

“Face” to “Face” with GMOs



Introduction

Lesson Introduction

Using their knowledge of GMOs, genetic recombination, and environmental/agricultural issues, students will develop their own genetically modified organism. Once created, students will create a Facebook® profile their organism and present their profile to the class during an informal presentation.



Grade Level: 9-12

Time Needed: 90 minutes
(for research and profile development)

Learning Objectives

After completing this lesson, students will be able to:

1. Design a genetically modified organism that solves an environmental and/or agricultural issue.
2. Develop a Facebook® profile for their organism that discusses the benefits, downsides, cost, and impacts it has on the environment.

Next Generation Science Standards

As a result of activities for grades 9-12, all students will learn content in these areas:

Standard

- **ETS1:** Engineering Design
- **HS-LS2:** Ecosystems: Interactions, Energy, and Dynamics

Performance Expectation

- **HS-LS2-7:** Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Dimension

Science & Engineering:

- Obtaining, Evaluating, and Communicating Information
- Engaging in Argument from Evidence

Disciplinary Core Ideas:

- **ETS1.B:** Developing Possible Solutions

Cross-cutting concepts:

Connections to Engineering, Technology, and Applications



Materials

- Access to the Internet
- Computer
- Colored pencils or markers
- "Facebook" Templates (TeacherDiscovery.com; Item P1519, \$19.99), or many free online options



Instructional Process

1. After discussing plant and animal genetic transformation, tell students they will be developing their own genetically modified organism to solve an agricultural or environmental issue existing in the world today. Appropriate issues might include: increasing resistance to drought or disease in specific crops, increasing the amount of protein or vitamins in third world food sources, increasing crop yields or meat production, resistance to pests, the ability of a plant to produce a valuable medication, a plant that absorbs pollution from the air, etc. The organism can be either plant or animal and should have traits that would be important for an organism to succeed in the given environment and deliver the desired trait.
2. Take 10-15 minutes to brainstorm with students about potential agricultural or environmental issues they can tackle.
3. Provide students with 1-2 days to research the potential issue and the possible solutions that a genetically modified organism could provide.
4. Once their research has been completed, ask students to create a Facebook® profile for their new organism. The profile should:
 - a. Describe the physical and genomic traits of the organism
 - b. Provide an explanation of the agricultural or environmental problem to be solved
 - c. Include a diagram of the organism
 - d. Describe how the GMO will solve the problem.

NOTE: You may want to provide a couple of different Facebook® templates for students to use. Many can be found by conducting an on-line search.

5. The project should be graded for the following criteria:
 - Creativity
 - Scientific Accuracy
 - Solves environmental/societal issue
 - Spelling/Grammar



Follow Up Questions

During the project, presentation, and/or in the Facebook® profile, students should answer the following:

1. How would you get the genetic information from one organism and into another? Explain the possible options. Which option would you use for your organism and why?
2. What are desired traits you want in your organism and why?
3. What are the societal and environmental benefits for creating this organism?
4. What are the possible negative effects of developing this organism?
5. How would you support your creation if someone felt that your organism was negatively impacting the environment and was calling for its destruction?

“Face” to “Face” With GMO’s - Student Sheet



Introduction

Since the invention of Genetically Modified Organisms (GMOs), scientists have been creating organisms to improve agricultural and environmental conditions in locations throughout the world. Organisms such as Golden Rice have been modified to improve the nutritive properties of certain foods. Other GMOs like BT Corn and Genetically Modified Chickens have been created to increase the yield of certain agricultural crops and livestock. Now it is your turn!

Materials

- Internet
- Computer
- Colored Pencils/Markers/Crayons
- “Facebook” Profile Templates

Procedure

Using information from class, your job is to:

- 1) Research an agricultural or environmental issue that could be solved using a genetically modified organism.
- 2) Design your own GMO to help solve your cultural and/or environmental issue. During the designing process, please think about the following:
 - a. Is your organism a plant, an animal, or a bacteria?
 - b. What traits are necessary for your organism to solve the agricultural and/or environmental issues of the region?
 - c. What traits should your organism have to allow it to survive in the climate and conditions of the regions in which it will live?
 - d. What does
- 3) Once designed, create a Facebook® profile for your organism using the template provided by your teacher. Be creative! Be accurate! The profile should:
 - a. Describe the physical and genomic traits of the organism
 - b. Provide an explanation of the agricultural or environmental problem to be solved
 - c. Include a diagram of the organism
 - d. Describe how the GMO will solve the problem.
- 4) On the due date, you will be asked to present your profile to the class in a short, informal presentation, so be ready! Make sure you include the answers to the following questions in your profile and presentation.

Follow Up Questions

- 1) How would you get the genetic information from one organism and into another? Explain the possible options. Which option would you use for your organism and why?
- 2) What are desired traits you want in your organism and why?
- 3) What are the societal and environmental benefits for creating this organism?
- 4) What are the possible negative effects of developing this organism?
- 5) How would you support your creation if someone felt that your organism was negatively impacting the environment and was calling for its destruction?