

# CHEESY MATH AND SCIENCE

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In order to answer the Driving Question “What is the optimal curdling agent to make the best cheese?” Biotech students made cheese by testing four curdling agents, looking at how long it takes each to curdle and how many curds it produces. The two best curdling agents were then tested using variable concentrations to determine the best concentration of the optimal agent. Math 3 students analyzed data and used statistics to determine the best curdling agent to make cheese based on four areas: amount of curds made, time to curdle, taste, and cost. Students found the average amount of curds made and the average amount of time it takes the curdling agent to produce cheese. They also took part in a blind taste test where they sampled the four cheeses that were made with different curdling agents. They took the taste test results from all classes and learned how to utilize Google Sheets to make histograms so that they could determine which cheese tasted the best. Finally, they used recipes and proportions in order to determine how much it would cost to use each curdling agent necessary to turn 100 gallons of milk into cheese. Together, students then analyzed the data to write a letter of recommendation to cheesemaker Donna Pacheco about which curdling agent would be the best to use.

## Teacher Reflections

**Biotech:** Biotechnology students learned about the history of cheese-making, types of curdling agents used to make cheese, and improvements on the cheese-making process initiated by the Biotechnology Industry. They then got to make the cheese and taste it. The students really enjoyed the hands-on cheese-making lab activity and going deeper into the study of something that is common but very interesting, and tasty! This project really showed the students how Biotechnology is used in everyday life, and was a great way to start out the year in an interesting, fun, and educational way.

**Math:** “Why do we have to learn this?” or “When are we ever going to use this in real life?” are common concerns that I am asked as a math teacher. This project allowed students to see where math can be useful to make real life decisions in the business world. The students were introduced to the Biotechnology industry and how it affects something we see on a day to day basis: cheese! The problem was open ended and challenging at the same time. This project was a learning experience for me as well since I have never collaborated with someone outside of my content area to create cross-curricular projects. It taught me how powerful integration can be and allowed me to explore content I would normally not be exposed to. For this project, I was fortunate to use my two externships to Monsanto and the Achadinha Cheese Company to make cheese and unbiased taste tests to help my students have a stronger project experience. Overall, it was a unique and fun way for students to apply mathematics in the real world.

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