



## DRIVING QUESTION

How can we use quadratic functions and systems of equations to help a North Carolina farm maximize profit while balancing land, labor, and environmental constraints?

## PROJECT SUMMARY

Students will be asked to research the local market to find farm lands for sale with teacher feedback. Budgets will be randomly distributed to groups. Students will then create a mathematical model using quadratic functions and systems of equations/inequalities in order to optimize how much of each crop they will grow. Lastly, using their models, they will decide what to recommend to the farmers for the balance of corn versus soy bean crops based on their budgets, labor limitations, and environmental limitations.

## REAL-WORLD CONTEXT

Farmers have to decide what crops to grow and how much of each based on their real-world constraints. Also, there isn't always an exact answer so they have to make their best judgement based on the facts they have. Some students might be interested in running their own businesses someday, so it shows them how to analyze real world data through mathematical models to help make decisions that benefit the company. While the data is made up for the crops, students will use skills such as searching the market to investigate what land they would purchase and what that means for their acreage.

## PRODUCTS & AUDIENCE

Students will share their presentations with local farmers.

## STUDENT REFLECTIONS

- "The group contract was the most helpful, especially with the firing protocols. My group was able to successfully fire someone who was not being helpful towards the group, which teachers rarely do."
- "Having attendance expectations in our group contract was super helpful. When another person wasn't in school, we made sure to reach out by email or in our Google docs, which added a level of professionalism."
- "It would have been better if we had animals to play with instead of crops just for cuteness!"
- "One important skill that I improved for both my program area and my future career is teamwork. Being able to work with people you met about a few weeks prior is definitely a needed skill when, for example, getting a job."
- "I learned how to take leadership to make the project start progressing."

## NC PORTRAIT OF A GRADUATE SKILLS GAINED

 COLLABORATION

 COMMUNICATION

 CRITICAL THINKING

 ADAPTABILITY

 LEARNER'S MINDSET

 PERSONAL RESPONSIBILITY

## TEACHER REFLECTION

"Overall, my students did what was asked of them. It was my first time doing this project, and it seems that students didn't connect what we were doing with quadratics with the project. Overall, it wasn't bad but I would love to improve it for next time!"