



FUTURELAB+

AG/ENVIRONMENTAL

Alternative Proteins


Community Outreach— Developing Knowledge

Developed in partnership with:

Discovery Education and Ignited

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This document is separated into two sections, For Teachers [T] and Student Resources [S], which can be printed independently.

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Cover Image

This model of a protein in cow's milk is a common allergen. Could a genetically engineered modification help?

AG/ENVIRONMENTAL / ALTERNATIVE PROTEINS

Community Outreach—Developing Knowledge

DRIVING QUESTION

Why should the public care about my novel GE product?

OVERVIEW

Local community members, and subsets thereof such as tribal communities and community activist organizations, make up a stakeholder group with vested interest in the regulation of GE crops. While many GE crops benefit farmers and their crop production, the benefits of these gene modifications are often not easily recognized as beneficial for consumers. Studies have found that many community members lack trust in the highly politicized GE technology used to make GE crops. Education on GE technology, age, socio-economics, sources used to gather information, and public awareness all play important roles in attitudes towards GE crops (Source: *A Study of Stakeholder Views to Shape a Communication Strategy for GMO in Brazil*).

Now that student groups have identified a local community challenge and developed a novel GE product concept, they will address the following question: does the community accept this solution? Students will develop interview questions and community surveys to gather qualitative and quantitative data around their local community's acceptance of and attitude toward their novel GE product concept. This information will then be used to bolster the informational website and final ad campaign (final product) with quotes, data, and tone that enhance public buy-in.

ACTIVITY DURATION

Four class sessions
(40–50 minutes each)

ESSENTIAL QUESTIONS

What is the community perception of my novel GE product?

How can community surveys and interviews drive novel GE product production?

What limitations exist in my novel GE product idea?

OBJECTIVES

Students will be able to:

Identify stakeholders in their own community.

Write and **ask** targeted questions to learn how their community will react to their novel GE product.

Develop and **execute** a plan to reach out to stakeholders to gather feedback.

Communicate knowledge about novel GE products from various lenses.

Materials**Stakeholder Contact List****Interview Questions Capture Sheet****Script Template for Emails****Project Notebook****Interview Summaries Capture Sheet**

Have you ever wondered...

What stakeholders are important for your community challenge and novel GE product?

Stakeholders should include the community members who are impacted by the challenges, those who have already been working to solve the challenge, and those that would need to distribute the GE product once on the market. This could include a wide range of people, such as a community activist, a mother of school-age children, a clerk at the grocery store, and a doctor at the local clinic.

How can information be gathered from the target audience of a new product?

Information should be gathered through both surveys, to gather qualitative data and develop a deeper understanding of it.



MAKE CONNECTIONS!

How does this connect to the larger unit storyline?

Students are engaging with the local community to gauge acceptance and attitudes around the proposed novel GE product. They will gather information about GE product hesitancy as well as the community challenge they identified in the prior lesson. This will inform students on their informational website and ad campaign (final project).

How does this connect to our world?

Public perception of GE products can vary among different communities, cultures, and parts of the world. While attitudes can be different, there are commonalities in how the global population thinks about GE products, especially concerning human safety.

How does this connect to careers?

Marketing analysts determine the best marketing approach for their target audience. They use information from user research to plan ad campaigns and disseminate pointed messaging that increases sales.

Community liaisons improve communication between organizations and their clientele to inform program direction. They might connect a school's students with outreach services, or do customer follow-up to ensure satisfaction.

Industry experts, also known as subject matter experts, have a deep knowledge of their industry. These experts often establish themselves through a strong online presence, frequent media contact, and involvement in boards of directors.

Genetic engineers use molecular techniques to modify genetic material and promote desired traits. They can be employed in a variety of industries such as food science, health, and sustainability.

Product designers help define and design a product for a particular client's needs. They identify customer pain points, brainstorm solutions, and create a "journey map" of the product idea.

Pedagogical Framing

Instructional materials are designed to meet national education and industry standards to focus on in-demand skills needed across the full product development life cycle—from molecule to medicine—which will also expose students and educators to the breadth of education and career pathways across biotechnology.

Through this collection, educators are equipped with strategies to engage students from diverse racial, ethnic, and cultural groups, providing them with quality, equitable, and liberating educational experiences that validate and affirm student identity.

Units are designed to be problem-based and focus on workforce skill development to empower students with the knowledge and tools to be the change in reducing health disparities in communities.



SOCIAL-EMOTIONAL LEARNING

Students will practice social awareness as they take others' perspectives into account when designing novel GE products. In addition, students will practice responsible decision making by taking into account public attitudes around novel GE products, as well as anticipating consequences of introducing a new product into the pipeline.

CULTURALLY AND LINGUISTICALLY RESPONSIVE INSTRUCTION

Students will reflect on their own biases and cultural perspectives when writing interview and survey questions. Students will also make an effort to communicate with local families and community members as they gauge community interest around their new product idea.

ADVANCING INCLUSIVE RESEARCH

In this lesson, students will examine the importance of informed consent, and consider how this can help rebuild trust with groups that have been exploited by past research. Prior to launching a novel GE product, students will work to obtain consent from stakeholders, including underrepresented groups, in order to improve community perceptions around their product. This will drive the roadmap for the final informational ad campaign to increase trust of community members in GE technology.

COMPUTATIONAL THINKING PRACTICES

Students will be collecting data on community buy-in of their genetically engineered product, while also practicing skills of recognizing unconscious bias in their analysis of the data. Additionally, students will obtain, analyze, and represent the data in their final website product to support the ideation of their novel GE product.

CONNECTION TO THE PRODUCT LIFE CYCLE

Students will focus on the **develop** phase of the product life cycle as they engage in early stage community research. Students will be engaging with the community through surveys and interviews, while also keeping in mind the **commercialize** phase of the product life cycle. This commercialization phase is the focus on their final ad campaign and informational website.

Day 1

Procedure

LEARNING OUTCOMES

Students will be able to:

Identify stakeholders in their own community.



Whole Group (10–15 minutes)

- 1 Have the community liaisons from Lesson 7 Day 4 share how they took the community into account when thinking about their novel GE product:
 - a. While each group has specific community interests, there will be some overlap among groups concerning who to reach out to in the community. Use the overlap to help jump start thinking.
 - b. Encourage students to speak of their own cultural experiences and discuss how these could influence their communication with the public.
- 2 Share with students the following description of stakeholders: “Stakeholders are the individuals, organizations, communities, agencies and governments with a vested interest in an issue. Stakeholders also include non-human entities such as the environment itself, or specific environmental resources. In short, everyone who has a vested interest in the food supply may be a stakeholder, although in practice not every stakeholder group is likely to get equal say in the debate due to power structures, economics, access to information, etc.” (Source: *Fast Facts about Genetically Modified Organisms*).
 - a. Brainstorm with students varying stakeholders they have been introduced to throughout the unit thus far.
 - b. Facilitate a discussion around which stakeholders may hold more power over GE product decisions and production and which may not due to power structure dynamics. What limitations exist in this power dynamic and how could this influence GE product production? A legal look into genetically modified regulation can be found at the [Library of Congress](#) to help guide this discussion.

Group Work (15–25 minutes)

- 1 Ask groups to collaborate together as they complete the [Stakeholder Contact List](#). The first step is to identify stakeholders that would be invested in their novel GE product idea.
- 2 Once students have determined who they should reach out to, have them determine specific people to contact. They can add this to the [Stakeholder Contact List](#).
 - a. If students know the person, they can add a phone number or email to the contact list. If they do not know a specific person, they can list a possible company to reach out to for an interview or survey. In addition,

Continues next page >

Day 1

Continued



Procedure

invite students to find a specific person at a company whose profile suggests they might be able to answer their questions. Students can explore via LinkedIn or company websites.

- 3 As a group, students will need to devise a plan for the community liaison to get input from enough stakeholders to be able to make a claim about the community attitude toward their novel GE product.

Whole Group (5–10 min)

- 1 Allow groups an opportunity to collaborate as a class.
 - a. Ask groups to share any community stakeholders they have identified, but do not know how to contact. Allow other groups to make suggestions for how to contact these individuals.
 - b. Share that the community liaisons will continue working on contacting these individuals throughout the next few weeks.

Homework

Ask groups to begin brainstorming interview questions and community survey questions using the *Interview Questions Capture Sheet*. Share with students that they should consider the following:

- 1 How can I communicate my novel GE product idea effectively?
- 2 How can I collect survey or interview data on the community challenge driving the production?
- 3 How can I collect survey or interview data on the public attitude toward my novel GE product?
- 4 What platform should I use to interview?



Day 2

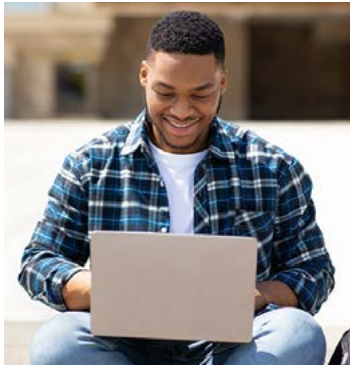
Procedure

LEARNING OUTCOMES

Students will be able to:

Develop a survey that asks targeted questions to learn how their community will react to their novel GE product.

Contact local stakeholders and **conduct** an interview to gather feedback on their novel GE product.



Whole Group (5–10 minutes)

- 1 Facilitate a quick discussion around the following questions:
 - a. What did you accomplish yesterday during your time brainstorming contact information for stakeholders?
 - b. What are some important things to consider when talking with community members about GE products?
 - c. What are some norms we should all consider when communicating with members of our community?
 - d. What soft skills, such as the skills you explored in Lesson 4, will come in handy when sending emails to community stakeholders? It may be useful to use Purdue University's *Email Etiquette* as a guide when brainstorming these skills.

Small Group (30–35 minutes)

- 1 Allow students time to complete and finalize a question bank for their community interviews using the *Interview Questions Capture Sheet* as a guide.
- 2 Approve group interview questions as they complete the assignment. Encourage groups to begin making surveys using online survey platforms. Groups should begin drafting emails using the *Script Template for Emails*. If time allows, they can send emails and begin collecting responses, but time will be available for this task over the next few weeks.

Teacher Note > *Monitoring student emails is important in this activity. Emphasize that communication with public stakeholders should be taken seriously and should be executed with professionalism and clarity. Teacher approval should be given prior to students reaching out to stakeholders for the first time.*

Day 3

Procedure

LEARNING OUTCOMES

Students will be able to:

Communicate knowledge about novel GE products from various lenses.

Whole Group (5–10 minutes)

- 1 **Optional:** Ask students to fill out their Daily Goal Capture Sheet in their **Project Notebook**.
- 2 Ask one group spokesperson to summarize the group's goals for the day. Use the following questions to guide further discussion:
 - a. What did you accomplish yesterday during your consideration of community challenges?
 - b. What are some important things to consider when talking with community members about GE products?
 - c. What are some norms we should all consider when communicating with members of our community?

Group Work (35–40 minutes)

- 1 Ask students to organize their groups into roles and monitor students as they aim to complete the Final Project Outline—Develop (Part 2) of their **Project Notebook**:
 - a. **Community liaison:** Design interviews and surveys. Reach out to the community and begin conducting interviews and distributing surveys to gather information on community challenges that are driving novel GE product production. Add to the website as time allows.
 - b. **Industry expert:** Meet with other industry experts to discuss questions and continue answering questions under Project Production Part 2: Develop. Continue adding to final website. Help community liaison with goals.
 - c. **Genetic engineer:** Meet with other genetic engineers to discuss questions and continue answering questions under Project Production Part 2: Develop. Continue adding to final website. Help community liaison with goals.



Teacher Note > *The process of identifying the altered gene and protein for a novel GE product is challenging. Students should use a model GE product as a guide (one that is already on the market). For advanced students, open-ended research is doable and they can search for literature on their model product. Students that need added support can reference Lesson 3 GE Product Cards. They can use the resources included for the product that is most like their own idea to complete this task.*

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Day 3

Continued

Procedure

d. Product designer: Meet with other concept designers to discuss questions and continue answering questions under Project Production Part 2: Develop. Continue adding to final website. Help community liaison with goals.

2 **Optional:** Ask students to answer the following questions as an exit ticket for the day:

a. What challenges have you had with website development thus far, if any?

b. What successes have you had with website development?

Homework

1 Ask students to continue reaching out to local community members to complete their survey and to set up interviews. All of their responses should be put into the *Interview Summaries Capture Sheet* (noted in the *Community Liaison* task in Part 2 of project).



Day 4

Procedure

LEARNING OUTCOMES

Students will be able to:

Communicate knowledge about novel GE products from various lenses.

Whole Group (5–10 minutes)

- 1 **Optional:** Ask students to fill out their Daily Goal Capture Sheet in their **Project Notebook**.

- 2 Ask one group spokesperson to summarize the group's goals for the day. Use the following questions to guide further discussion:
 - a. What challenges have you had with website development thus far, if any?
 - b. What successes have you had with website development?
 - c. What type of community experts you have heard back from and to whom are you still trying to reach out?
 - d. What strategies have worked to get community responses to interview requests or surveys?

- 3 Encourage groups to ask for advice from the larger classroom community about challenges they have encountered in their projects thus far.

Group Work (30–40 minutes)

- 1 Allow students more time to complete the Final Project Outline—Develop (Part 2) of their **Project Notebook** and add to their informational website.
 - a. **Community liaison:** Design interviews and surveys. Reach out to the community and begin conducting interviews and distributing surveys to gather information on community challenges that are driving novel GE product production. Add to the website as time allows.
 - b. **Industry expert:** Meet with other industry experts to discuss questions and continue answering questions under Project Production Part 2: Develop. Continue adding to final website. Help community liaison with goals.
 - c. **Genetic engineer:** Meet with other genetic engineers to discuss questions and continue answering questions under Project Production Part 2: Develop. Continue adding to final website. Help community liaison with goals.
 - d. **Product designer:** Meet with other product designers to discuss questions and continue answering questions under Project Production Part 2: Develop. Continue adding to final website. Help community liaison with goals.



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Day 4

Continued

Procedure

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- 2 By the end of class, groups should have the website sections completed on their final informational website. The Community liaison is not expected to have all interview answers at this time, but should be drafting information as it becomes available.

Individual Work (5–10 minutes)

- 1 Refer students to the Project Phase Chart Capture Sheet from their **Project Notebook**. Ask each student to complete the Develop—Community Background section as they reflect on this lesson.
- 2 Additionally, ask each student to complete the Commercialize—Community Impact section of their Project Phase Chart Capture Sheet from the **Project Notebook**.

Teacher Note > *This can be done as homework if time is running short.*

Homework:

- 1 Students will continue reaching out to local community members to complete their survey and to set up interviews. Students have until the beginning of Lesson 10 to complete their interviews and obtain survey data.



National Standards

Next Generation Science Standards

Science and Engineering Practice

Obtaining, Evaluating, and Communicating Information: Obtaining, evaluating, and communicating information in grades 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs. Communicate scientific information (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically).

Career and Technical Education (CTE)

A1.4

Research and identify public misunderstandings related to biotechnology and discern the source of these misunderstandings.

A2.1

Know the relationship between morality and ethics in the development of biotechnology health care products.

A2.4

Understand the critical need for ethical policies and procedures for institutions engaged in biotechnology research and product development.

2.2

Identify barriers to accurate and appropriate communication.

2.3

Interpret verbal and nonverbal communications and respond appropriately.

2.4

Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.

2.5

Communicate information and ideas effectively to multiple audiences using a variety of media and formats.

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Stakeholder Contact List

Directions

As a group, collaborate to brainstorm stakeholders who would be interested in your novel GE product idea.

1. Highlight community members you hope to contact.
Brainstorm more!

	Suggestions	Notes
Nutrition and Food	<ul style="list-style-type: none"> Food-Based organization Local community-supported agriculture (CSAs) Local restaurant owner Grocery store manager Food bank volunteer/organizer Food production worker School cafeteria staff 	
Health-based	<ul style="list-style-type: none"> Public health advocate and professional Doctor 	
Generic	<ul style="list-style-type: none"> Farmers Parents Local politician 	
General Public	<p>If you select this, it is important to be intentional about who you ask. Consider socioeconomic status, race, ethnicity, and what aspect of the community they represent. Does their community role fit with your target audience?</p>	
Other Ideas	<p>Global community, sovereign Tribal nations, municipalities, local communities, industry, biotechnology firms, organic and conventional farmers, farm workers, fishermen, religious groups, ecologists, engineers, toxicologists, risk analysts, doctors, politicians, non-governmental organizations, and advocacy organizations.</p>	

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Stakeholder Contact List

Continued

2. Conduct research and find contacts from your local community and answer how their input will support the case for your novel GE product.

Name and Community Role	Contact Number and Email	How this input supports the case for your novel GE product

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Stakeholder Contact List

Continued

Name and Community Role	Contact Number and Email	How this input supports the case for your novel GE product

Teachers Approval	
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Interview Questions Capture Sheet

Directions

To gain more insight into how the public will perceive your novel GE product, you will be interviewing stakeholders with surveys or through interviews. Use *Strategies for Qualitative Interviews* when writing your questions.

1. Step 1. Write five to eight sentences that introduce the stakeholder to your novel GE product. Be sure to answer the following questions in your paragraph:
 - a. What is your product?
 - b. Why should the community (or specific stakeholder) care about the product? State what positive impact this product could have on the community.
 - c. What connections (cultural or specific) would the stakeholder consider when learning about your product (i.e., health, safety, economic impacts, cultural views on crops, etc.)? Make a statement of recognition centered around these connections to emphasize empathy and understanding.

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Interview Questions Capture Sheet

Continued

2. Step 2. Write at least three questions to collect data on the general attitude or perception of GMOs.

Example: In general, how do you feel about GMOs
in _____ industry?

a

b

c

3. Step 3. Write at least three questions to collect data on the community challenge you are trying to solve.

Example: Do you view _____ as a community challenge?
How has it impacted you directly?

a

b

c

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Interview Questions Capture Sheet

Continued

4. Step 4. Write at least three questions to collect attitude and trust in your novel GE product.

Example: Would you purchase a genetically modified product that _____? What concerns do you have about it?

a	
b	
c	

5. Step 5. How will you change the above questions for specific stakeholders? What edits will you make?

Stakeholder	Edits (tone, phrases, etc.)
a	
b	
c	

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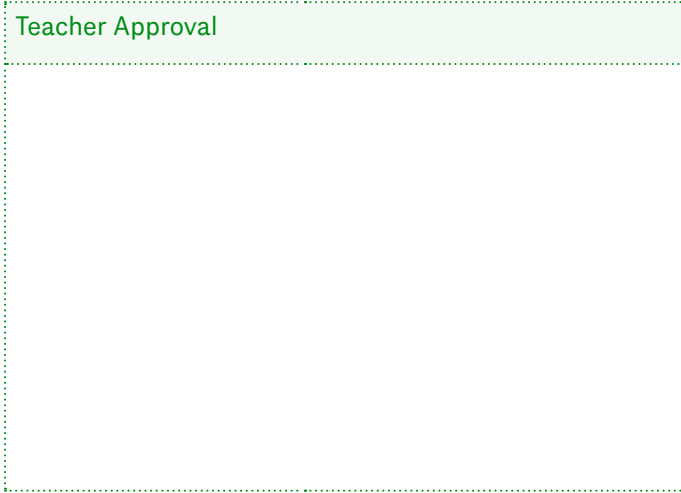
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Interview Questions Capture Sheet

Continued

7. Step 7. Please review your questions with your teacher and get approval as indicated by the signature below.

Teacher Approval



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Script Template for Emails

Directions

Use this template to draft an email to reach out to your stakeholders requesting an interview or survey response. Make sure you get approval from your teacher before sending this out.

Dear *(name of individual)*,

Hello! My name is *(name)* and I am reaching out from *(school name)*.

As part of an assignment for my *(name of your class)* I am creating a concept for a genetically modified product that could solve a community challenge here in *(name of the community and city)*. This product is an idea and does not have plans to be actually produced at this time. As part of my research, I was hoping to get some insight from you about your experience with *(community challenge)* and your thoughts about my genetically engineered product idea: *(novel GE product)*.

.....
Insert paragraph from Interview Question capture sheet, Step 1
.....

I was hoping you could take the time to answer this short survey to help with my project. Your responses will remain anonymous and will only be used by my project group to assess community views of my product idea to community buy-in toward my product idea. I appreciate your time in helping me, and please do not hesitate to reach out with any questions.

Thank you,

(Signature)

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Interview Summaries Capture Sheet

Directions

As you hear back from Stakeholders, use this template to summarize their interview and survey responses.

1 Stakeholder Name

Stakeholder Role

a	Summary of Views on Community Challenge	
b	Summary of Views on Novel GE Product	
c	Other Notes and Quotes	

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Interview Summaries Capture Sheet

Continued

2 Stakeholder Name

Stakeholder Role

a Summary of Views on
Community Challenge

b Summary of Views on
Novel GE Product

c Other Notes and
Quotes

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Interview Summaries Capture Sheet

Continued

3 Stakeholder Name

Stakeholder Role

a Summary of Views on
Community Challenge

b Summary of Views on
Novel GE Product

c Other Notes and
Quotes

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Interview Summaries Capture Sheet

Continued

4 Stakeholder Name

Stakeholder Role

a Summary of Views on
Community Challenge

b Summary of Views on
Novel GE Product

c Other Notes and
Quotes

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Interview Summaries Capture Sheet

Continued

5 Stakeholder Name

Stakeholder Role

a Summary of Views on
Community Challenge

b Summary of Views on
Novel GE Product

c Other Notes and
Quotes

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Interview Summaries Capture Sheet

Continued

6 Stakeholder Name

Stakeholder Role

a Summary of Views on
Community Challenge

b Summary of Views on
Novel GE Product

c Other Notes and
Quotes
