



Feeding the Planet

Lesson 4 - Sustainable Agriculture: Production

National Learning Standards:

- HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats in order to address a question or solve a problem.

Grade Level: 9-12

Lesson Length: 60 minutes

Learning Objectives:

Participants will:

- Categorize agricultural commodities into the four uses of agricultural products – food, fiber, fuel, and shelter.
- Define key terms related to food security.
- Explore food security on a global scale, including affordability, availability, quality, and safety of various farm outputs.

Materials and Equipment Needed:

- Production Sustainability PowerPoint
- Butcher paper or tear sheet (1 per group)
- Markers and/or colored pencils
- Access to the internet
- Feeding the Planet Activity Sheets (1 per student)

Cross-Curricular Connections:

Use these suggested adaptations to make learning across the curriculum easy!

Science	Technology	Engineering	Mathematics
Explore the impact of biological advancements in agricultural production methods. Suggested resource: Bringing Biotechnology to Life www.agfoundation.org/bringing-biotech-to-life/	Research the impact of planting and harvesting technology, such as GPS units in tractors.	Create a Venn Diagram to compare and contrast the engineering design of a piece of production equipment used today, and in the past.	Evaluate production and price data provided by the USDA Economic Research Service: www.ers.usda.gov/

Teacher Preparation:

- Print Feeding the Planet Activity Sheets.
- Cut out butcher paper, if necessary.
- Reserve access to the computer lab/cart, if necessary.



Lesson

Introduction (Anticipatory Set) • 5 minutes

STEP 1: Food, fiber, fuel, and shelter are the main uses for agricultural products. Using the student worksheet, direct students to brainstorm as many agricultural products as they can that fit in each category.

- o Have a few students share their products aloud and ask students to write down products they may not have brainstormed.
- o *What do all the items we listed have in common? Where do they come from? Why do farmers grow crops? These agricultural products, and many more, are demands that we as consumers place on the farmers and ranchers who grow crops and raise animals. They produce agricultural commodities because of basic supply and demand. Can we produce enough calories to meet the growing population's food, fiber, fuel and shelter needs? Let's dig into each of the categories a little deeper to find out more.*

Input and Modeling • 15 minutes

STEP 2: Let's focus on our primary reason for growing crops – food – and look at one of the main concerns with food – whether or not people have it.

- o Have students define the three following terms using the fill-in-the-blank on their activity sheet. Review to make sure everyone has the right terms written down.
 - **Food secure:** “no reported indications of food-access problems or limitations.”
 - **Food insecure:** “a household-level economic and social condition of limited or uncertain access to adequate food.”
 - **Hunger:** “an individual-level physiological condition that may result from food insecurity.”ⁱ
- o *What are the underlying factors affecting food security? See if any of the students can guess correctly, and then reveal the main factors.*^{ii, iii}
 - **Availability (and access)**
 - **Affordability**
 - **Quality and Safety (and utilization)**
- o *How is hunger in the U.S. different from other places around the world?*
 - Using a projector and screen connected to the internet, visit the Global Food Security Index website at foodsecurityindex.eiu.com/Country and click on the U.S.
 - Show the class the U.S. and share with them the following information from the website:
 - **Country Name:** U.S.
 - **Overall Food Security Ranking:** 9
 - **Challenges:** Food security and access policy commitments
 - **Affordability:** Food consumption as a share of household expenditure, presence of food safety net programs, and access to financing for farmers
 - **Availability:** Sufficiency of supply
 - **Quality and Safety:** Nutritional standards and ability to store food safely
 - **Natural Resources and Resilience:** Early warning measures/climate-smart agriculture



Checking Understanding and Guided Practice • 20 minutes

STEP 3: Direct students to form a group of three, choose any country except the U.S., and gather the information listed below from the website. The students will create an infographic with that information. Have students hang posters on the wall when they're finished.

- o Country Name
- o Overall Food Security Ranking
- o Challenges
- o Affordability
- o Availability
- o Quality and Safety
- o Natural Resources and Resilience

Have students walk around the classroom looking at each poster once everyone finishes. Discuss what students noticed.

Independent Practice • 10 minutes

STEP 4: Have students brainstorm ideas to solve the challenges they saw. Have them write their ideas on their handout and elicit student answers.

Wrap-Up (Review, Assess, Challenge) • 10 minutes

STEP 5: Have students individually, or in pairs, visit www.agfoundation.org and complete the "Sustainable Agriculture: Production" module within the "Sustainable Agriculture Online Learning Experience" https://www.agfoundation.org/files/sustainable_agriculture_rise/#/

- o Challenge students to review the content and reflect in their notes on two new concepts they discovered, and one question they still have.
- o Have students share their reflections and note information for continued investigation.



Directions

List as many agricultural products as possible in each category.

Food	Fiber
Fuel	Shelter

Directions

Fill in the blanks to define these terms:

- **Food secure:** _____ reported indications of _____ problems or _____.
- **Food Insecure:** A _____ economic and _____ condition of limited or uncertain _____ to _____ food.
- **Hunger:** An _____ physiological condition that may result from _____.

Three factors affecting food security:

- 1.
- 2.
- 3.



Website: foodsecurityindex.eiu.com/Country

Country Name:

Overall Food Security Ranking:

Challenges:

Availability:

Affordability:

Quality and Safety:

How can we help people be more food secure?



References:

- ⁱ USDA ERS. (2016, October). Definitions of food security. Retrieved from <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/definitions-of-food-security/>
- ⁱⁱ World Food Programme. (2017). What is food security? Retrieved from <https://www.wfp.org/food-security-analysis>
- ⁱⁱⁱ The Economist Group. (2021). Global food security index. Retrieved from foodsecurityindex.eiu.com/Country