



## Activity: Producing More Food With Less

### Activity Overview:

In this activity, students consider the needs of growing plants and build understanding of the relationship between the life cycle of crops and the important role of farmers in providing food for growing populations. Students brainstorm innovative strategies for providing food to communities in regions that may have limited access to foods (or certain crops). Students are encouraged to consider the resources they would need and try to feed people without unnecessarily expanding those resources. As an extension activity, students could research current projects aimed at increasing food supply while making use of available resources.

**Activity Duration:** 30 minutes

### Next Generation Science Standards:

MS-LS1-6: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

LS1.C: Organization for Matter and Energy Flow in Organisms: Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy.

### Essential Questions:

- How do plants that start as small seeds turn into crops that feed many people?
- Why do some regions of the U.S. have limited or reduced access to certain crops?
- What are some innovative ways we can establish or increase the growth of crops in rural, suburban, urban, and remote areas?

### Objectives:

Students will:

- Analyze the relationship between the life cycle and needs of plants and the role of farmers in feeding growing populations
- Propose strategies for increasing the availability of crops to people in a variety of settings
- Explain the importance of producing as many crops as possible using available resources

### Materials:

- Sunshine Map
  - Optional resource located at <http://bit.ly/1PLYEAW>
- Rainfall Map
  - Optional resource located at <http://bit.ly/1JC1x5J> at bottom of page
- Crop information (For student groups)
- Science journals or other student writing materials



**Procedure:**

1. Engage students by asking them to give you a thumbs-up if they have ever eaten any of the following foods: cereal, bread, soy milk, rice, potato chips, apple juice, or salad. *(Note: Feel free to substitute with other foods or drinks made out of corn, sorghum, potatoes, wheat, soy, vegetables, and fruits.)*
2. Tell students that if they have eaten any of the foods you just mentioned, they have eaten food grown right here in the United States. But before the food can get to their kitchen table, it begins as a seed and has an entire life cycle through which it needs to evolve.
3. Ask students to share what they know about the life cycle of a crop (or plants). Give students two minutes to think and then have them report out. Guide students towards the idea that in order to grow from a seed, all crops need soil, sunlight, and water. However, each kind of crop requires a different amount of sunlight and water (and may require a unique type of soil).
4. Distribute or project the rainfall map and the sunlight map. Ask students to explain what each map is demonstrating, using the title and the map key to inform their responses. Next, distribute (or show) the following information to your students:

<p><b>Wheat Needs</b></p> <ul style="list-style-type: none"> <li>- Rainfall: 12-15 inches</li> <li>- Sunlight: As close to full sunlight as possible</li> <li>- Temperature: In the 70s (degrees Fahrenheit) is optimal</li> </ul>	<p><b>Corn Needs</b></p> <ul style="list-style-type: none"> <li>- Rainfall: 20-22 inches</li> <li>- Sunlight: Full sunlight</li> <li>- Temperature: Above 60 degrees Fahrenheit is optimal</li> </ul>
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5. Using this information and the maps, ask students if wheat and corn can grow everywhere in the United States. Ask them to discuss where it looks like these two crops may be able to grow and where they may not be able to grow, based on the information in the two maps.
6. Explain that wheat and corn represent a truth about all crops: *Various crops thrive in different areas and not all crops can be easily grown everywhere.* Explain that farmers in different regions of the United States usually grow crops best suited for their regions. Farmers need to consider which crops will do best based on their region’s climate, yearly sunlight and rainfall, and soil type.
7. Explain that the United States has almost 319 million people and it is not possible for everyone to live in areas where it is easy to grow crops. For example, people who live in large urban centers may not have as much access to locally-produced fruits and

vegetables as people who live in more suburban or rural areas. Additionally, people who live in regions with dry climates may not have as much access to fresh crops that require a lot of water for growth. Therefore, it's important to be innovative in order to grow as much food as possible in all different parts of the country, because everyone needs to eat!

8. Have students work in groups to use the rainfall and sunlight maps to identify at least two regions of the country where they think it may be difficult to grow crops. Instruct each group to record these areas on paper and support their selections by providing evidence based on the maps.
9. Once groups have selected their regions, ask students to work together to brainstorm possible solutions to these challenges. Use guiding questions, such as the following, to guide or prompt students' thinking:
  - In a colder climate, how might a farmer grow food year round?
  - In a dry climate, how might a farmer ensure crops are getting water?
  - How might a town in a region with limited annual rainfall make use of the rain they do get?
  - How might communities with limited access to soil, such as urban areas, produce food?
  - What are some strategies isolated or distant towns could use to improve their access to fresh produce or meat?
10. After about 10 minutes of brainstorming, bring the class back together for a full-group discussion. As students propose their ideas, probe them to think about whether their solution would work in urban, suburban, and rural areas. Ask them to consider how they might alter their solutions for a different region. Encourage all students to propose ideas.
11. Next, ask students to discuss the following questions:
  - What resources would be needed in order to implement your ideas in a successful way?
  - Would the resources be readily available to the community or region or would they have to create, purchase, or import them?
  - What kind of effect might these additional resources have on the community and/or the environment?
12. Lead students towards the conclusion that farmers carefully determine which crops will grow best in their region so they are able to make the most of their resources. This allows farmers to produce as much as food as they can for as many people as possible. Although there may be many exciting innovations for increasing the number of people that can be fed by a particular crop, it is important to consider the resources needed to



get that crop to the community. Ultimately, farmers work hard to produce the most food possible using the least amount of resources possible.

**Optional Extension:**

Explain that many initiatives currently exist that work to increase food supply to communities in need while minimizing resources. Have students research projects that are currently underway and compare their own ideas with these projects.

