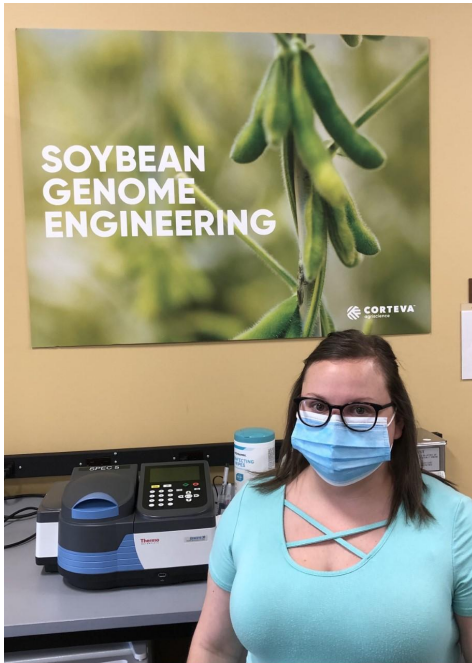


# Corteva Externship



Hayley Pratt

Biology and ELL teacher at  
North High School

2021 extern at Corteva Soybean  
Genome Engineering Lab

## Part I: Overview of Workplace

Corteva is an international company that sells seed for a range of different crops.

The Soybean Genome Engineering (SGE) lab is responsible for integrating genes of interest into the existing soybean genome. The goal is to create new products to eventually go on the market.

## Part II: Workplace Focus

The SGE transformers insert a gene of interest into the soybean genome during a new experiment each week. Transformation is accomplished by infecting soybean embryonic axis (EAs) with agrobacterium containing the gene of interest. These infected EAs are then grown into a plant. Once mature, the plant leaves are tested to determine if the gene was inserted into the DNA.

## Part III: Introduce the Problem

Students will take on roles of members of the genetics community to debate whether companies, such as Corteva, should be allowed to create and use genetically modified organisms. This project will be completed throughout the Inheritance of Traits and Variation of Traits units. At the culmination of the units, the students will have a public debate pertaining to their opinion of GMOs.

# Part IV: Standards/Learning Targets

Learning targets covered:

## Inheritance of Traits

- Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins. (HS-LS1-1)
- Create a model of meiosis to demonstrate how characteristics of one generation are passed to the next with variation
- Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for traits passed during meiosis. (HS-LS3-1)

## Variation of Traits

- Make and defend a claim based on evidence suggesting the sources of genetic variation through mutations. (HS-LS3-2)
- Apply concepts of statistics to predict the probability of inheriting a given trait. (HS-LS3-3)
- Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. (HS-LS3-3)

# Part IV: Driving and Essential Questions

## **Should companies be allowed to create and use genetically modified organisms (GMOs)?**

### Scaffolded questions if needed:

- What *is* a genetically modified organism?
- How are genetically modified organisms created? Is there more than one method? Is one way better than others?
- What is the purpose of genetically modify organisms? Why would a company create them?
- What is the effect of the modification on the organism? What is the effect on humans that consume the organism? What is the effect on the environment?
- What is the effect on future generations of a GMO?
- Should certain crops be allowed to be modified while others should not?
- Who are the stakeholders in the conversation?
- What are the benefits to GMOs? What are the negatives?

## Part V: Extern Host Role

The host will be invited to help monitor the debate.

Hosts:

- Joy Bolar, Technology Leader SGE
- Heather Firmento, Research Investigator
- Magan Lewis, CPD&D Global Technology Adoption Lead

## Part VI: Student Learning

Students will be able to choose what side of the debate they would like to argue on. This will be a lengthy project, students will not commit to a side until near the end. There will be check-in reflections throughout the project for students to begin to make their allegiances for pro-GMOs or against GMOs, but they will not be asked to commit to a side until they are better informed on both sides of the issue. Students will also be able to view the issue from the viewpoint of a stakeholder of interest. They can choose to argue as the environmentalist, farmer (traditional or organic), CEO, scientist, ecologist, toxicologist, fisherman, politician, etc. There are so many different sides to this debate, the students can choose to approach it in whichever viewpoint they align with. After the debate, students will write a reflection on their learning through the project. Part of the reflection will include reflecting on whether the debate swayed their opinion on the issue.