatula.
6. Remove the batter from the top of the pan with your finger. Then take a knife and move it through the batter.
7. Bake for 35-40 minutes at 350 degrees F with the rack in the middle of the oven.
8. Invert the pan to let the cake cool. Then take a frosting spatula and glide this around the outside of the cake, allowing it to fall out of the pan. Spin the spatula around the bottom of the pan and use a smaller knife to remove the center tube.

Recipe Courtesy of: "His Clever Tricks Result in Perfect Angel Food Cake Every Time." *TipHero*, 8 Apr. 2016, [tiphero.com/perfect-angel-food-cake](http://tiphero.com/perfect-angel-food-cake).

# Angel Food Cake - Step-by-Step Pictures





Add 1 ½ Teaspoons of Cream of Tartar to Egg Whites



Add ½ Teaspoon of Salt to Egg Whites

Add 2 Teaspoons of Vanilla to Egg Whites



Beat on Medium Speed Until You See Soft Peaks



Beat on Medium Speed Until You See Soft Peaks



Increase Speed to Medium High and Add Sugar One Tablespoon at a Time (total of ¾ cup)





Add 1 ½ Teaspoons of Cream of Tartar to Egg Whites



Add ½ Teaspoon of Salt to Egg Whites



Add 2 Teaspoons of Vanilla to Egg Whites

Beat on Medium Speed Until You See Soft Peaks



Beat on Medium Speed Until You See Soft Peaks



Increase Speed to Medium High and Add Sugar One Tablespoon at a Time (total of ¾ cup)





Sift the Flour and Sugar Together at Least 3 Times



Sift Flour and Sugar Mixture Over the Batter in Batches



Fold the Flour and Sugar Mixture Into the Egg Whites



When Combined, Spoon the Batter into the Pan



Spread the Batter Evenly in the Pan



Remove Batter From Edge of Pan With Your Finger



Use a Thin Knife to Move Through the Batter to Remove Any Air Bubbles/Pockets



Remove From Oven and Turn Cake Upside Down to Cool



Once Completely Cooled Take a Frosting Spatula Around the Outside of the Pan to Allow Cake to Fall Out of Pan



Angel Food Cake



Cut With a Serated Knife to Avoid Smushing the Cake



Angel Food Cake





Sifted Flour vs Unsifted Flour



Don't Throw Them Away!  
Save the Yolks and Use Them For Another Recipe

# Twelve Yolk Pound Cake Recipe

## Ingredients:

- 12 large egg yolks room temp
- 3 cups all-purpose flour
- 2 ½ teaspoons baking powder
- ½ teaspoon salt
- 2 cups granulated sugar
- 1 teaspoon vanilla
- 1 cup cold water

## Directions:

1. Prepare a 10-inch tube pan or 12 cup bundt pan with nonstick spray.
2. Preheat the oven to 350 degrees F.
3. Sift flour, baking powder, and salt together.
4. In a mixing bowl, beat egg yolks until very fluffy and thick.
5. Gradually, beat in sugar and beat 2 minutes on high speed, stopping to scrape the bowl.
6. Reduce speed to low and add vanilla and cold water.
7. Gradually, but quickly add sifted flour mixture while beating on low, scrape bowl.
8. Beat only long enough to blend, about 2 minutes.
9. Pour batter into a prepared pan.
10. Bake 50 to 60 minutes or until golden brown or when a pick inserted in thickest portion of cake comes out clean or with dry crumbs.
11. Cool cake for 15 minutes on a wire rack before removing from the pan. Loosen the sides of the cake from the pan with a spatula, then remove from the pan. Cool completely on the wire rack.
12. Store in an airtight container 4 days or on countertop or 1 week in the refrigerator.

Recipe Courtesy of: Paula, et al. "Twelve Yolk Pound Cake Recipe from Call Me PMc Blog." *Call Me PMc*, 30 Mar. 2020, [www.callmepmc.com/twelve-yolk-pound-cake/](http://www.callmepmc.com/twelve-yolk-pound-cake/).

# Twelve Yolk Pound Cake - Step-by-Step Pictures





Prepare Pan Using Cooking Spray and Flour



Pour Batter Into Prepared Pan

Finished Pound Cake

