



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

<b>Name(s)</b>  <b>Lucile Allen</b>	<b>Project Number</b>  <b>J0602</b>
<b>Project Title</b>  <b>How to Build a Better Cupcake</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> I love to bake and enjoy sharing my baked creations with my friends and family. I especially like baking cupcakes and cakes and my friends love eating them. Unfortunately, cupcakes are high in saturated fats and sugar and contain little fiber or protein. This results in a food item that is not very good for you and can cause blood sugar highs and lows when you eat them. But what if cupcakes could be good for you? For my science fair project, I decided to investigate whether I could create a healthier cupcake that is still delicious. My plan was to try and make a recipe for a cupcake that was better for you, but that still tasted like a cupcake and not a vegetable. The question for my project was is it possible to create a healthy cupcake that still tasted good. My hypothesis was that by substituting healthier ingredients, I could create a cupcake that would be better for you but still tasted good.</p> <p><b>Methods</b> After picking my project, I researched what was unhealthy in cupcakes using medical and nutritional web pages and journal articles (see background section for details) and then searched for substitutions for those ingredients. Based on what I learned I decided to focus on three areas to increase the nutritional value of cupcakes: reducing processed sugar, reducing saturated fat, and increasing fiber and protein. In my experiment I started by creating four recipes that had healthy substitutions for fat, sugar and provided added protein and fiber. That resulted in cupcakes that didn't rise and were inedible. In the next phase of my experiment, I tried recipes with gradual substitutions: standard recipe, standard recipe + healthy sugar, standard recipe + healthy sugar and added fiber and protein, standard recipe + healthy sugar, added fiber and protein + healthy fat. Once I had 3 modified recipes that tasted o.k. I taste tested them on 20 kids and 22 adults.</p> <p><b>Results</b> The original recipe received the highest average ratings in all evaluations except for texture. All the recipes except recipe 7 got over a seven out of ten in the overall rating showing that the healthy recipes were still edible and considered by participants to taste good. Sweetness was the factor most negatively affected by my substitutions with the original recipe rating at a 7 and the healthier recipes rating at 5 to 5.5. Recipe 6, which had honey instead of sugar and almond flour, actually got a higher ranking in texture, and was a close second to the original in almost everything else. Over half of the participants chose the original recipe as their favorite while over a third of participants selected one of the healthier recipes as their favorite.</p> <p><b>Conclusions</b></p>	
<b>Summary Statement</b>  In my project I studied what was unhealthy in cupcakes and tried to use substitutions to create a healthier, but still delicious cupcake.	
<b>Help Received</b>  Kia Nesmith, Sue Sherwood, Christy Brigham (my mom), Mitch Allen (my dad)	