

What choices can sustainable farmers make to increase their economic success?

PROJECT PUMPKIN (gr 3-5)
Sustainable Farming Practices
(ILS 12A and B)

Overview

This curriculum explores the relationship between people and the food they eat. By growing pumpkins in a garden plot, the curriculum takes teachers and students through six features of sustainable agriculture that separate it from conventional farming. If the entire curriculum is completed, students will gain an understanding of sustainability and people's place in the food chain.

Sustainable Agriculture, for the purpose of this curriculum, shall be defined as "a system of food production, supported by consumers, where farming operations, practices and technologies work in harmony with the natural systems that sustain life on earth."

Suggested Grade Level

This curriculum is designed for 3rd through 5th grade levels. The topics covered can be built upon in complexity throughout that age range.

Approximate Time

This activity takes 75-90 minutes, in one or two sessions.

Objectives

1. The students will learn that higher crop yields are the result of a combination of sustainable farming practices: crop rotation and diversity, healthy soil, and seasonal planting.
2. The students will learn that these sustainable farming practices reduce the need for pesticides, increase the number of beneficial insects, and may reduce soil erosion and pollution of wetlands.
3. The students will learn that when these factors are in place the higher yields should produce economic benefits for the farmer.

Activity Abstract

Students will play "Farm-opoly," a game with built-in choices related to the way that crop diversity choices affect the success or failure of their farming enterprises. Students will discuss the topic and what they learned playing the game, and then students will replay the game, making different choices about crop diversity.

Background Information

Farming has changed over the 350 plus years since our country was first inhabited by settlers from other countries. Agriculture formerly consisted of a collection of small-scale

family farms; this is no longer the case. Over the past century, our country has become dominated by large-scale, corporate “factory” farms. Farming has become a business enterprise, and the financial bottom line is the main concern for corporate farms. This is especially true in California. Since 1910 the number of farms has declined from 6.3 million to 2 million today. However, the acreage in cultivation as remained relatively constant. Most of those that have disappeared are mid-size farms.

Today, large-scale industrialized farms are predominant, with regional variations in amount of capitalization and dependence on immigrant labor. Industrialized farms focus mainly on monoculture – the planting of just one type of crop -- or on a very limited amount of crops, leading to the potential for soil exhaustion, increase in erosion due to over-plowing, and increased pest infestation. This is avoided by a strong reliance on herbicides and pesticides that cause further problems to air and water quality.

Contrary to industrialized farming there are some important practices that small farmers can follow: Soil health can be improved by conservation tillage, by use of compost, erosion control, contour plowing, and planting. Beneficial insects can take the place of harmful ones by consuming nutrients that the latter need to survive. Furthermore, they are necessary to pollinate certain crops such as those of the squash and other members of the cucurbit family. Because of increased demand for fresh fruits and vegetables, it is important that the farmer select crops that wither will travel well or that can be sold easily to a local market or other consumer. It has been learned that food in the U.S. travels an average of 1,300 miles and changes hands half a dozen times before it is consumer. This results in no consumer connection to the source of the food and its transport.

Although there are many small-scale farms, they do not exert a large influence on the overall food system and they are often not economically rewarding or even viable for the farmers who run them. The family farms that remain are perceived as a lifestyle, relying on the labor of family members rather than depending on migratory workers hired for short periods in which labor is needed. Appendix B lists ways that small farmers can make a profit.

U.S. farm policies make small farms less economically viable. Market competition and declining crop prices make small farms less profitable, squeezing some growers out of production and causing others to join the ranks of large farmers to make up for their lower profits. Large growers exert more political clout and wealth and have preferential access to the things that made them more successful to begin with. Farm subsidies by far favor the largest producers. There are social consequences caused by our food system, with large-scale grower-shippers and retail chains exerting powerful control in the food system, with consumer food prices increasing and commodities getting lower prices for growers. Small growers can’t compete for market share with the middlemen who keep increasing profits and power. It is unfortunate that we do not have an institutional framework for rewarding food systems that promote long term social sustainability.

Materials

- Farm-opoly game board for each 3-4 players (See separate document)
- At least fifteen small green and yellow playing chips for each player (cut from construction paper)



- Game piece for each player--could be seeds colored by students--corn kernel, barley, white beans, etc. If not available, use small button, etc.

Procedure (Session 1)

1. **Tap prior knowledge/share with neighbor.** Brainstorm a list of answers to the following question: How would a farmer be affected if he depended on only one crop and for some reason it failed?
2. **Hands-on experience and introduce scientific principle.** Explain that students will play a game called Farm-opoly in which they will be new farmers making farming choices that take them to Cropwell Farm. They will play in teams, using the three part spinner, and collecting green or yellow chips as they play the game. The spaces they land on indicate how many chips they get. Green represents positive choices or events and yellow represents choices or events with negative consequences. Do not tell this to the students at the beginning of the game. They will realize it as they proceed through the game, and it is part of their learning. Optional rule: If player misses a turn, he/she may give up a green chip to take the turn. Be aware that some paths go two ways. The most successful “farmers” are those with the most green chips left after deducting an amount equal to the yellow chips they collected.
3. Have students play game.
4. **Relate activity and concept.** Discuss the game. What did students notice about the effect of using a variety of crops on their success as farmers? What could “variety” mean? (low moisture, rotation, companion planting, different crops rather than a monoculture.) What are variables over which he/she has no control that affect a farmer’s success? (good and bad weather) What situations are the result of good planning (such as using conservation tillage, having helpful insects, using companion planting)? What are practices produce negative results? (using herbicides, erosion onto wetlands, using pesticides, planting the same crops in the same field repeatedly)
5. Have students create a list of good farming practices based on the game and discussion. The background information and Appendix B contain information that may help the students and add to the discussion.
6. If desired, read and discuss the Prosperitas story (Appendix A) with the class.
7. Discuss the advantages of crop diversity, as the students gleaned from the game, discussion and story.

Procedure (Session 2)

1. Have students play Farm-opoly again, this time armed with the knowledge from session 1.
2. **Conclusion/Wrap-up.** Discuss the game. What different choices did the students make as they played the game? Was every part of the game “fair?” If possible, what would they change about being a farmer? What did they learn from session 1 that helped them make different choices in the game? Can they tell from this game if farmers make enough money to keep operating? How can they tell? How else could they find out about farming, its rewards and negatives?

Extensions (optional)

1. Discuss or have the students journal on this question: What could students do if for some reason the food supply were interrupted?
2. Interview a local farmer and ask questions about the various points you learned from the game.
3. Work with a team member to investigate a large-scale farm operation.
4. Find out the location and schedules for farmers' markets in your area. Attend one.
5. Create a different game showing the important concepts you learned.
6. Write an acrostic related to the lesson. An acrostic is a vertical poem made up by choosing a word then building lines by using one letter to build each line. For example, if the word is "FARM," the first line starts with F, the second starts with A, the third with R and so on. Build the concepts into the acrostic. Each line must have **at least** four words in it.
7. Make up a song or rap about crop diversity showing what you have learned.
8. With a partner or two, make up a dance or charade showing the ways that farmers can make different choices to improve their farms.

References

The Center for Agroecology and Sustainable Food Systems Training Manual.

<http://zzyx.ucsc.edu/casfs/training/manual/contents.html>

"Sheep institute a natural step towards weed control." Montana State University.

<http://www.montana.edu/commserv/csnews/nwview.php?article=330>

Crawford, J.F. "Benefits of crop rotation on refuge lease lands."

<http://www.klamathbasincrisis.org/0tgabenefitscraw.htm>

"Winter annual cover crops: increasing field productivity." Michigan State University.

http://www.msue.msu.edu/learnnet/covercrop_032002.htm

Bauder, J. "The benefits of crop rotations." Montana State University.

<http://www.montana.edu/wwwpb/ag/baudr181.html>

Appendix A: Prosperitas Story.

Prosperitas

Long, long ago, there were one hundred farms in the state of Prosperitas. Most of the people made their living by growing food on their small farms. On a small farm everyone in the family helped to grow the crops that they would use to live off during the year. Along with many other chores, the father plowed the fields and planted seeds of corn, wheat, oats, and other grains for their animals and for themselves, along with vegetables and fruits to store for the winter. He was careful to change the place where he planted his crops so that the soil would not get worn out. He fooled the insect pests by growing plants around his crops that the insects didn't like. His family helped fertilize the fields by spreading manure from the animals on the soil, a smelly job.

The children would help take care of the animals. They felt very important as they took care of cows, sheep, pigs, and chickens. Boys would bring them back and forth from the fields to the barn. Girls would milk the cows in the barn and collect the eggs that the hens laid. They would feed the chickens, making clucking sounds as they walked around the barnyard spreading grain from the fields. The children would feed leftover food from dinner to the pigs in their sties, watching as they snorted their way through their "delicious" dinner. Children were responsible for many other chores as well, like carrying water in large buckets from the well or from a stream. Searching for firewood was another important task. So was helping to pull weeds that grew in the vegetable garden and gathering the wool that their father would shear off the sheep.

The mother worked hard, too, taking care of the house and the family, along with preserving the food in many ways. She churned cream from the cows' milk into butter that was kept in a cool basement under the ground. For the long winter ahead, she preserved the vegetables they grew by drying them or putting them in special jars as time went by. She made all of their clothes and the candles that lit their small home. She raised bees for honey to sweeten their food.

Many were the good years. Frequently the farmer would produce different kinds of crops on his acres and did not waste the resources of his farm. If there was more than the family could use, he would be able to load up the cart and go to a nearby town to sell their produce to make some extra money for the family. Townspeople would be happy to buy fresh eggs, butter, carrots, or green vegetables from him.

Some years were not as good as others. Over the years it was often the case that bad weather, the wrong amount of rainfall or sunshine, temperatures that were too cold or hot, attacks by insects or diseases that would lessen the amount of crops they were able to grow. Often family members would be very hungry. Sometimes they would become sick due to lack of food. When this happened, other farmers in the community would help the family until things got better. They felt responsible for keeping the country strong and prosperous.

After many years, people began to invent tools that would help the farmer grow crops in a different way. The tools were very expensive for the poorer farmers and so only the wealthy could afford them. These wealthy farmers started to buy the farms from those who weren't doing as well, paying very little for the small farms. They formed larger farms. They also started to use new products called chemicals that would help to feed the crops quickly and kill the insect pests easily. They found that if they grew just one or two kinds of crop they could grow a large amount of the kind that people far away



wanted to buy. Local townspeople couldn't find the many kinds of vegetables and fruits at their markets anymore. They became sad and thought about moving away.

More important and even richer farmers from another state came in and bought the large farms, so there were even fewer farms that covered the same amount of land. After a while, there were only thirty three small farms left, while the very large farms used the land in a way that changed its richness and productivity. The town started to become poorer because the very large farms took their money somewhere else after they sold the few large crops they grew.

Followup questions:

- *What do you think happened to the small farmers who continued to keep their farms?
- *What will happen to the town if the very large farms decide to sell their property and stop farming altogether?
- *Who will work on the small family farms?
- *Which of the farmers will have the most power over decisions that have to do with the kinds of food that will be grown for the people who living in a large city nearby?
- *What might happen to the land that is no longer being farmed?

Appendix B: Ways for Small Farmers to Improve Production.

- In order to survive economically, the small farmer can use a variety of strategies to create higher yields and local opportunities. If weather extremes are typical of the farmer's area, crops that can be harvested in early summer, such as winter wheat, can be planted and thrive in different seasons. Winter annual cover crops can be used to provide forage for animals. They can deliver the environmental benefits of erosion control, weed suppression and nitrate absorption to protect groundwater quality even if the crop is burned off or plowed under instead.
- Insect pests had started to adapt to established rotations of alternate years and were becoming able to persist in the soil until the crop was planted again. Longer rotations and intervening with a cover crop in the rotation prevents that from taking place and helps to increase yield.
- Crop rotation can prevent the loss of minerals and nutrients in the soil and can actually replace nutrients. An example of this is planting leguminous plants to replace nitrogen in fields that are planted with high-demand crops.
- Crop rotation enhances the productivity and proficiency of any farm operation. It can involve alternating various row crops or can alternate row crops with grain crops. For example, onions can be a valuable rotational crop for farmers. Because it must be managed closely, it is frequently hand weeded and cultivated. This type of tilling provides maximum cereal grain production following onions. There are also reduced levels of pests that can cause crop destruction. A well-managed onion crop reduces the amount of chemicals used.
- Soil health can be improved by conservation tillage, by use of compost, erosion control, contour plowing and planting.
- Beneficial insects can take the place of harmful ones by consuming nutrients that the latter need to survive. Furthermore, they are necessary to pollinate certain crops such as those of the squash and other members of the cucurbit family. (SEE INTEGRATED PEST MANAGEMENT CHAPTER).
- Because of increased demand for fresh fruits and vegetables, it is important that the farmer select crops that either will travel well or that can be sold easily to a local market or other consumer. It has been learned that food in the U.S. travels an average of 1,300 miles and changes hands half a dozen times before it is consumed. This results in no consumer connection to the source of the food and its transport.
- Studies have shown that use of sheep in some fields can reduce herbicide use since sheep like to eat certain weeds that cause problems for farmers.
- If the farmer is able to produce crops using sustainable methods and find a market for those goods, he or she can reap the economic benefits of diversity of crops.