



Diversity Game

In this activity students will begin to learn the importance of biodiversity.

Background Information



All living things have a different genetic makeup. These genetic differences can make some kinds of plants resistant to insect pests or disease while other kinds of plants may not be. Diversity in genetic makeup allows some plants to survive under harsh environmental conditions, such as drought, poor soils, and strong winds, while other plants simply do not survive.

Traditionally, farmers have selected for specific traits by collecting seeds from plants with the desirable traits and planting them. Over thousands of years this has created a highly managed crop adapted to its particular environment as well as the needs and preferences of the farmers.

Additionally, traditional farmers planted a wide range of crops, ensuring that something would survive even if there were a natural disaster, such as insect infestation, during the year. The diversity of crops also provided their families with a varied diet.

Materials



For each student

- copy of blackline master of corn outline
- crayons or colored pencils
- scissors
- string

For the teacher

- blackline master of corn outline

Preparation



1. Make enough copies of the blackline master so that each student has one.
2. Do this activity outside on a playing field or in the gymnasium.

Class Discussion



Engage students in a discussion of biodiversity. Ask them to brainstorm what is meant by “biodiversity.” Begin with a discussion of what “bio” means and what “diversity” means. This is a complex topic. Do not expect students to have a well-developed understanding of it.

- What does “bio” mean? (**life**)
- What does “diversity” mean? (**varied**)

There are three levels of biodiversity:

- biodiversity between different kinds of crops (corn, beans, squash)
- biodiversity within a single kind of crop (black, white, and yellow corn)

DIVERSITY GAME

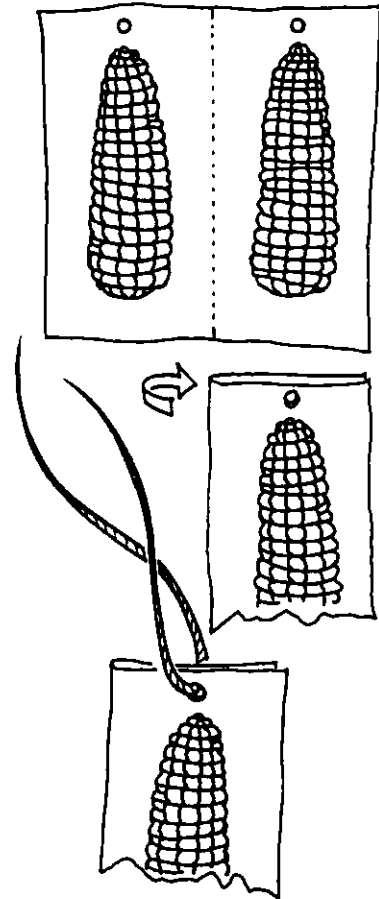
- biodiversity within individual plants (two stalks of yellow corn next to one another—each one has different-sized kernels or a different level of resistance to insects)

Ask students: Can you think of examples of biodiversity in our community? Encourage students to brainstorm a class list.

What to Do



1. Have students cut out the outlines of the ears of corn shown on the blackline master. Then, have them fold the cutouts in half.
2. Next, ask students to color one side of the ear, leaving the other side plain. Encourage students to be creative. However, each student should select only one or two colors to use.
3. Have students poke a hole through the corn cutout and loop a string through the hole. Ask them to tie their string and ear of corn around their neck. Have them display the uncolored side of the ear of corn first.
4. Ask all students to close their eyes. Tell them that you will secretly choose one student to act as the corn plague. You will let that student know by tapping him or her on the shoulder.
5. Make a large circle in the gymnasium or on a playing field. Have students move around in the circle. As they begin to circulate around the gymnasium or playing field, have students shake the hands of all of the other students. As the plague circulates, he or she will secretly tickle the palm of the other students using an index finger, indicating that the tickled student is out of the game.
6. At first the plague will have a large impact because the corn is all the same variety. After the class has played the game for about five minutes, stop and take a count of the number of students, or ears of corn, that were attacked by the plague.
7. Start the game again, but this time have students flip their ears of corn over to show the side they colored. Tell students that you will select one of them to be the plague again, but this time the plague is restricted to one



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color, or one pair of colors, of corn. Secretly whisper the color or pair of colors to the student you select to play the plague. This time the plague can give the secret signal only to students with that color of ear of corn. Stop the game after about five minutes. Count how many ears of corn were attacked this time compared to last time.

8. Engage students in a discussion. Stimulate discussion with questions such as
- Was there a big difference in the size of the two groups attacked by the plague?
 - Why do you think there was a difference?
 - Does this tell you anything about the importance of biodiversity?

Threats to Corn

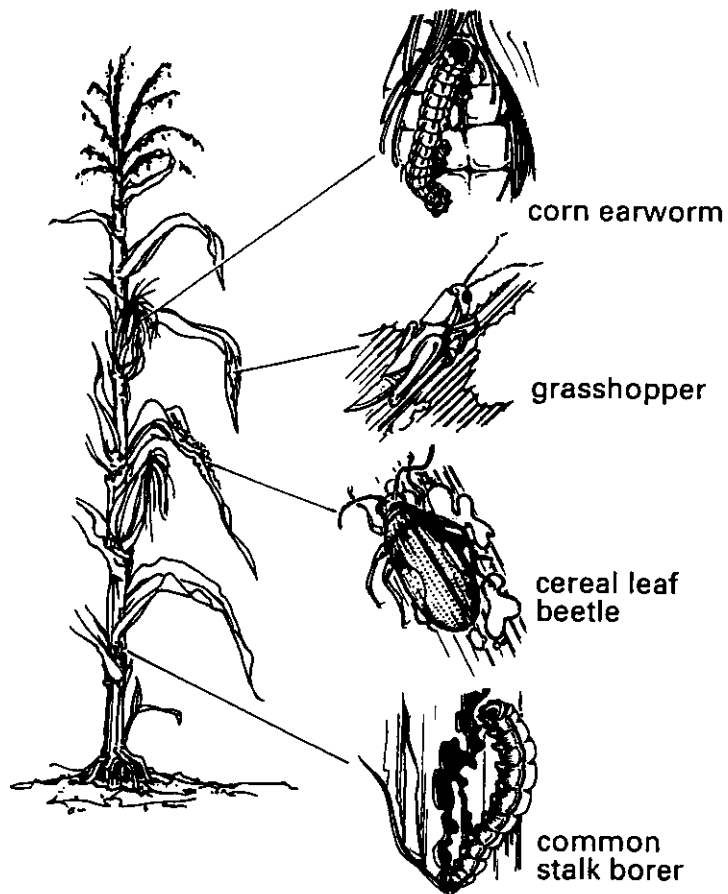
Several insects threaten corn; among them are grasshoppers, corn earworms, cereal leaf beetles, and common stalk borers. All of these insects depend on corn for survival. When these insects feed on the corn, they often kill the plant or damage its growth. However, these insects pose a major threat to cornfields only when they are found in large numbers and are able to rapidly eat the plants. Insect damage like this can greatly reduce the productivity of a field of corn, reducing the yield.

Grasshoppers attack corn, eating the edges of leaves and moving inward. They also eat corn silk. If they eat the silk before the ear of corn has been pollinated, this decreases the number of kernels that will form, sometimes leaving completely bare, infertile ears.

Corn earworms enter through the tip of the corn ear, burrowing in and eating their way through the kernels. If you have ever eaten corn that was grown without the use of pesticides or have grown it yourself, you probably have seen a few kernels that earworms have eaten. You may even have seen the worm.

Cereal leaf beetles eat the leaves of the corn plant. They do the most damage when they are still in their larval stage.

Common stalk borers also do the most damage in the larval stage when they burrow their way into the corn plant, eating through the leaves and stalk. This pest hollows out the stem, and the corn plant either falls over or can't transport water to the leaves.



Teacher Reading**Notes from Chiapas, Part II**

by Ama Marston

In areas where traditional, subsistence agriculture once dominated, agricultural practices are rapidly changing as a result of the introduction of new technology, such as the use of petrochemical-based pesticides and chemical fertilizers. With these changes farmers are faced with a number of major decisions, decisions that will affect their families, their communities, and the environment.

These kinds of changes are evident in Mexico's southernmost state, Chiapas. Here, indigenous people have practiced sustainable, subsistence agriculture for thousands of years. However, in the past 20 years government agronomists have been sent into the indigenous communities to introduce what the government perceives as modern techniques of farming. The government agronomists bring with them hybrid seeds, petroleum-based fertilizers, insecticides, and herbicides. While the use of these new methods has had short-term benefits, such as increased production, the local people are beginning to feel the negative impacts of this technology.

The soil is being exhausted, and the chemicals are too often misused, causing chemical burns on the plants. Also, some residents suffer short-term and long-term health problems from exposure to these toxins. Moreover, many medicinal plants that grew alongside the crops in the fields are gone as a result of the use of herbicides that indiscriminately kill noncrop plants.

Consequently, the farmers are confronted with difficult choices that they never before had to face.

Corn Outline

