



GROWING YOUR COMMUNITY

Challenge Guide

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Challenge Rationale

Students can contribute locally to the impact problems of population growth, access to resources, limited space for growing food, and year-round plant-based food production. After thoughtful research to evaluate how these challenges exist globally and locally, students will assess their local food system and create a solution to help minimize food insecurity in their community. The final product will be a functioning soil-based growing space for edible plants and products to benefit the area food system with an emphasis on community partnerships.

Establishing The Challenge

Identify a Challenge

According to the United States Department of Agriculture, food insecurity is defined as a household's consistent access to adequate food being limited by a lack of money and other resources at times during the year.¹ Often, we think of this as being a problem affecting only third-world countries. However, Feeding America shares that 42 million Americans live in food-insecure households.² Often, we think of individuals who are living with food insecurity as being homeless or easy to identify, but they could be your neighbor or even a classmate. What can we do to help solve this problem? One way to start solving this problem of food insecurity is to create sustainable local food systems.

¹U.S. Department of Agriculture, Economic Research Service. (2016). Definitions of food security. Retrieved from <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security/>

²Feeding America. (2017). Feeding America. Retrieved from www.feedingamerica.org

Establishing The Challenge

Challenge Question

With the challenge of food insecurity in communities across the globe, your team has been selected to assess your local food system and create a solution to help maximize food production and community partnerships while minimizing food insecurity in your community.

THIS SOLUTION MUST ADDRESS THE FOLLOWING NEEDS:

- Produce a variety of edible plants in a soil-based growing space
- Complete a needs assessment related to food and hunger in the community
- Maximize community impact with food products and partnerships

SUCCESS WILL BE DETERMINED BY:

- Creating, constructing, and maintaining an environment that is suitable for edible plant growth
- Showing progress towards a food-based long-term solution for the local community
- Demonstrating development and maintenance of community partnerships for the benefit of local food security

Standards Addressed

Next Generation Science Standards

nextgenscience.org

- MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- MS-LS21 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

Common Core Standards

corestandards.org/mathematics-standards/

- CCSS.MATH.CONTENT.6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
- CCSS.MATH.CONTENT.7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
- CCSS.MATH.CONTENT.8.EE.B.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Standards Addressed

Voluntary National Content Standards in Economics

<https://www.councilforeconed.org/wp-content/uploads/2012/03/voluntary-national-content-standards-2010.pdf>

- Content Standard 3: Allocation: Students will understand that different methods can be used to allocate goods and services. People acting individually or collectively must choose which methods to use to allocate different kinds of goods and services
- Content Standard 13: Income: Students will understand that income for most people is determined by the market value of the productive resources they sell. What workers earn primarily depends on the market value of what they produce.
- Content Standard 15: Economic Growth: Students will understand that investment in factories, machinery, new technology, and in the health, education, and training of people stimulates economic growth and can raise future standards of living.
- Content Standard 18: Economic Fluctuations: Students will understand that fluctuations in a nation's overall levels of income, employment, and prices are determined by the interaction of spending and production decisions made by all households, firms, government agencies, and others in the economy. Recessions occur when overall levels of income and employment decline.

Guiding The Challenge

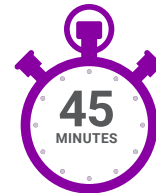
Each Purple Plow Challenge can be implemented in a variety of methods, time frames, and programs. Follow the steps below to help determine how this challenge will best fit the current situation and educational environment.

1. **REVIEW** the Purple Plow “Design Process” (next page) and the “Lesson Packet” documents.
Note that the lessons are encouraged but not required.
2. **EXAMINE** the suggested timeline to determine ways to integrate the challenge and lessons to fit your needs.
3. With the time frame in mind, **USE THE GUIDANCE PROVIDED** in this section to help students progress through the challenge. This guidance includes suggested student prompts, guiding questions for students, signs of step completion, and journaling opportunities. The student prompts, guiding questions, and journal prompts are found in the “Student Guide.” Facilitators or students may determine the method by which they record their research and discoveries found for these prompts and journal reflection questions.

SUGGESTED TIMELINE

This sample pacing guide is created for a 90-day calendar with a 45-minute class. It is important to remember that timing may vary on student’s pace, as well as how much time you dedicate to each of the steps listed below. Your students may return to certain steps and repeat the process, no journey is the same!

DESIGN PROCESS STEP	TIMELINE
Identify	5 days
Imagine	8 days
Design	5 days
Create	6 days
Test & Improve	61 days
Share	5 days



Guiding The Challenge

To fulfill the requirements of the challenge, you will need time beyond the allotted program time above. Possible options for competing include:

- Sending the constructed growing structure and related materials home with students wishing to compete (participating in regular progress monitoring of project with facilitator)
- Developing continuation options in an after-school or extra-curricular club with facilitator
- Including parents in the process of continuing the investigation (with option of providing space at school to keep project)

Challenge Design Process



IMAGINE

Brainstorm solutions to the problem. List all ideas – don't hold back! Discuss and select the best possible solution.

CREATE

Follow the design plan and build the prototype.

SHARE

Communicate what was learned. Share the design, data, and conclusions. Present results.

IDENTIFY

Define the problem and how it is affecting life globally, nationally, and locally. Research and consider how others have approached solving the problem. Describe why this problem needs a solution. Determine constraints (e.g., time, space, resources, etc.).

DESIGN

Diagram the prototype. Identify the materials needed to build the prototype. Write out the steps to take. Describe the expected outcomes.

TEST & IMPROVE

Test the design and collect quantitative and qualitative data. Discuss results and compare with the expected outcomes. Seek areas of improvement and make changes where needed.



Materials list

Suggested Materials list

The items listed below are suggested materials needed to conduct the challenge. Facilitators and students are encouraged to be creative and inventive in acquiring the materials needed to complete the challenge (e.g., purchased, recycled, donated, etc.).

MATERIALS REQUIRED	SUGGESTED MATERIAL OPTIONS
• Space for plants to grow • Plants • Computer for word processing and simple graphic design • Computer with internet access	• Outdoor space, raised beds or containers • Seeds or plant starts • Feeding America’s “Map the Meal Gap” website available at http://map.feedingamerica.org/

STEP ONE

1 | IDENTIFY



Purpose of Step

Define the problem and how it is affecting life globally, nationally, and locally. Research and consider how others have approached solving the problem including how people have addressed this problem historically. Describe why this problem needs a solution. Determine constraints (e.g., time, space, resources, etc.).

Student Prompts and Guiding Questions:

- What is food insecurity?
 - a. What is the level of food insecurity in the United States and in your local community?
 - b. What are some ways to help reduce food insecurity?
 - c. What resources and community partnerships are available locally and could help with food insecurity issues?
- Conduct a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis of your growing space.
 - a. What kind of foods grow in your local environment and are best for distribution into the community?
- Conduct a SWOT analysis of your community with regards to food access.

Signs of Step Completion

Students will present a description of the challenge to the facilitator. They should include how this problem affects communities globally, nationally, and locally. The description should also include ways in which others have addressed finding a solution and constraints to be considered (e.g., time, space, resources, etc.).

AT THE COMPLETION OF THIS STEP, DIRECT STUDENTS TO THE REFLECTION QUESTIONS IN THE "GROWING YOUR COMMUNITY" STUDENT GUIDE.

STEP TWO

2 | IMAGINE



Purpose of Step

Brainstorm solutions to the challenge. List all of your ideas – don't hold back! Discuss and select the best possible solutions.

Student Prompts and Guiding Questions:

- What solutions support sustainable food security in your community?
- What community partnerships will be most valuable in progressing your goal as a team?
- What does the soil-based space look like for your specific environment?
 - a. What materials and resources will you need to create this space? What other items will you need (e.g., seeds, plant starts, fertilizer, garden tools, etc.)?
- How do the growth zones and growing seasons affect your plant choice?
- What external factors do you need to consider when planting and maintaining (e.g., wildlife, pests, soil inputs, etc.)?
- How will your growing space interact with the surrounding environment?
- How will your team develop constructive community partnerships?
 - a. How will you initiate and sustain these relationships?
 - b. What can you develop to help in the development of these relationships (e.g., business plan, goal statement, etc.)?
- What is the benefit of making this a community effort?
- How will you sustain the effort to reduce food insecurity in your community after the challenge season ends?

Signs of Step Completion

Students will present a list of possible solutions to the identified challenge to the facilitator.

AT THE COMPLETION OF THIS STEP, DIRECT STUDENTS TO THE REFLECTION QUESTIONS IN THE "GROWING YOUR COMMUNITY" STUDENT GUIDE.

STEP THREE

3 | DESIGN



Purpose of Step

Develop a possible solution and identify the materials needed to provide evidence for why the solution is creative, unique, and sustainable. Write out the steps to take and describe the expected outcomes.

Student Prompts and Guiding Questions:

- Design a soil-based growing space that meets the demands set forth in the challenge.
- Determine what specific materials will be needed.
- What plants will successfully grow and be accepted as food in the community?
- Create a supply list and budget including potential resources and partnerships for financing the project.
- Describe the outreach tactics and deliverables for community partnerships.
 - a. List out potential community partners.
 - b. Plan for communication.
 - c. Describe how you will reach out to partners. Identify the timeline for the challenge season and beyond.
- Describe how the food will be harvested and sent through distribution channels in your community to best impact areas of food insecurity.

Signs of Step Completion

The students will present a detailed description of the solution as well as a written plan of how it could be carried out. Look for the following in the plan: a materials list with budget (if building a physical model or conducting lab research), detailed directions, and expected outcomes.

AT THE COMPLETION OF THIS STEP, DIRECT STUDENTS TO THE REFLECTION QUESTIONS IN THE "GROWING YOUR COMMUNITY" STUDENT GUIDE.

STEP FOUR

4 | CREATE



Purpose of Step

Follow the design plan and construct the solution.

Student Prompts and Guiding Questions:

- Use all research, knowledge gained, and the design plan to implement the growing space as well as community partnerships.
- Revisit any of the previous steps for clarification or refinement as needed.
- Consider the parameters of the challenge and what needs to be accomplished for a successful challenge.

Signs of Step Completion

The students will construct the solution and share with the facilitator.

AT THE COMPLETION OF THIS STEP, DIRECT STUDENTS TO THE REFLECTION QUESTIONS IN THE "GROWING YOUR COMMUNITY" STUDENT GUIDE.

STEP FIVE

5 | TEST & IMPROVE



Purpose of Step

Test the design and collect qualitative and quantitative data. Discuss results and compare with the expected outcome. Seek areas of improvement and make changes where needed.

Student Prompts and Guiding Questions:

- Analyze the process of gaining community partnerships and adjust as needed.
- Maintain the growing space for maximum food production.
- Create data tables, graphs, photographs, and other appropriate supporting materials.
- Maintain community partnerships through a variety of means (e.g., updates, presentations, phone calls, etc.).
- Connect with local food distributors who are also advocating to reduce food insecurity in the community. Collaborate as the opportunity allows.
- What other factors are affecting all of the systems and what observations can be collected?

Signs of Step Completion

The students will keep records of all test trials and share data with the facilitator. Entries should include both qualitative and quantitative data. The students will also share recordings of any improvements made to the solution and the effect they had on the outcome.

AT THE COMPLETION OF THIS STEP, DIRECT STUDENTS TO THE REFLECTION QUESTIONS IN THE "GROWING YOUR COMMUNITY" STUDENT GUIDE.

STEP SIX

6 | SHARE



Purpose of Step

Communicate what was learned throughout the challenge. Share the design process, data, and conclusions on how the solution answers the challenge question.

Student Prompts and Guiding Questions:

- Develop a presentation including knowledge gained, design plans, partnerships, and strategies for sustainable influence in the community in the area of food insecurity.

Signs of Step Completion

The students will present what was learned through the design process, including sharing how the solution addresses the problem, key aspects of design, data from test trials, and end results.

Extension Possibilities

- Partner with a local food bank to give them produce from the growing space.
- Collaborate with a community-based meal service for donation of food as well as help with food preparation and serving.

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