

Filling the Global Grocery Bag

Grade Levels

9 - 12

Purpose

Students learn what factors affect a country's ability to produce their own food and how food expenses differ throughout the world.

Estimated Time

90 minutes

Materials Needed

Activity 1:

- *Farming Around the World* PowerPoint
- *Farming Around the World* handout, 1 copy per student
- *Snapshot of Agriculture* handout, print 1 copy per class front to back

Activity 2:

- *USDA Food Expenditures by Country* table
- [Hungry Planet Family Food Portraits](http://menzelphoto.photoshelter.com/gallery/Hungry-Planet-Family-Food-Portraits/G0000zmgWvU6SiKM/C0000k7JgEHhEq0w) (<http://menzelphoto.photoshelter.com/gallery/Hungry-Planet-Family-Food-Portraits/G0000zmgWvU6SiKM/C0000k7JgEHhEq0w>)

Essential Files (maps, charts, pictures, or documents)

- [Farming Around the World handout](https://cdn.agclassroom.org/media/uploads/2016/04/25/Farming_Around_the_World_handout.pdf)
(https://cdn.agclassroom.org/media/uploads/2016/04/25/Farming_Around_the_World_handout.pdf)
- [Farming Around the World PowerPoint](https://cdn.agclassroom.org/media/uploads/2016/04/25/Farming_Around_the_World.pptx)
(https://cdn.agclassroom.org/media/uploads/2016/04/25/Farming_Around_the_World.pptx)
- [Snapshot of Agriculture handouts](https://cdn.agclassroom.org/media/uploads/2018/01/04/Snapshot_of_Agriculture.pdf) (https://cdn.agclassroom.org/media/uploads/2018/01/04/Snapshot_of_Agriculture.pdf)
- [USDA Food Expenditures by Country table](https://cdn.agclassroom.org/media/uploads/2016/04/14/USDA_Food_Expenditures_by_Country.xlsx)
(https://cdn.agclassroom.org/media/uploads/2016/04/14/USDA_Food_Expenditures_by_Country.xlsx)

Vocabulary Words

arable: suitable for growing crops

climate: the prevailing weather conditions in a specific area over a long period of time

Engel's Law: an observation in economics stating that as income rises, the proportion of income spent on food falls, even if absolute expenditure on food rises

growing season: the portion of the year where rainfall and temperature allow plants to grow

income: monetary payment received from work or other sources of payment

open space: portions of land that are not developed with buildings or other structures; areas where space can be utilized for farms and the production of food

temperate climate: climates that are generally moderate, not extremely hot or cold; changes between summer and winter are minimal

Did You Know? (Ag Facts)

- In proportion to total income, Americans pay the least for food when compared to other countries.¹
- People in developing countries spend the highest percentage of their income (over 40%) on food.²
- Grains make up 45% of the world's diet.²

Background Agricultural Connections

When we enter a grocery store in the United States we are surrounded by a wide variety of food. Our food ranges from highly processed prepared meals to fresh produce, meat, and dairy products. Why do American grocery stores have such a large variety of food? America is a large country that includes many climates, various types of soil, varying degrees of annual precipitation, well as access to machines and other technologies which maximize a farmer's ability to produce our food. How do each of these factors affect a country's ability to produce food?

Climate plays a huge role in the production of our food. Citrus fruits such as oranges, grapefruit, lemons, and limes require a tropical or subtropical climate. In the United States citrus fruits are grown primarily in Florida and Southern California. Tropical fruits such as pineapple, mangos, passionfruit, and papaya can be grown in Hawaii. Other berries and fruits such as strawberries, raspberries, peaches, and melons can be grown in more **temperate** climates as long as the length of the **growing season** is sufficient for the plants to produce their fruit. Other crops prefer cooler climates such as wheat, potatoes, sugar beets, and many vegetables such as broccoli, onions, lettuce, carrots, and spinach. After finding the ideal climate for plant growth, there must also be the appropriate type of soil and an adequate water supply for a successful harvest. The livestock that produce our meat, eggs, and milk are slightly more adaptable to various climates, especially with the use of modern animal husbandry practices which provide temperature controlled buildings and shelters in unsuitable weather. **Open space** is another important factor to consider in evaluating a country's capability to produce their own food. In some areas, residential populations or businesses are too dense for a farm which requires a lot of space for plant growth or the rearing of animals. Other countries, such as islands are simply just small and isolated. Visit the [World Bank Data](http://data.worldbank.org/indicator/AG.LND.AGRI.ZS) (<http://data.worldbank.org/indicator/AG.LND.AGRI.ZS>) website to compare the percentage of **arable** land in each country. Another factor determining a country's ability to provide their own food is their access to technology and machinery. All food *can* be grown with minimal machinery, but a farmer can produce much more with the help of machines and implements such as tractors, plows, planters, and harvesters. This adds to the struggle for many underdeveloped countries who farm like their ancestors. In addition to all of the favorable food-producing conditions that have been mentioned, the United States also has an infrastructure to transport, store, and preserve foods safely. In some cases we can utilize crops grown in various parts of the world which allow for year-round access to specific fruits and vegetables rather than only seasonal access.

The amount of money, or percentage of a family income that it takes to feed a family varies worldwide. If you consider each of the factors listed above, you can begin to understand why in 2014 the average US consumer spent 9.8% of their income on food. This represents the sum of 5.5% spent on food at home (purchases from grocery stores and other outlets) and 4.3% spent on meals away from homes (restaurants, school lunches, or other institutions).¹ There is an economic observation known as **Engel's Law**: As one's **income** goes up, the budget share for food goes down. This means that as income goes up, people have more money to spend on things other than food. At low income levels, people spend a high percentage of their money on food to survive.

Interest Approach - Engagement

1. Visit National Geographic's webpage titled [What the World Eats](http://www.nationalgeographic.com/what-the-world-eats/) (<http://www.nationalgeographic.com/what-the-world-eats/>). Project the webpage for students to see. Explain that each pie graph represents an average representation of each country's diet. It is represented in total daily calories as well as being broken down into food groups.
2. Explore and compare the pie graphs with students by having them guess and find the answer to the following questions:
 - "Which country consumes the most daily calories?" (*United States*) "Which country consumes the least calories?" (*Somalia*)
 - "Which country or countries proportionately consume the most/least grains? Can you think of a reason why?"
 - "Which country or countries proportionately consume the most/least meat? Can you think of a reason why?"
 - (Continue with other food groups until your students have a general idea of diets worldwide)
3. Summarize what students have learned from this webpage by pointing out that first world countries typically consume the most calories per day. Third world countries typically consume the least. Ask your students, "Since Americans consume the most calories, do you think they spend the highest proportion of their income purchasing their food? Do you think underdeveloped countries spend the smallest proportion of their income to purchase groceries?" Explain to your students that they will be learning the answers to these questions.

Procedures

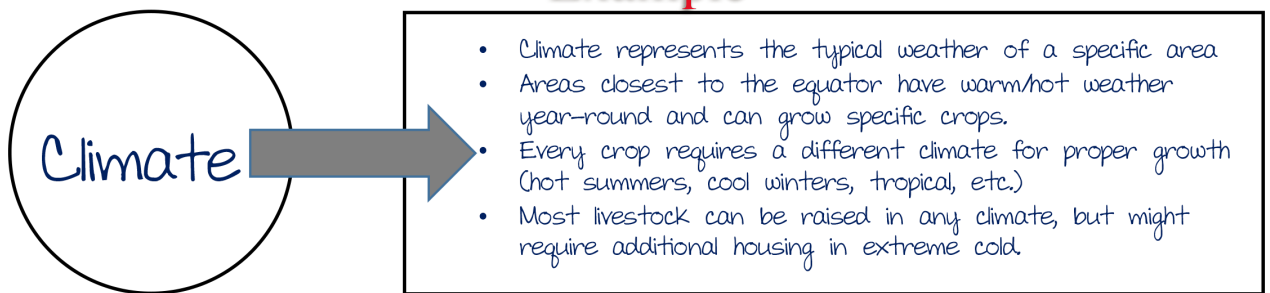
Activity 1: What factors affect a country's ability to produce their own food?

1. Ask your students where their food is produced (*farms*). Next, ask them where farms are located (*worldwide*). Explain that in the United States we have a plentiful food supply of a large variety of foods. At our grocery stores, we can purchase fresh produce year-round.
2. Display the *Farming Around the World* PowerPoint. Using the map on slide 2, ask your students if every country throughout the globe has the same factors influencing their food supply. Ask questions such as, "How do farms vary throughout the world? What crops are grown in which areas or countries? What animals are raised? Do farming practices vary? Why?" Brainstorm some of the differences your students imagine can be found on farms from continent to continent.
3. Give each student 1 copy of the *Farming Around the World* handout. Using the PowerPoint and the handout, explain to students how the following six factors impact food production in various parts of the world. Students will take notes

throughout the discussion following the example pictured to the right.

- **Climate:** Climate plays a large part in a farmer's ability to grow crops and raise the livestock that provide our food. Climate refers to the weather and seasons in a given area. Factors such as the length of a growing season and temperature are critical to successful crop growth and harvest.
- **Open space:** Whether growing crops or raising livestock, farmers need open space to farm. Some countries have ample open space and others have little open space with high populations creating difficulty to provide food for their own population.
- **Soil Quality:** Not all land has *arable* soil, or soil that is suitable for crop growth. Some soils are too sandy or contain too much clay and don't hold adequate nutrients or proper water drainage or absorption. Other soils may not be suitable to grow crops such as fruits, vegetables, and grains, but they are suitable to grow grasses which provide feed for livestock.
- **Water availability:** Water is a limited natural resource that is necessary to farming. Too much or too little water can be detrimental to a farm. Water requirements vary by crop.
- **Available Technology:** Farming requires a great deal of physical labor. Technology and machinery help to ease this burden and allow a farmer to produce more food. However, in some countries, particularly third world countries they may not have access to these advancements or may not be able to afford them. Technology also allows for food to be transported longer distances and preserved for later use.
- **Economics and Government:** Forms of government such as capitalism and socialism impact farming. Government policies may encourage or discourage farm production. Market pricing of agricultural crops, government subsidies, and regulations applied to farming practices may all impact farming in a positive or negative way.

Example



4. Once all six factors have been discussed, ask students which one is most important. Allow students to think about this question and help them understand that they are all important. These six factors influence farm productivity. If one factor is less than optimal, food production will be limited. Illustrate by giving examples such as:
 - **Deserts:** These areas have plenty of open space, a hot climate, and sandy soil. However, without adequate water, crops will not grow.
 - **High elevations:** Many mountain areas of the world have ample open space, fertile soil, and plenty of available water. However, the climate is cold leaving only a very short growing season in the summer that is not adequate time to plant and harvest a crop.
 - **Cities:** A large concentration of people live in most cities. Even if there was an ideal climate, soil, and water available there would not be space for a farm.
5. Divide your class into 12 groups. Give each group a *Snapshot of Agriculture* handout. Instruct students to research the country they have been given and find the answers to the questions contained on the handout. Have student groups share with the class what they learn about their assigned country. These facts will prepare students for *Activity 2*.
 - **Optional Activity:** If your students can access Google Earth, assign each group to make a Google Earth Farm Tour of their country showing the landscape and terrain of the country along with any farms they can locate through an internet search. Many tutorials can be found on YouTube to learn how to create a "virtual tour." Farm images can be found through a Google image search. Encourage students to accurately find the location of the picture as well as to be sure the image represents a common agricultural practice.

Activity 2: How do grocery bills differ throughout the world?

1. After completing *Activity 1*, students should be able to understand the factors affecting a country's capability to produce food. Introduce the concept that culture also plays a role in eating habits and dietary choices.
2. Ask students to brainstorm a list of things families in the U.S. spend money on. Organize the items into expense categories (food, clothing, housing, recreation, transportation, etc.)
3. Prioritize the list beginning with the most essential category leading down to the least essential category. Discuss how priorities would change if your available budget became smaller. Which categories would they decrease their spending if the need arose?
4. Display the attached table, *USDA Food Expenditures by Country*. This table can also be accessed directly through the [USDA website](http://www.ers.usda.gov/data-products/food-expenditures.aspx#26636). (<http://www.ers.usda.gov/data-products/food-expenditures.aspx#26636>) Have students begin to make observations about the statistics and find correlations.
5. Show students the [Hungry Planet Family Food Portraits](http://menzelphoto.photoshelter.com/gallery/Hungry-Planet-Family-Food-Portraits/G0000zmgWvU6SiKM/C0000k7JgEHhEq0w) (<http://menzelphoto.photoshelter.com/gallery/Hungry-Planet-Family-Food-Portraits/G0000zmgWvU6SiKM/C0000k7JgEHhEq0w>). Each picture has a family in various parts of the world along with the groceries they would consume in a typical week.
6. As you view the pictures, encourage students to apply what they have learned so far and discuss the culture, geographic locations, and the average cost of food for each group as you view the pictures.

Concept Elaboration and Evaluation

1. Introduce students to *Engel's Law* and explain that in economics, as income rises, the proportion of income spent on food falls, even if the actual expenditure on food rises.
2. To summarize this activity, refer back to the questions posed in the *Interest Approach*. "Since Americans consume the most calories, do they spend the highest proportion of their income to purchase groceries? Do you think under developed countries spend the smallest proportion of their income to purchase groceries?"
3. Review and summarize the following key concepts:
 - Agriculture is a global economy.
 - Agricultural resources vary from country to country. Not every country has an adequate climate, natural resources, skills, or technology to produce and access a healthy food supply.
 - Many under-developed countries face economic challenges in being able to provide food.



We welcome your [feedback](https://usu.co1.qualtrics.com/jfe/form/SV_4HhIVpN4L8IC2IT) (https://usu.co1.qualtrics.com/jfe/form/SV_4HhIVpN4L8IC2IT)! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Enriching Activities

- Have the students Google a grocery flyer from a different country. Have them use the items on the flyer to purchase and plan a week's worth of meals for a family of four.

Sources

1. <http://www.ers.usda.gov/data-products/food-expenditures.aspx#26636> (http://www.ers.usda.gov/data-products/food-expenditures.aspx#26636)
2. <http://www.one.org/us/2014/11/12/14-surprising-stats-about-global-food-consumption/> (http://www.one.org/us/2014/11/12/14-surprising-stats-about-global-food-consumption/)

Suggested Companion Resources

- [Crop Intensity Maps](https://www.agclassroom.org/matrix/resource/966/) (https://www.agclassroom.org/matrix/resource/966/)
- [Interactive Map: Staple Food Crops of the World](https://www.agclassroom.org/matrix/resource/694/) (https://www.agclassroom.org/matrix/resource/694/)
- [World Hunger Map](https://www.agclassroom.org/matrix/resource/810/) (https://www.agclassroom.org/matrix/resource/810/)
- [Food Facts: 7 Reasons to Eat Insects](https://www.agclassroom.org/matrix/resource/961/) (https://www.agclassroom.org/matrix/resource/961/)
- [TEDMED Talk: What Does the World Eat?](https://www.agclassroom.org/matrix/resource/690/) (https://www.agclassroom.org/matrix/resource/690/)
- [Will the Last Farmer in America Please Turn Out the Light? video](https://www.agclassroom.org/matrix/resource/944/) (https://www.agclassroom.org/matrix/resource/944/)
- [Digesting the Global Food System](https://www.agclassroom.org/matrix/resource/553/) (https://www.agclassroom.org/matrix/resource/553/)
- [Dirt to Dinner](https://www.agclassroom.org/matrix/resource/956/) (https://www.agclassroom.org/matrix/resource/956/)
- [Food Security & Nutrition Around the World](https://www.agclassroom.org/matrix/resource/721/) (https://www.agclassroom.org/matrix/resource/721/)
- [Hungry Planet Family Food Portraits](https://www.agclassroom.org/matrix/resource/703/) (https://www.agclassroom.org/matrix/resource/703/)

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National Agriculture in the Classroom