PRODUCE SAFETY UNIVERSITY

Virtual Edition

Table of Contents

My Action Notes

When I get back I want to:

Do this…	Because…
Use the Take-Home Training for Professional Standards slides and speakers notes that are on the flash drive to train others	This knowledge is too cool to keep to myself!

Overall PSU Goals

PRODUCE SAFETY UNIVERSITY

Provide Child Nutrition Professionals the tools to:

- Identify and mitigate food safety risks associated with produce.
- Increase produce shelf life, prevent spoilage and reduce waste.
- Improve student acceptance of produce.
- Control produce costs.
- Engage the community and support local agriculture.
- Apply best practices for writing produce specifications.

Objectives of Produce Safety University

PRODUCE SAFETY UNIVERSITY

Identify and mitigate food safety risks

Increasing Shelf Life, Preventing Spoilage, Reducing Waste

Improving Student Acceptance

Control Produce Costs

Involving the Community, Supporting Local Agriculture

Specification writing best practices

INSERT "Where does your produce come from?" TAB

Where Does Your Produce Come From?

PRODUCE SAFETY UNIVERSITY

Tom Schwartz
Master Trainer
Specialty Crops Division,
USDA AMS

USDA
United States Department of Agriculture

Objectives

PRODUCE SAFETY UNIVERSITY

- Identify different growing areas and types, harvesting, processing and distribution of fresh produce.
- Explain the complexities and challenges of food safety in the global food supply.

Introduction

PRODUCE SAFETY UNIVERSITY

Key Points

What

- Discuss the diverse global food/produce areas that supply fresh produce, and how food safety has made an impact.

Why

- Examining how produce is handled impacts the decisions of procurement.

How

- By identifying all areas of risk.

Global Food Supply

PRODUCE SAFETY UNIVERSITY

Growers
- Production
- Farming

Handlers
- Brokers
- Processors

Outlets
- Wholesale
- Retail

Consumer

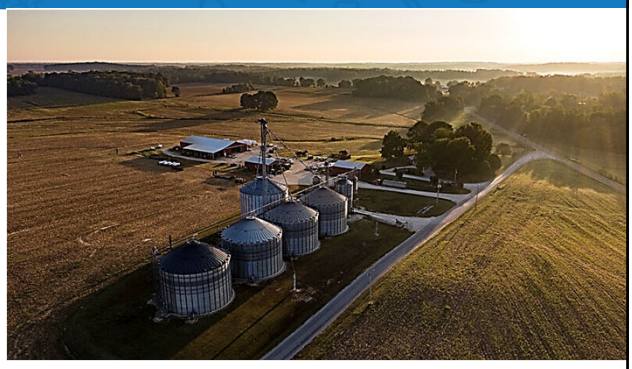
Growing Produce

What is a Farm?

PRODUCE SAFETY UNIVERSITY

Primary Production Farm

- Under one management in one general location
- *Growing crops*
- Harvesting Crops
- Raising Animals
- Pack or hold raw agricultural commodities
- Limited manufacturing/processing activities



What is a Farm?

PRODUCE SAFETY UNIVERSITY

Secondary Activities Farm

- Separate location from the primary production farm but majority owned by the same entity as the primary farm.
- Further harvests (shelling, hulling, packs or holds).

Farm examples

PRODUCE SAFETY UNIVERSITY

Farms

PRODUCE SAFETY UNIVERSITY

Growing Areas

PRODUCE SAFETY UNIVERSITY

Growing Areas

PRODUCE SAFETY UNIVERSITY

Growing Areas

PRODUCE SAFETY UNIVERSITY

Hydroponic

PRODUCE SAFETY UNIVERSITY

Greenhouse – Vertical growing

PRODUCE SAFETY UNIVERSITY

Aquaponic

PRODUCE SAFETY UNIVERSITY

Urban Growing

PRODUCE SAFETY UNIVERSITY

Harvesting

PRODUCE SAFETY UNIVERSITY

Processors

PRODUCE SAFETY UNIVERSITY

Processors

PRODUCE SAFETY UNIVERSITY

Wholesalers/Distributors

PRODUCE SAFETY UNIVERSITY

Distributors

PRODUCE SAFETY UNIVERSITY

Apple Production

Apple Production

PRODUCE SAFETY UNIVERSITY

Apple Packing

PRODUCE SAFETY UNIVERSITY

Storage

PRODUCE SAFETY UNIVERSITY

- Controlled Atmosphere
- Oxygen Reduced
- Temperature Maintained
- Humidity Controlled
- Carbon Dioxide Monitored
- Ethylene is "Cleaned"

Safety in the Supply Chain

Terminal Market

PRODUCE SAFETY UNIVERSITY

Farmer's Market

PRODUCE SAFETY UNIVERSITY

Retail

PRODUCE SAFETY UNIVERSITY

School Foodservice

PRODUCE SAFETY UNIVERSITY

INSERT "Food Safety Overview" TAB

Food Safety Overview

PRODUCE SAFETY UNIVERSITY

Lauren McClean
Food Safety Specialist
USDA FNS Office of Food Safety

USDA United States Department of Agriculture

Objectives

PRODUCE SAFETY UNIVERSITY

- Provide a brief overview of the food safety system in the United States.
- Understand the food safety hazards associated with fresh produce.
- Identify which foodborne illnesses are typically associated with produce.

Introduction

PRODUCE SAFETY UNIVERSITY

Key Points

What

- Fundamentals of food safety including food safety hazards
- The connection between food safety and produce safety

Why

- Foodborne illness outbreaks associated with fresh produce continue to be a concern.
- Understanding what the food safety risks are and how to reduce them helps to prevent illness among students and ensure that meals are safe.

How

- The resource below provides information about foodborne disease-causing organisms that frequently cause illness in the United States
- **Foodborne Illness Causing Organisms in the U.S.**

Food Safety Regulations

The Role of Government

PRODUCE SAFETY UNIVERSITY

Federal — State — Local

- Set food safety standards
- **Ensure standards are met** (through inspections and investigations)
- Maintain a strong **enforcement** program to address non-compliance
- **Collaborate** and **engage** in partnerships to expand public health education and awareness

Key Federal Players

PRODUCE SAFETY UNIVERSITY

- **FSIS**: Regulates meat, poultry, egg products, and siluriformes.
- **FDA**: Regulates shell eggs, seafood, and all other foods, including produce.
- **CDC**: Investigates and monitors foodborne outbreaks.

The Fundamentals

PRODUCE SAFETY UNIVERSITY

What is Food Safety?

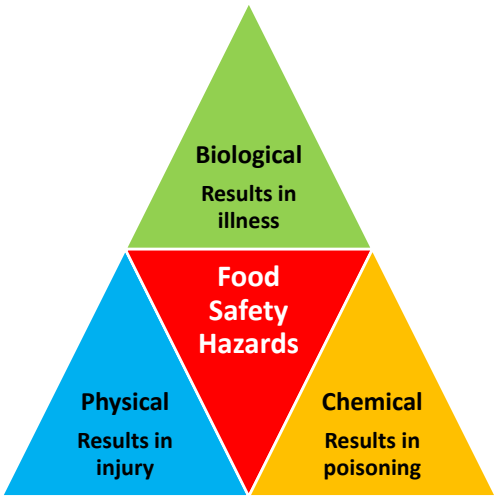
Conditions and practices that prevent the **unintentional contamination** of food

Unintentional contamination may result from **food safety hazards**

A food safety hazard is a **biological, chemical, or physical** property that may cause a food to be **unsafe for human consumption**

Food Safety Hazards

PRODUCE SAFETY UNIVERSITY



Physical Hazards

PRODUCE SAFETY UNIVERSITY

- **Naturally occurring**
  Pits, shells, seeds, bones, etc.
- **Foreign materials**
  Glass, plastic, wood, metal, stones, personal items, etc.
- **Risks: Traumatic injury**
  - Choking
  - Damaged teeth or gums
  - Laceration or perforation

Chemical Hazards

PRODUCE SAFETY UNIVERSITY

- **Naturally occurring**
  - Mycotoxins
    - Aflatoxins (e.g., corn products)
    - Patulin (e.g., apple juice)
  - Toxic mushroom species
- **Added**

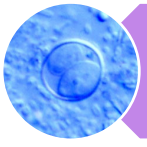
  Environmental contaminants (e.g., pesticides, fertilizers)
- **Risks: Acute poisoning or chronic illness**

Biological Hazards

PRODUCE SAFETY UNIVERSITY

Bacteria

Viruses



Parasites

Common Foodborne Illnesses

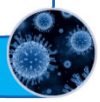
PRODUCE SAFETY UNIVERSITY

Salmonellosis

- Onset time: 6 - 48 hours
- Symptoms: Diarrhea, fever, abdominal cramps, vomiting
- Duration: 4 - 7 days

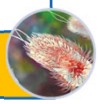
Norovirus Infection

- Onset time: 12 - 48 hours
- Symptoms: Nausea, vomiting, abdominal cramps, diarrhea, fever, headache
- Duration: 12 - 60 hours



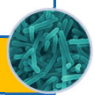
***E. coli* 0157:H7 Infection**

- Onset time: 6 - 48 hours
- Symptoms: Severe (bloody) diarrhea, abdominal cramps, vomiting; potential kidney failure
- Duration: 1 - 8 days



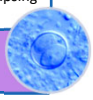
Listeriosis

- Onset time: 9 - 48 hours GI illness; 2 -6 weeks invasive disease
- Symptoms: Fever, muscle aches, and nausea or diarrhea. Pregnant women: Premature delivery or stillbirth.
- Duration: Variable



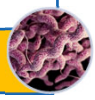
Cyclosporiasis

- Onset time: 1 - 14 days; typically at least 1 week
- Symptoms: Watery diarrhea, loss of appetite, weight loss, abdominal cramps, nausea, vomiting, fatigue
- Duration: May be remitting/ relapsing over weeks/months



Campylobacteriosis

- Onset time: 2 - 5 days
- Symptoms: Diarrhea (may be bloody), abdominal cramps, fever, vomiting
- Duration: 2 - 10 days



Biological Hazards

Factors that Influence Microbial Growth

Factors That Influence Microbial Growth

PRODUCE SAFETY UNIVERSITY

Bacteria need **six conditions** to grow in food.

- **F**ood
- **A**cidity
- **T**ime
- **T**emperature
- **O**xygen
- **M**oisture

Plant Characteristics

PRODUCE SAFETY UNIVERSITY

- **Surface topography**
  - Wax layers
  - Cell walls
- **Physical damage**
  - Unintentional
  - Intentional

*A **nutritive food source** is critical for bacterial growth.*

Fresh-Cut Produce

PRODUCE SAFETY UNIVERSITY

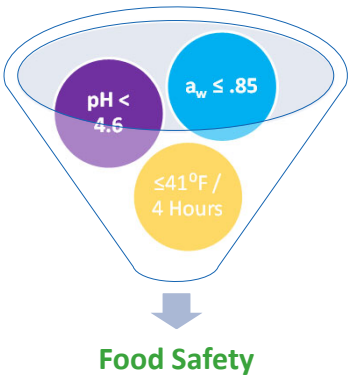
Fresh-cut, by definition, indicates that the plant's **protective cell layers are injured**.

The natural exterior barrier is broken.

Time/Temperature Control for Safety (TCS) Food

PRODUCE SAFETY UNIVERSITY

- Requires **time / temperature** control to limit pathogen growth or toxin formation
- **Acidity** (pH) and **moisture** (a_w) content determine if a food is TCS.
- The FDA Food Code lists **raw seed sprouts**, **cut melons**, **cut leafy greens**, and **cut tomatoes** as TCS foods.



Food Safety

Note: Values shown in image are general.

Oxygen Requirements

PRODUCE SAFETY UNIVERSITY

Different types of bacteria need **different levels of oxygen** to grow.

- **Anaerobic** cells cannot tolerate oxygen.
- **Aerobic** cells require oxygen.
- **Facultative anaerobes** can grow with or without oxygen. Most foodborne pathogens are facultative anaerobes.

Foodborne Outbreaks

What's causing illness?

Food Safety in the United States

PRODUCE SAFETY UNIVERSITY

Foodborne illness:
Results from eating contaminated food

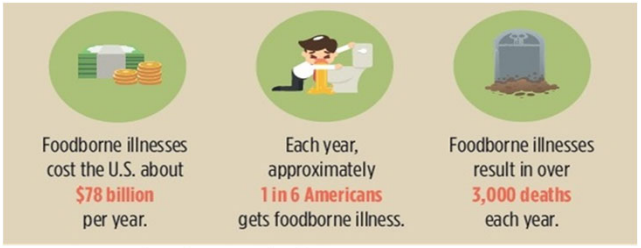


Image Source: CDC National Center for Environmental Health

Foodborne outbreak: Two or more persons experience a similar illness after ingestion of a common food and epidemiologic analysis implicates the food as the source of the illness

CDC Attribution Estimates, 1998 – 2008

PRODUCE SAFETY UNIVERSITY

Contribution of Different Food Categories to Estimated Domestically-Acquired Illnesses and Deaths, 1998-2008

Figure 1. Contribution of different food categories to estimated domestically-acquired illnesses and deaths, 1998-2008*

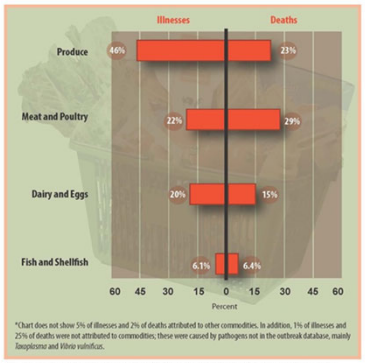


*Chart does not show 5% of illnesses and 2% of deaths attributed to other commodities. In addition, 1% of illnesses and 25% of deaths were not attributed to commodities; these were caused by pathogens not in the outbreak database, mainly *Toxoplasma* and *Vibrio vulnificus*.

Recent Foodborne Outbreaks Associated With Produce

PRODUCE SAFETY UNIVERSITY

October 2021

***Salmonella* Oranienburg**

Linked to whole, fresh onions

November 2021

***E. coli* O157:H7**

Linked to packaged spinach

Recent Foodborne Outbreaks Associated With Produce

PRODUCE SAFETY UNIVERSITY

December 2021

Listeria monocytogenes

2 outbreaks linked to packaged salad

Food Safety in Schools

PRODUCE SAFETY UNIVERSITY

Schools are doing a great job ensuring that kids are served safe meals!

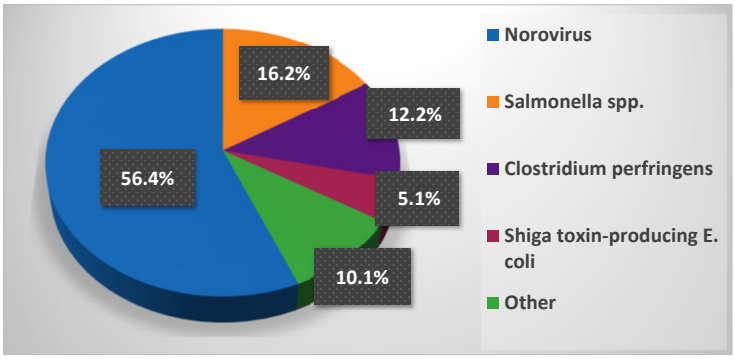
of all **foodborne outbreaks** reported to the CDC are associated with schools.

However, foodborne outbreaks do occur. **Outbreaks in schools have more illnesses** than outbreaks in non-institutional settings.

State Reported Foodborne Outbreaks in Schools, 2000 - 2010

PRODUCE SAFETY UNIVERSITY

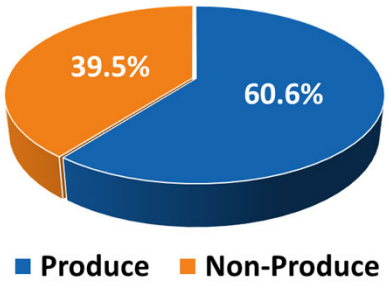
122 foodborne outbreaks and 7,603 foodborne illnesses



*STEC includes pathogenic and non-pathogenic Shiga-toxin producing *E. coli*

Estimated % of Illnesses Caused by Norovirus

PRODUCE SAFETY UNIVERSITY



Contamination Sources

PRODUCE SAFETY UNIVERSITY

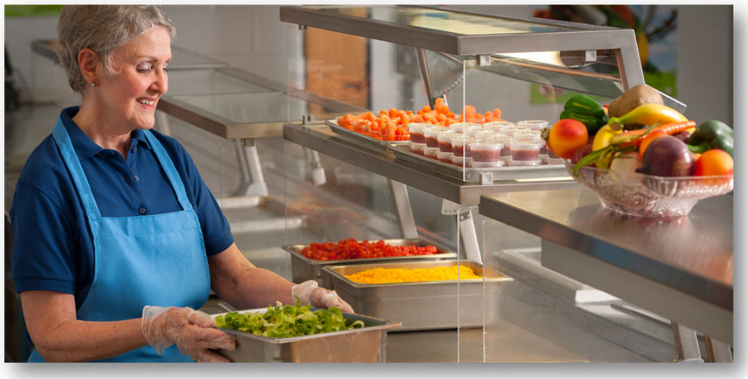
A foodborne outbreak indicates that something in **the food safety system needs to be improved**. The system includes:

- Production
- Processing
- Packing
- Distribution/Transportation
- Storage
- Preparation

Conclusion

PRODUCE SAFETY UNIVERSITY

Produce safety is important and food safety hazards can be minimized.



FDA Foodborne Illness-Causing Organisms in the U.S. WHAT YOU NEED TO KNOW

While the American food supply is among the safest in the world, the Federal government estimates that there are about 48 million cases of foodborne illness annually–the equivalent of sickening 1 in 6 Americans each year. And each year these illnesses result in an estimated 128,000 hospitalizations and 3,000 deaths.

The chart below includes foodborne disease-causing organisms that frequently cause illness in the United States. As the chart shows, the threats are numerous and varied, with symptoms ranging from relatively mild discomfort to very serious, life-threatening illness. While the very young, the elderly, and persons with weakened immune systems are at greatest risk of serious consequences from most foodborne illnesses, some of the organisms shown below pose grave threats to *all* persons.

ORGANISM	COMMON NAME OF ILLNESS	ONSET TIME AFTER INGESTING	SIGNS & SYMPTOMS	DURATION	FOOD SOURCES
Bacillus cereus	*B. cereus* food poisoning	10-16 hrs	Abdominal cramps, watery diarrhea, nausea	24-48 hours	Meats, stews, gravies, vanilla sauce
Campylobacter jejuni	Campylobacteriosis	2-5 days	Diarrhea, cramps, fever, and vomiting; diarrhea may be bloody	2-10 days	Raw and undercooked poultry, unpasteurized milk, contaminated water
Clostridium botulinum	Botulism	12-72 hours	Vomiting, diarrhea, blurred vision, double vision, difficulty in swallowing, muscle weakness. Can result in respiratory failure and death	Variable	Improperly canned foods, especially home-canned vegetables, fermented fish, baked potatoes in aluminum foil
Clostridium perfringens	Perfringens food poisoning	8–16 hours	Intense abdominal cramps, watery diarrhea	Usually 24 hours	Meats, poultry, gravy, dried or precooked foods, time and/or temperature-abused foods
Cryptosporidium	Intestinal cryptosporidiosis	2-10 days	Diarrhea (usually watery), stomach cramps, upset stomach, slight fever	May be remitting and relapsing over weeks to months	Uncooked food or food contaminated by an ill food handler after cooking, contaminated drinking water
Cyclospora cayetanensis	Cyclosporiasis	1-14 days, usually at least 1 week	Diarrhea (usually watery), loss of appetite, substantial loss of weight, stomach cramps, nausea, vomiting, fatigue	May be remitting and relapsing over weeks to months	Various types of fresh produce (imported berries, lettuce, basil)
***E. coli (Escherichia coli)* producing toxin**	*E. coli* infection (common cause of "travelers' diarrhea")	1-3 days	Watery diarrhea, abdominal cramps, some vomiting	3-7 or more days	Water or food contaminated with human feces
***E. coli* O157:H7**	Hemorrhagic colitis or *E. coli* O157:H7 infection	1-8 days	Severe (often bloody) diarrhea, abdominal pain and vomiting. Usually, little or no fever is present. More common in children 4 years or younger. Can lead to kidney failure	5-10 days	Undercooked beef (especially hamburger), unpasteurized milk and juice, raw fruits and vegetables (e.g. sprouts), and contaminated water
Hepatitis A	Hepatitis	28 days average (15-50 days)	Diarrhea, dark urine, jaundice, and flu-like symptoms, i.e., fever, headache, nausea, and abdominal pain	Variable, 2 weeks-3 months	Raw produce, contaminated drinking water, uncooked foods and cooked foods that are not reheated after contact with an infected food handler; shellfish from contaminated waters
Listeria monocytogenes	Listeriosis	9-48 hrs for gastro-intestinal symptoms, 2-6 weeks for invasive disease	Fever, muscle aches, and nausea or diarrhea. Pregnant women may have mild flu-like illness, and infection can lead to premature delivery or stillbirth. The elderly or immunocompromised patients may develop bacteremia or meningitis	Variable	Unpasteurized milk, soft cheeses made with unpasteurized milk, ready-to-eat deli meats
Noroviruses	Variously called viral gastroenteritis, winter diarrhea, acute non-bacterial gastroenteritis, food poisoning, and food infection	12-48 hrs	Nausea, vomiting, abdominal cramping, diarrhea, fever, headache. Diarrhea is more prevalent in adults, vomiting more common in children	12-60 hrs	Raw produce, contaminated drinking water, uncooked foods and cooked foods that are not reheated after contact with an infected food handler; shellfish from contaminated waters
Salmonella	Salmonellosis	6-48 hours	Diarrhea, fever, abdominal cramps, vomiting	4-7 days	Eggs, poultry, meat, unpasteurized milk or juice, cheese, contaminated raw fruits and vegetables
Shigella	Shigellosis or Bacillary dysentery	4-7 days	Abdominal cramps, fever, and diarrhea. Stools may contain blood and mucus	24-48 hrs	Raw produce, contaminated drinking water, uncooked foods and cooked foods that are not reheated after contact with an infected food handler
Staphylococcus aureus	Staphylococcal food poisoning	1-6 hours	Sudden onset of severe nausea and vomiting. Abdominal cramps. Diarrhea and fever may be present	24-48 hours	Unrefrigerated or improperly refrigerated meats, potato and egg salads, cream pastries
Vibrio parahaemolyticus	*V. parahaemolyticus* infection	4-96 hours	Watery (occasionally bloody) diarrhea, abdominal cramps, nausea, vomiting, fever	2-5 days	Undercooked or raw seafood, such as shellfish
Vibrio vulnificus	*V. vulnificus* infection	1-7 days	Vomiting, diarrhea, abdominal pain, bloodborne infection. Fever, bleeding within the skin, ulcers requiring surgical removal. Can be fatal to persons with liver disease or weakened immune systems	2-8 days	Undercooked or raw seafood, such as shellfish (especially oysters)

For more information, contact: The U.S. Food and Drug Administration Center for Food Safety and Applied Nutrition
Food Information Line at 1-888-SAFEFOOD (toll free), 10 AM to 4 PM ET, Monday through Friday.
Or visit the FDA Web site at www.fda.gov.

INSERT "Growing Food Safely" TAB

Growing Food Safely

PRODUCE SAFETY UNIVERSITY

Tom Schwartz
Master Trainer
Specialty Crops Division
USDA AMS

USDA United States Department of Agriculture

Objectives

PRODUCE SAFETY UNIVERSITY

- Identify on the farm best growing practices for fresh produce to reduce the risk of food borne illness.
- Recognize previously voluntary growing practices and Good Agricultural Practices are now required by the Food Safety Modernization Act (FSMA).

Introduction

PRODUCE SAFETY UNIVERSITY

Key Points

What

- Review Good Agricultural Practices (GAPs) to reduce the risks of food borne illness.

Why

- To make food handlers aware of the potential sources of contamination.

How

- Resources:

https://www.ams.usda.gov/services/auditing/gap-ghp

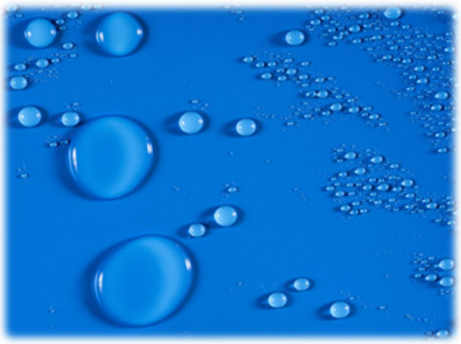
Good Agricultural Practices (GAPs)

Before We Begin…

PRODUCE SAFETY UNIVERSITY

Of all the areas of potential foodborne contamination, which of the following has had the largest impact on pathogen transfer?

1. Water
2. Soil
3. Hygiene
4. Compost
5. Equipment



A New Era of Produce Safety

PRODUCE SAFETY UNIVERSITY

FDA FOOD SAFETY MODERNIZATION ACT

THE FUTURE IS NOW

FSMA Produce Safety Rule

Standards for the Growing, Harvesting,

Packing, and Holding of Produce for Human Consumption

(21 CFR 112)

Crops "Covered" Under the Rule

PRODUCE SAFETY UNIVERSITY

- All fruit and berries such as apples, strawberries, cherries, and stone fruit
- All lettuces and greens such as romaine, iceberg, cabbage and leafy greens; herbs
- Vegetables such as tomato, summer squash, broccoli, cabbage, onions, etc.
- All melons such as cantaloupe, honeydews, variety melons and watermelons

Crops "Not Covered" Under the Rule

PRODUCE SAFETY UNIVERSITY

Rarely Consumed Raw:

- Fruits such as sour cherries
- Vegetables; All beans, beets, ginger root, chickpeas, lentils collards, eggplants, potatoes, pumpkins, winter squash, sweet potatoes, horseradish, water chestnuts, okra, rhubarb, etc.
- Grains, including sweet corn

Potential Points of Contamination

PRODUCE SAFETY UNIVERSITY

USDA Fresh Audit Types

PRODUCE SAFETY UNIVERSITY

- USDA GAP & GHP Audit
- Mushroom GAP Audit
- Group GAP
- Tomato Audit Protocol
- Produce GAPs Harmonized Audit
- Leafy Green Marketing Agreement (LGMA)

CALIFORNIA LGMA
COMMITTED TO SAFE LEAFY GREENS

Produce GAPs Harmonization Initiative

How Contamination is Spread

PRODUCE SAFETY UNIVERSITY

Humans

Soil

Produce

Animals

Buildings
Equipment
Tools

Water

GAP Major Areas

PRODUCE SAFETY UNIVERSITY

Traceability

Traceability

Facilities

Production Practices

Hygiene

Transportation

Product Handling

Traceability

Traceability

Safe Growing Practices

Key Areas of Good Agricultural Practices

Traceability

PRODUCE SAFETY UNIVERSITY

- One **step** forward, One **step** back
  - ✓ Bar Coding
  - ✓ Sequential Numbering
- Product Recall – Successful "mock"

Good Agricultural Practices (GAPs)

PRODUCE SAFETY UNIVERSITY

Reduce contamination risks using:

- Worker training programs
- Water monitoring, testing, treatment
- Manure and compost management
- Wildlife and animal monitoring
- Sanitation programs

Water

Source of Contamination

PRODUCE SAFETY UNIVERSITY

Water can carry and spread human pathogens, contaminating entire fields of large amounts of produce.

Production Contamination Sources

- Irrigation, crop sprays, frost protection, flood events

Postharvest Contamination Sources

- Fluming, cooling, washing, waxing, cleaning

FSMA - Agricultural Water

Definition:

"Water intended to, *or is likely to*, contact covered produce or food contact surfaces. All agricultural water must be safe and of adequate sanitary quality for its intended use."

Applies to farms covered by the FMSA rule.

Probability of Contamination

PRODUCE SAFETY UNIVERSITY

Public Source	Ground	Surface
		
Treated	Protected	Open to Environment

Postharvest Water

PRODUCE SAFETY UNIVERSITY

Cannot eliminate *every* food safety risk in the field.

Postharvest water has the *potential* to spread contamination widely.

Humans

Source of Contamination

PRODUCE SAFETY UNIVERSITY

Workers can spread pathogens to produce by directly handling fruits and vegetables.

Improper health and hygiene practices

- Lack of training and hand washing
- Lack of adequate toilet facilities

Illness or injury

- Working while sick
- Injuries that result in blood contacting fresh produce

Source of Contamination

Visitors should be trained in food safety practices.

Soil

Source of Contamination: Soil

PRODUCE SAFETY UNIVERSITY

Soil Amendments:

- **Any** chemical, biological, or physical materials **intentionally** added to the soil to improve and support plant growth and development.

Examples:

- Fertilizers, stabilized compost, manure, non-fecal animal byproducts, peat moss, perlite, vegetative waste, sewage sludge biosolids, table waste, agricultural tea and yard trimmings.

Manure & Compost

PRODUCE SAFETY UNIVERSITY

- Risk assessment – if and when **raw** *manure or biosolids* are appropriate to use
- Commodity specific guidance
- Raw manure:
  2 weeks prior to planting
  120/90 days prior to harvest
- Product Covered:
  Soil Contact (yes/no)

Animals

Source of Contamination: Animals

PRODUCE SAFETY UNIVERSITY

<u>Domestic</u> and <u>wild</u> animals can carry and transmit human pathogens to produce.

- May result in direct fecal contamination of

  crops and fields.
- Animal feeding, rooting, and movement
- Animals can contaminate water sources
- Manure run-off can contaminate fields

Buildings, Equipment, Tools

Sanitation

PRODUCE SAFETY UNIVERSITY

Continue produce safety practices by keeping things clean during harvest and postharvest handling.

Consider everything that touches, or impacts produce

- Picking and packing containers
- Packing equipment
- Packing area (open or closed environment)
- Hands and clothing
- Buildings (i.e., coolers, storage areas)
- Transport vehicles

Produce Distributors

Distributors

PRODUCE SAFETY UNIVERSITY

Produce Distributors (including cooperatives and food hubs)

<u>Must adhere to FSMS rules including;</u>

- Current Good Manufacturing Practices (cGMP)
- Food Traceability
- Food defense (intentional contamination)
- Sanitary Transportation

GAP Audit/Certification

Must I buy from a GAP certified producer?

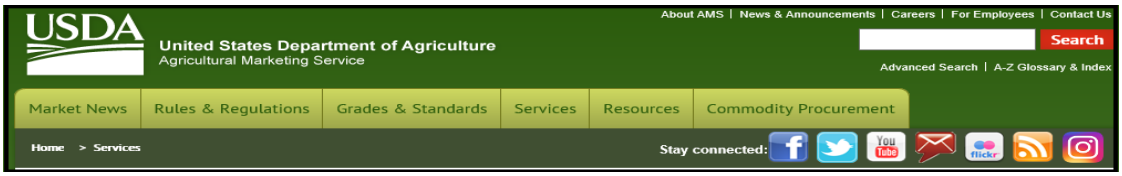
PRODUCE SAFETY UNIVERSITY

- There is **NO** federal requirement that child nutrition operations purchase from GAP certified producers.
- Many growers use GAP practices but have not paid for the certification.
- You can conduct an informal GAP audit to make sure that you are comfortable with the producer's food safety (good agricultural) practices and plans.

Locating GAP Audited Growers

PRODUCE SAFETY UNIVERSITY

https://origin-edit.ams.usda.gov/services/auditing/gap-ghp



Find a USDA Gap-Certified Company

- By Location
- By Commodity
- By Company Name
- By Audit Type, Commodity, Location and Company

Buying Local Checklist

PRODUCE SAFETY UNIVERSITY


Checklist for Retail Purchasing of Local Fresh Produce

It is important for buyers of fresh, whole produce to have assurances that safe food handling practices were followed on the farm and during delivery to their facilities. Growers can provide documentation of food safety assurances through a buyer's onsite review of their farm, a certificate of attendance at good agricultural practices (GAPs) trainings or Produce Safety Alliance (PSA) workshops, or with documentation from a third-party audit.

While some growers must comply with the Produce Safety Rule of the Food Safety Modernization Act (FMSA) and attend PSA trainings, it is not required for all growers, such as for growers of products not typically consumed raw or produce that will be further processed. Completion of this checklist can provide documentation to the buyer that GAPs were followed on the farm, and that the buyer took reasonable care when purchasing fruits and vegetables directly from a grower. This checklist can also guide the conversation between retail buyers of fresh produce and local growers as they establish terms of the purchasing arrangement to ensure safe food practices are followed.

Items on this checklist are based on GAPs and elements of the FSMA Produce Safety Rule.

Name of Producer/Farm _____

City _____ State _____ Zip _____

Telephone _____ E-mail _____

Total acres of fresh produce farmed _____ Availability of promotional materials YES NO

Products available for purchase:

Product Insurance Liability is held: YES (Dollar amount _____) NO

Is produce from the farm USDA Certified Organic? YES NO

(Note: USDA Certified Organic is a certification of practices and does not focus on food safety).

Is the farm USDA GAP certified or food safety third party certified (such as SQF or GlobalGAP)? YES NO

Has the person in charge of the farm produce completed GAPs or PSA training? YES NO

Can buyers schedule a tour of the farm during the production season? YES NO

IOWA STATE UNIVERSITY Extension and Outreach

North Central Region Center for FSMA Training, Extension, and Technical Assistance

https://store.extension.iastate.edu/product/Checklist-for-Retail-Purchasing-of-Local-Produce

INSERT "Growing Food Safely GAPs Activity" TAB

As part of the new purchasing requirements, your school district will only purchase from local farmers that have a food safety program. Sally works with you and has been asked to meet with the local farmer Tom Mato to determine if they have a food safety program in place. The school has been buying tomatoes from Tom for several years. Sally calls Tom and informs him of the new requirement and they agree to an 8:00 A.M. tour of the farm the following week. Prior to the visit, Sally asks Tom to complete a self-audit checklist which she will review during the tour.

Tom Mato Farms is owned and operated by Tom Mato Jr. It is a local family farm that grows tomatoes, sweet peppers, squash, and several other crops which the family sells at the local farmer's market. The farm is located just out of town adjacent to several other small farms.

When Sally arrives at the farm, Tom offers to take Sally in his truck to drive around the property so she can visit the fields before a tour of the packing operations. Sally gladly accepts his offer as this will give her a chance to discuss his food safety practices.

As they ride along, Sally notices the farmhouse where Tom and his family live, several buildings for storing equipment and packing materials, and an open packing house with a small cold box for storing product. Tom explains that the family farm has been in operation for 50 years and that he has been managing it for the last fifteen.

As they drive down the fields Sally notes people picking the tomatoes into plastic buckets and loading them on to an open flatbed truck that will take them directly to the packing shed. They stop to observe for a while and to check the portable toilets. The rest rooms are clean, have adequate supplies and provide drinking water. They watch for a while, and then return to the packing facilities to complete the tour, Sally notices that some of the fields are being irrigated, Tom states that they are lucky to have a stream accessible. As they pull in, chickens are loose in the yard and Tom is quick to promote his fresh eggs for sale every weekend at the farmer's market.






When they arrive back at the packing shed, their timing is perfect; product has arrived from the field and is being packed into clean 25lb. cardboard cartons, perfect for your school. The packing operation is low tech but appears clean and orderly. Sally notices some of the workers are cleaning the tomatoes with a wet cloth. Tom explains that due to the rain last week, some of the tomatoes are a bit muddy and they are not set up with a wash tank for cleaning the tomatoes. He also explains that part of his food safety plan is to minimize risk by eliminating wash tanks which could contribute to cross contamination.

Sally asked to review some of the food safety policies and training records. Tom escorts her to his office inside the farmhouse and points out the restrooms for the packing facility are also inside the house in case she needs to wash up. A review of the food safety plan, production logs and records indicate practices are generally in good order. However, Sally noted that some of the training records were two years old and that as a *visitor*, she was not requested to follow the same visitor and hygiene practices required in his plan. Tom explained that **all** family members and employees receive training upon hiring, and he made a onetime exception to the policy today for Sally due to her awareness of food safety practices and knew she did not pose a risk. Sally thanks Tom for the opportunity to visit his farm and tells him she will be contacting him shortly.

Processing / Wash Up / Post-Harvest Sanitation Log

Name of operation:

Please see the food safety plan for overall information on process/packing line water control procedures.

Date	Cleaning List (check each)					Date Cleaned	Treatment	Cleaned By (name)
	Contact Surface	Water Holding Tanks	Wash Tanks	Harvest Totes/Containers	Cooler Shelves/Floor			
7/11/21	Water test				within tolerance TM-AM			

INDIVIDUAL TRAINING RECORDS

Format No:

Employee Name: Tom Junior

Job Title:

Department: Field Manager Shift:

Date	Task	Training Completed	Effectiveness Checking	Observations	Trainer Signature
7/18	Food Safety	7/20/18	85%	None	TSenior

Personnel

YES NO

*** Are employees properly trained in personal hygiene and the prevention of microbial contamination of produce?**

Workers should understand the consequences of poor sanitation for their own health and the potential for spreading foodborne illness to others. The grower should clearly outline sanitation policies. These policies should apply to anyone with direct contact with the produce, in addition to equipment operators, pest control operators and potential buyers. Personnel must understand

Farm Visit Observations

Compost pile, adjacent growing field

Irrigation water

Group #1 Question

What GAP practices does the farm do well?

_____

_____

_____

All groups - What additional questions should Sally ask?

_____

_____

_____

All groups - Would you buy from this farm?

_____

_____

Group #2 Question

What problems were observed, as to irrigation or water use.

_____
_____
_____

How can they be addressed?

_____
_____
_____

All groups - What additional questions should Sally ask?

_____
_____

All groups - Would you buy from this farm?

_____
_____

Group #3 Question

What are the food safety concerns concerning animals?

_____
_____
_____

How can they be addressed?

_____
_____
_____

All groups - What additional questions should Sally ask?

_____
_____

All groups - Would you buy from this farm?

_____
_____

Group #4

What are the food safety concerns concerning the packing area?

_____
_____
_____

How can they be addressed?

_____
_____
_____

All groups - What additional questions should Sally ask?

_____
_____

All groups - Would you buy from this farm?

_____
_____

Group #5

Is the food safety documentation adequate and sufficient?

_____
_____
_____

Areas of improvement.

_____
_____

All groups - What additional questions should Sally ask?

_____
_____

All groups - Would you buy from this farm?

_____
_____

Checklist for Retail Purchasing of Local Fresh Produce

It is important for buyers of fresh, whole produce to have assurances that safe food handling practices were followed on the farm and during delivery to their facilities. Growers can provide documentation of food safety assurances through a buyer's onsite review of their farm, a certificate of attendance at good agricultural practices (GAPs) trainings or Produce Safety Alliance (PSA) workshops, or with documentation from a third-party audit.

While some growers must comply with the Produce Safety Rule of the Food Safety Modernization Act (FMSA) and attend PSA trainings, it is not required for all growers, such as for growers of products not typically consumed raw or produce that will be further processed. Completion of this checklist can provide documentation to the buyer that GAPs were followed on the farm, and that the buyer took reasonable care when purchasing fruits and vegetables directly from a grower. This checklist can also guide the conversation between retail buyers of fresh produce and local growers as they establish terms of the purchasing arrangement to ensure safe food practices are followed.

Items on this checklist are based on GAPs and elements of the FSMA Produce Safety Rule.

Name of Producer/Farm _____

City _____ State _____ Zip _____

Telephone _____ E-mail _____

Total acres of fresh produce farmed _____ Availability of promotional materials YES NO

Products available for purchase:

Product Insurance Liability is held: YES (Dollar amount _____) NO

Is produce from the farm USDA Certified Organic? YES NO

(Note: USDA Certified Organic is a certification of practices and does not focus on food safety).

Is the farm USDA GAP certified or food safety third party certified (such as SQF or GlobalGAP)? YES NO

Has the person in charge of the farm produce completed GAPs or PSA training? YES NO

Can buyers schedule a tour of the farm during the production season? YES NO

IOWA STATE UNIVERSITY
Extension and Outreach

North Central Region
Center for FSMA Training, Extension and Technical Assistance

Production Practices	Yes	No	N/A
Are wells protected from contamination?			
What is the source of irrigation water? ☐ Well ☐ Stream ☐ Pond ☐ Municipal ☐ Other _____			
What method(s) of irrigation is used on the farm? ☐ Drip ☐ Overhead ☐ Flood Note: *Drip is recommended for leafy greens*.			
Are generic *E. coli* tests conducted on agricultural water used in fields?			
What types of manure are used on produce crops? ☐ Raw manure ☐ Composted ☐ Aged ☐ No manure is used			
Is the manure composted onsite or purchased commercially? ☐ Onsite composting ☐ Purchased commercially			
Is there documentation of composting methods used to validate the safety of the product?			
Is raw manure incorporated into soil two weeks prior to planting or 120 days prior to harvest to avoid raw manure from touching edible portion of the produce? (USDA Organic Standard)			
Is the manure application schedule documented and available?			
Is land use history available to determine risk of product contamination from sources such as runoff from upstream, flooding, chemical spills, or excessive agricultural crop application?			
Is the field protected from animal confinement or grazing area runoff?			
Is land that frequently floods used to grow food crops?			
Are there preventive procedures in place to protect fresh produce in the field from flooding?			
Are preventive measures in place to restrict livestock, domesticated animals, and wildlife from growing areas?			
Are portable toilets used in a way that prevents field contamination such as located away from growing areas on even ground surfaces and emptied regularly?			
Are there policies or procedures on how to deal with contaminated produce in the field?			

Product Handling	Yes	No	N/A
Is produce checked for signs of contamination from sources such as animal feces or footprints prior to harvest?			
Are baskets, totes, or other containers kept off the soil during harvesting?			
Are harvesting baskets, totes, or other containers kept covered and cleaned (with potable water) routinely?			
Is harvesting equipment, machinery, and tools that come into contact with produce crops kept as clean as possible?			
Do procedures used in field packing of produce items minimize risk of contamination? Examples would include elevation of boxes from the ground or wearing of clean gloves?			
Are the same containers used for produce items typically eaten raw and other produce? If so, are containers cleaned and sanitized between uses?			
Is dirt, mud, or other debris removed from product before packing?			
Are there policies or procedures in place about how to deal with contaminated produce during packing?			
Is the water used for cleaning products after harvest from a tested, potable water source?			
Are food-grade packaging materials stored in areas protected from pets, livestock, wild animals, and other contaminants?			
Is product protected from contamination as it travels from field to packing facility?			

Facilities	Yes	No	N/A
What source of water is used for cleaning purposes on the farm? ☐ Well ☐ Municipal ☐ Other			
Is this water source tested for generic *E. coli* at least once per year with results kept on file?			
Are temperatures of storage coolers monitored and documented?			
Is a product packing area in use? Is there space for culling and storage of produce?			
Are packing and storage facilities located away from growing areas?			
Are packing areas protected from wild and domestic animals?			
Are food grade packaging materials used?			
Are toilets and hand washing stations that use potable water cleaned and serviced routinely?			
Is a pest control program in place?			
Are there standard operating procedures for cleaning and sanitizing?			
Are cleaning and sanitizing procedures routinely followed with food contact surfaces regularly washed and rinsed with potable water, and then sanitized?			
Are there policies or procedures on how to manage human waste spills, including septic spills?			

Worker Health and Hygiene	Yes	No	N/A
Is a worker food safety training program in place with records of dates, topics, and participants?			
Are workers trained about hygiene practices and sanitation?			
Is smoking and eating confined to designated areas separate from product handling?			
Are adequate restroom facilities with washing facilities (potable water, soap, and disposable towels) readily available for all workers or anyone who touches the product? Note: *OSHA requires one toilet and one handwashing facility per every 20 workers within ¼ mile of the working area.*			
Do workers practice good hygiene when harvesting and packing product by:			
Wearing clean clothing and shoes daily?			
Keeping hair covered or restrained?			
Not wearing jewelry in the packing area?			
Washing hands after touching soiled surfaces, using the toilet, and before handling produce?			
Covering open wounds with clean bandages and another protective layer such as a disposable glove?			

Transportation	Yes	No	N/A
Is the product kept protected from physical damage and contamination during transit to customers?			
Is the transport vehicle inspected for cleanliness before loading product?			
Is there a cleaning schedule for the transport vehicle, and is there documentation to show it is followed?			
Are there designated areas in transport vehicles for storage of food products and non-food items to avoid the risk of cross-contamination?			
Does the transportation schedule mitigate risk of temperature abuse of products?			

I confirm that to the best of my knowledge, the information provided is accurate.

Signature of Seller: _____ Date _____

Updated by Catherine Strohbehn, adjunct professor and extension specialist in human sciences, Joe Hannan, commercial horticulture specialist, Angela Shaw, associate professor in food science and human nutrition and extension food safety specialist, Linda Naeve, extension specialist with Value Added Agriculture, and Manreet Bhullar, graduate research assistant in food science and human nutrition at Iowa State University. Originally prepared by Amy Casselman, graduate student, Strohbehn, and Sam Beattie, extension food safety specialist at Iowa State University.

Photos by Linda Naeve.

FS 0030 June 2018

Understanding FSMA: The Produce Safety Rule

Food Safety Modernization Act

The Food Safety Modernization Act (FSMA) is considered to be the most sweeping reform of food safety laws in more than 70 years. Signed into law by President Obama on January 4, 2011, it directs the U.S. Food and Drug Administration (FDA) to shift the focus away from merely responding to contamination events toward establishing systems to prevent them from occurring. Seven regulations were written under the law, each of which will affect the vast and complex food production, processing, and distribution network that provides consumers with an uninterrupted supply of safe, nutritious, and affordable food. One of these regulations, "Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption," is of critical importance to growers of fresh produce. Known more simply as the "Produce Safety Rule," this regulation establishes, for the first time, science-based minimum food safety standards for growing, harvesting, packing, and holding fruits, vegetables, mushrooms, and sprouts intended for human consumption.

The following is a discussion of (1) farming activities and types of produce that are covered under the rule, (2) key requirements within the regulation, (3) certain exemptions and modified requirements for which farms may be eligible, and (4) deadlines for complying with the rule.

Coverage under the Produce Safety Rule

When we say that a type of produce, a produce-growing activity, or a farm or orchard is "covered" under the regulation, we mean that growers who meet the criteria for coverage will need to comply with the farm food safety standards written in the regulation. Not all produce or growing activities are covered. Retail establishments where produce is sold or served to consumers (e.g., farm stands, farmers markets, grocery stores, and restaurants) are not covered under the regulation, although they may be covered under other state or local regulations. Only commercial produce farms are affected. Home gardens are not regulated.

Criteria for determining which farms or types of produce are covered are based on the size of the farm in terms of annual sales and the inherent risk for some commodities to cause illness if they were to become contaminated.

Fruits, vegetables, sprouts, and mushrooms covered under the regulation are:

1. Grown on commercial farms with average annual produce sales of at least $25,000 calculated over the previous three years of production. Sales values in the regulation written in 2011 must be adjusted upward each year to account for inflation (see the calculation tool on the FDA website at **tinyurl.com/InflationTool**).

2. Likely to be eaten raw (e.g., leafy greens, cucumbers, tomatoes, summer squash, and most fruits). Raw produce is considered riskier than cooked fruits and vegetables where any harmful microorganisms are likely to be destroyed.

Put another way, produce not covered under the regulation includes those commodities that are:

- Grown on farms with average annual produce sales less than $25,000 (increased each year to account for inflation).
- Rarely eaten raw (e.g., potatoes, winter squash, pumpkins, and some root crops). FDA has an exhaustive list of produce that is rarely consumed raw, and thus not covered under the regulation, at **tinyurl.com/RarelyConsumedRaw**.

Qualified and processing exemptions are available wherein all parts of the rule are not required and only certain modified requirements are in place. These will be discussed later in this article. Keep in mind that even if you think your produce is not covered, you are still required to do all that you can to prevent contamination with harmful microorganisms.

> "The regulation states that only produce likely to be eaten raw that is grown on farms with at least $25,000 in produce sales is covered."

Key Requirements in the Produce Safety Rule

The Produce Safety Rule is divided into key requirements that are intended to prevent contamination of produce during production, harvesting, and after harvesting. Each of these will be discussed separately in detail:

1. Worker Health, Hygiene, and Training
2. Agricultural Water for Pre- and Postharvest Uses
3. Biological Soil Amendments
4. Domesticated and Wild Animals
5. Equipment, Tools, Buildings, and Sanitation
6. Required Records

Worker Health, Hygiene, and Training

FDA requires that all personnel who harvest or handle fresh produce covered under the regulation, and those who supervise them, receive food safety training that is appropriate to their assigned duties. Training must be offered upon hiring and periodically thereafter, and it must be presented in a language that all workers can understand.

Specific training outcomes required for harvesters and handlers include:

1. Recognizing the importance of health and personal hygiene for all personnel and visitors, including knowing symptoms of a health condition that is reasonably likely to result in contamination of produce or food-contact surfaces with harmful microorganisms.
2. Knowledge of appropriate hygienic practices when handling produce or food-contact surfaces. This includes washing and drying hands when necessary, especially after using the toilet, and removing or covering jewelry that could fall into the product.
3. The ability to recognize produce that should not be harvested because it is likely to be contaminated with harmful microorganisms.
4. Understanding the importance of inspecting harvest containers and equipment prior to harvest so that they are functioning properly, clean, and maintained.

In addition to these requirements, at least one supervisor or responsible person on a covered farm must have completed food safety training at least equivalent to that received under a standardized curriculum recognized by FDA. The Produce Safety Alliance (PSA), in association with FDA, has created a seven-hour training curriculum. Grower training courses are offered throughout the country and can be found on the Produce Safety Alliance website at **tinyurl.com/GrowerTraining**. In Pennsylvania, Penn State Extension offers regular produce safety certification courses. Visit the Penn State Extension FSMA website at **extension.psu.edu/fsma** for a list of upcoming courses in Pennsylvania.

> "Harvesters, handlers, and supervisors must receive training appropriate to their assigned duties."

Agricultural Water for Pre- and Postharvest Uses

Water is used extensively in farming operations. Preharvest uses include irrigation, chemical crop sprays, cooling, and frost control. Postharvest uses include washing or cooling harvested produce or cleaning food-contact surfaces. Handwashing and drinking water are also important uses of water on the farm. In the Produce Safety Rule, FDA only regulates the safety of pre- and postharvest "agricultural water," a term FDA has defined as water that is intended to, or likely to, contact the harvestable part of the growing crop, the harvested produce, or surfaces that can come into contact with the product.

The source from which agricultural water is obtained is strongly associated with its potential to become contaminated. Surface water has the highest level of risk because it is a shared resource that may be subject to sudden and unexpected contamination from animal intrusion, manure runoff from neighboring livestock operations, or wastewater septic tank discharge. Groundwater is considered safer, although shallow, improperly constructed or located wells may be subject to surface water contamination from runoff or during flooding events. Municipal water is the safest because it is regularly monitored and usually treated to eliminate harmful bacteria. Indirect irrigation methods, such as drip systems, are considered to have the lowest risk for produce contamination because the water is unlikely to contact the harvestable part of the crop. On the other hand, overhead spray systems are at a higher risk because the water will likely contact the harvestable part of the crop.

> "Only water that is intended to, or likely to, contact the harvestable part of the crop is regulated."

Microbiological Testing Requirements

Frequency of testing. FDA requires growers to periodically monitor the quality of pre- and postharvest agricultural water through microbiological testing. The frequency of agricultural water testing is based on its source. For surface water, FDA requires farms to do an initial survey using a minimum of 20 samples collected as close as practicable to harvest over the course of two to four years. For untreated groundwater, FDA requires farms to do an initial survey using a minimum of four samples during the growing season or over a period of one year. There is no requirement to test agricultural water that is received from public water systems.

> "The frequency of water testing required under the rule varies depending on the source of the water."

Microbiological criteria for agricultural water. Microbial limits established for agricultural water are based on levels of *E. coli* bacteria. *E. coli* is a common inhabitant of the intestinal tract of humans and animals and thus is a widely accepted indicator of fecal contamination and therefore the presence of human pathogens. See the FDA website for a list of several laboratory methods that are approved for this test. Growers are required to make two calculations from the *E. coli* data obtained during testing: the geometric mean (GM) and the statistical threshold value (STV).

- The GM represents a type of average value for the amount of generic *E. coli* in a water sample. Multiple *E. coli* values determined over time are transformed into logarithmic (log) values. Then the average of the log values is determined, and this value is transformed back to the non-log form. It is called a rolling average because once a new test result is obtained, an older one within a defined interval is removed. For surface water, the number of samples in the rolling average is 20. For groundwater, the number of samples is four. The maximum allowable rolling GM value for water that contacts the harvestable part of the crop is 126 cells of *E. coli* per 100-milliliter sample. FDA recognizes that any E. coli that is present on the surface of fresh produce will rapidly begin to die immediately after direct water application. Therefore, growers are permitted to adjust their laboratory-obtained values downward by 0.5 log unit (about a two-thirds reduction) for each day between when the water was applied and harvested for a maximum of four days.
- The STV reflects the level of variability in *E. coli* levels among the samples such as could happen when sporadic rain showers wash waste into rivers and creeks. It can be thought of as the microbial level at which 90 percent of the samples are below the value. The maximum allowable STV for water that contacts the harvestable part of the crop is 410 cells of *E. coli* per 100-milliliter sample.

If the GM or STV values exceed the limits during the baseline sampling, then the cause of the deviation must be determined and corrective actions taken. A new baseline study as described above must then be conducted. If the results are at or below the GM and STV limits, the number of samples taken each year can be reduced to five or one for surface water or groundwater, respectively.

In addition to testing, you must conduct an annual inspection of your entire water system to determine any conditions that might lead to a contaminated water supply.

FDA allows growers to treat agricultural water with EPA- and FDA-approved chemical sanitizers as long as the product is labeled for crop contact and used according to label directions. Other treatments such as ozone or UV irradiation can be used as long as scientific evidence that proves its effectiveness is presented. Microbial testing of treated water is not required, although treatment variables (e.g., concentration, pH, and application method) must be monitored and documented for each use.

The agricultural water standards are among the more controversial sections of the Produce Safety Rule. FDA anticipated that growers would need extra time to learn how to take sam-

ples, do the necessary calculations, and take corrective actions if the water supply were found to be noncompliant. FDA therefore allowed an additional two years beyond the compliance date for the regulation before water requirements would be enforced.

However, the negative reaction to these standards was more than FDA had expected. Many growers and commodity groups have expressed that the sampling and testing requirements are overly burdensome and the required calculations too complex for most to carry out, document, and interpret. In response, FDA has indicated their intent to simplify the requirements for agricultural water, and has also proposed an additional two years beyond the original deadline before compliance will be enforced while they evaluate the practicability and scientific basis for policies and procedures written in the regulation.

In the meantime, growers are advised to continue testing their agricultural water during the growing season to help them understand seasonal trends and potential sources of contamination.

Biological Soil Amendments

Biological soil amendments are materials of animal or plant origin that are intentionally added to the soil to improve its chemical or physical properties (e.g., compost and manure). Animal manures are often added to soil because they are a rich source of nutrients that support plant growth. However, untreated animal manure is a potential food safety hazard if it comes into contact with the harvestable part of the crop. For this reason, the Produce Safety Rule establishes farm food standards for the application of biological soil amendments of animal origin. The regulation forbids the use of human waste except for sewage sludge biosolids that have been treated according to applicable federal or state regulations.

FDA has established standards in the Produce Safety Rule for the use of raw animal manure and compost prepared from raw animal manure as soil supplements.

> "Only raw or composted animal manure that can come into contact with the harvestable part of the crop is regulated."

Raw Manure

FDA states that it is highly likely that raw animal manure contains one or more microbial species that can cause human illness. However, scientific studies have shown that once human pathogens are no longer within the protective environment of the animal colon, they begin to die in response to the destructive effects of sunlight and less favorable temperature and humidity conditions. FDA is currently sponsoring studies to measure the rate at which pathogens die as affected by climatological conditions, application methods, and soil type. Of particular interest is determining the number of days needed between field application and harvest to reduce pathogens to safe levels.

FDA has stated that this will require several years of research under actual farming conditions. Until these studies are complete, FDA does not object to farmers adhering to the raw manure application standards described in the USDA National Organic Program, which call for a 120-day interval between the application of raw manure for crops likely to come in contact with the soil amendment, and 90 days for crops that do not contact the soil. They further state that all untreated biological soil amendments of animal origin, including raw manure, must be applied in a manner that does not contact produce during application, and minimizes the potential for contact with covered produce after application. FDA advises that adherence to these standards is a prudent step toward minimizing the likelihood of contamination while the issue continues to be studied.

Compost Containing Materials of Animal Origin

FDA has established microbial reduction targets for processes used to treat biological soil amendments, including manure. Safe compost must have no detectable levels of *Listeria monocytogenes*, *Salmonella* spp., and *E. coli* O157:H7. Alternatively, if only *Salmonella* species are tested, they must be absent in a 4-gram dried sample, and fecal coliforms must be fewer than 1,000 colony-forming units per gram (CFU/gm).

The Produce Safety Rule provides two examples of scientifically valid composting methods that will meet these standards:

1. Static composting that maintains aerobic (i.e., oxygenated) conditions at a minimum of 131°F (55°C) for three consecutive days and followed by adequate curing
2. Turned composting that maintains aerobic conditions at a minimum of 131°F (55°C) for 15 days (which do not have to be consecutive), with a minimum of five turnings followed by adequate curing

There is no restriction on the number of days between application of compost and harvesting for either of these two methods. Any composting method that deviates from these protocols must follow the application intervals for raw manure. In addition to compost preparation requirements, FDA requires that preventive measures be taken to minimize the potential for contact of the compost with produce during and after application. Research will continue to develop and validate alternative composting methods that can meet the microbial reduction standards, and further guidance will become available in the future.

Domesticated and Wild Animals

The Produce Safety Rule addresses concerns about the potential for grazing animals (e.g., livestock and dairy cattle), working animals used in fields for various purposes (e.g., mules or horses), and intrusion by wild animals (e.g., birds, deer, or feral swine) into fields. Growers must take measures to prevent entry of domesticated animals such as cattle, swine, and poultry into fields. Control measures include confining them to designated areas that are not accessible to fields, and being aware of potential routes for contamination, such as wind-blown dust or water runoff.

During the growing season, fields must be inspected for evidence of fecal contamination and measures must be taken as necessary to ensure that contamination cannot occur during harvesting. For example, placing brightly colored flags or cones around a contamination site is a recommended way to notify harvesters that they should not harvest produce within the designated perimeter.

FDA recognizes the challenges associated with preventing wildlife intrusion and does not expect growers to completely eliminate this potential hazard, such as by surrounding fields with fences. FDA also acknowledges that unwarranted killing or trapping of animals is not recommended if they threaten protected species. Instead, all reasonable and practical nonlethal methods, such as noise cannons, decoys, or netting, are appropriate.

> "FDA requires that reasonable and practical measures be taken to ensure that wild and domesticated animals do not become a source of contamination."

Equipment, Tools, Buildings, and Sanitation

Sanitation standards for equipment and tools that are likely to contact produce during harvesting and postharvest handling are written into the Produce Safety Rule. Knives, implements, mechanical harvesters, hydro-coolers, grading belts, sizers, and equipment used to store or convey harvested, covered produce (e.g., containers, bins, food-packing material, dump tanks, flumes, and transport vehicles) are examples of equipment with produce-contact surfaces.

Equipment and tools must be designed and constructed so they can be easily cleaned and, when necessary, properly sanitized. They must be stored and maintained to protect produce from becoming contaminated and to prevent them from attracting and harboring pests.

Postharvest packing or storage facilities must be suitable in size, construction, and design to facilitate maintenance and sanitary operations that reduce the potential for produce contamination. Packing buildings must have adequate space for efficient operation, pest intrusion must be monitored and controlled, and overhead drip or condensate minimized. There must be adequate drainage to prevent accumulation of water and waste liquids on the floor. Readily accessible toilet facilities must be provided that are designed, located, equipped, and maintained so they cannot become a source of contamination.

FDA has no objection to packing or sorting activities that are conducted outdoors or in buildings with open walls, as long as measures are taken to prevent pests from becoming established and to trap or otherwise remove them when necessary.

> "Postharvest equipment, containers, tools, and the packing environment must not be potential sources of contamination."

Exemptions to the Rule and Modified Requirements for Exempt Farms

Discussed above are the full requirements for growers who are covered under the regulation. However, some produce farms covered under the regulation may be eligible for certain exemptions and may not have to comply with all parts of the Produce Safety Rule. Two types of exemptions are available for some growers: the qualified exemption and the processing exemption. These two exemptions are discussed below, in addition to a brief review of the mixed type facility exemption that falls under another FSMA regulation. The following discussion should help you decide if you are eligible for either of these exemptions.

Qualified Exemption

Determination of Eligibility

In an attempt to further lighten the regulatory burden on smaller farms, Congress wrote into the law that produce farms with average annual food sales of less than $500,000 over the previous three years may be eligible for a qualified exemption (QE). Again, note that because of inflation, this number is increased each year.

It is important to understand that, in contrast to criteria for coverage, which is based on average annual gross produce sales, QE eligibility is based on three-year average annual

farm food sales. This means that in addition to gross receipts for fruits and vegetables, sales of grains for human or animal consumption, animals raised for human food, dairy products, and farm-processed food products are also factored in. This may be a particularly important factor for highly diversified farms where a variety of agricultural food and feed products are produced. A further requirement for QE eligibility is that more than half of the average annual food sales must be made directly to qualified end users (QEU). FDA defines QEUs in either of the following ways:

1. Consumers who purchase food directly from a farmer such as at a farmers market or farm stand, over the Internet, or at a community supported agriculture (CSA) operation
2. Retail grocery stores or food service establishments (restaurants) that are located in the same state as the farm where the produce was grown or within 275 miles of the farm (note that indirect sales where the produce is resold, such as to distributors, warehouses, and fresh-cut processors, do not fall into this category)

> "Eligibility for a qualified exemption is based on average annual total food sales."

Modified Requirements

Farms that have attained qualified exemption status are not subject to the full standards and recordkeeping requirements in the areas of worker health, hygiene, and training; the use of biological soil amendments containing animal manure; sampling and testing of agricultural water; exclusion of domesticated and wild animals; and sanitation of equipment, tools, and buildings. However, compliance with these farm food safety standards is still highly recommended since FDA may withdraw an exemption if at any time they determine that your farming practices could put consumers at risk of illness.

Qualified exempt growers are subject to the following modified requirements:

- If the produce is displayed and sold in unpackaged form, such as at a farmers market, the name and complete business address of the farm where the produce was grown must be prominently displayed on a label, poster, sign, or placard at the point of purchase. This information must include the street address or post office box, city, state, and Zip code.
- If the produce is packaged for retail display and sale, the same type of name and business address information must be prominently displayed on the label.

Processing Exemption

Determination of Eligibility

As mentioned above, the Produce Safety Rule only applies to produce that is likely to be eaten raw. However, some fruits and vegetables could be grown for either the fresh market or further processing. For instance, a tomato grower might sell at least some of the crop to a grocery store where it would be displayed and sold in its fresh form. On the other hand, at least some portion of the harvest might be sold to a commercial cannery where the tomatoes would be subjected to high temperatures that are sufficient to kill harmful microorganisms. Other examples of processes with "kill steps" include blanching prior to freezing, fermenting, or distilling. If evidence can be presented that proves the process is adequate to reduce harmful microorganisms to safe levels, then that portion of the crop destined for further processing would be eligible for this exemption. The rest of the crop would not be eligible, although it is possible that the qualified exemption could apply.

> "Covered produce that is further processed may not be subject to all parts of the rule."

Modified Requirements

Farms claiming a processing exemption are not subject to all parts of the Produce Safety Rule. However, the following modified requirements apply:

1. You must disclose in documents accompanying shipment of the produce, whether directly to the processor or to an intermediary broker or distributor, that it has not yet been adequately processed.
2. You must obtain annual written assurance from either the processor that adequate processing procedures are followed or a broker or distributor that "not yet adequately processed" documents must accompany further shipments and adequate processing was performed before the final product was sold to consumers.

Mixed Type Facility Exemption

There is another type of exemption that some growers might be interested in. It is not written in the Produce Safety Rule but instead to another FSMA regulation, the Preventive Controls for Human Food Rule. This is for mixed type facilities (MTF) where both growing and processing activities take place. MTF exemptions to the Preventive Controls Rule are available, but only for certain products and processes that FDA has determined to be "low risk." For instance, in addition to

growing fresh produce, a farmer might also have an on-farm side business where baked goods are cooked, packaged, and sold to customers. If your farm is a MTF, see the article on the Preventive Controls for Human Food Rule to learn more about this exemption.

Required Records

Unlike third-party audits mandated by many wholesale produce buyers, the FDA Produce Safety Rule does not require a written food safety plan. However, in order to remain compliant with the regulation, certain records must be kept for at least two years past the date the record was created. Records used to satisfy the criteria for a qualified exemption must be kept as long as necessary to support the farm's status during the applicable calendar year.

> "FDA has a list of required records that must be kept to document compliance with food safety standards."

Personnel Qualifications and Training

You must keep a record that proves at least one supervisor or responsible person on your farm has successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the FDA. Training information was provided in the "Coverage under the Produce Safety Rule" section above.

Agricultural Water

Recordkeeping is relatively simple but can become more burdensome if you choose to use treatments or methods not specifically provided in the regulation. You must keep records showing the following:

1. The findings of the required inspection of the agricultural water system.
2. Results of any analytical tests conducted on agricultural water. Laboratory results must be reviewed, dated, and signed by a supervisor or responsible party within a reasonable time after the records are made.
3. You must document any corrective measures you have taken if agricultural water does not meet the geometric mean and statistical threshold water quality criteria.
4. If you are treating your agricultural water with chemical sanitizers or physical treatments such as UV irradiation, you must keep treatment monitoring records and scientific data or information that proves the adequacy of the water treatments.
5. If public municipal water is used, annual documentation of testing results or certificates of compliance provided by the public water system must be kept on file.
6. If you are claiming a specific microbial die-off reduction during washing or storage, you must have on hand the results of scientific studies that support your claim.
7. If you use microbial water quality criteria sampling frequencies or laboratory testing methods other than those stated in the regulation, you must provide the results of scientific studies supporting your claim that your water is safe for its intended use.

Biological Soil Amendments of Animal Origin

If compost is prepared on the farm, records must be kept documenting that proper time, temperature, and number of turnings were achieved. Records related to on-farm soil amendment treatment must be reviewed, dated, and signed by a supervisor or responsible party within a reasonable time after the records are made.

When soil amendments are purchased from outside vendors, growers must document annually that:

1. The method used to treat or compost the biological soil amendment of animal origin is a scientifically valid process that was carried out with appropriate process monitoring.
2. Upon receipt on the farm, the soil amendment has been handled, conveyed, and stored in a manner and location that minimizes the risk of contamination from untreated or incompletely composted biological soil amendments of animal origin.

Equipment, Tools, Buildings, and Sanitation

Records must be kept showing the date and method that food-contact equipment used during harvesting, packing, or holding was cleaned and sanitized. The records must be reviewed, dated, and signed by a supervisor or responsible party within a reasonable time after they are made.

Qualified Exemption Requirements

Qualified exemption status is not automatic. You must keep at least three years of records, such as receipts, demonstrating that your farm meets the average annual food sales criteria. Receipts must be dated, but no signature is required. You must review your eligibility for the qualified exemption each year and keep a written record of the annual review that verifies your continued eligibility for the exemption. The annual review record must be dated and signed by a supervisor or responsible party within a reasonable time after the records are made. Growers are encouraged to begin keeping records from previous and upcoming years so they will be ready to claim the exemption once the enforcement date occurs.

Processing Exemption Requirements

To claim a processing exemption, you must obtain written assurance from the business that processes your product that it has adequate processes in place to reduce microorganisms of public health significance to safe levels. Processors are required by other state or federal regulations to prove the adequacy of their processing methods, so they should be able to provide this to you. These records must be updated annually.

Deadlines for Compliance with the Rule

Compliance dates are based on three-year average annual produce sales as shown in the table below. The deadline for larger growers with sales greater than $500,000 is January 26, 2018. Small businesses with sales between $250,000 and $500,000 have until January 28, 2019. Very small businesses with sales between $25,000 and $250,000 have until January 27, 2020. For each category, an additional two years are given for compliance with the agricultural water standards issued in the regulation. In 2017, FDA proposed additional extensions for the agricultural water compliance deadline. Readers can keep up to date on any changes to the regulation at any of the websites listed in the Additional Resources section of this article.

Business Category	Produce Sales Criteria*	General Compliance Deadline	Ag Water Related Deadline
Very small	More than $25,000 up to $250,000	1/27/2020	1/26/2022
Small	More than $250,000 up to $500,000	1/28/2019	1/26/2021
Other	More than $500,000	1/26/2018	1/27/2020

*Sales values are in 2011 dollars.

As you can tell by now, the definitions and criteria for coverage and exemptions are complex. For a further explanation of coverage and exemption options, watch the video from Penn State Extension at **extension.psu.edu/fsma**.

Additional Resources

The Produce Safety Alliance. Cornell University.
producesafetyalliance.cornell.edu

Information on training opportunities, farm food safety resources, and the latest news on the Produce Safety Rule.

FDA Food Safety Modernization Act (FSMA). U.S. Food and Drug Administration (FDA).
www.fda.gov/Food/GuidanceRegulation/FSMA

Official site for all the regulations under FSMA including "Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption" (the Produce Safety Rule). Contains the complete regulation, fact sheets, and regular updates on Guidance Documents.

The Penn State Extension FSMA Website.
extension.psu.edu/fsma

Interpretative videos, decision trees, and fact sheets explaining coverage and exemption criteria and a list of upcoming FSMA Produce Safety certification training opportunities in Pennsylvania.

Prepared by Luke LaBorde, professor of food science.

extension.psu.edu

Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

Produced by Ag Communications and Marketing

Code EE0216 4/18pod

INSERT "Buy Smart, Save Smart" TAB

Buy Smart, Save Smart

PRODUCE SAFETY UNIVERSITY

Chef Cyndie Story
K-12 Consultant
Culinary Solution Centers, LLC

USDA United States Department of Agriculture

Objectives

PRODUCE SAFETY UNIVERSITY

Review the Food Safety Modernization Act (FSMA) rules followed by reputable vendors.

Describe the Buy American Provision procurement requirements and exceptions.

Apply fresh produce cost saving measures in school meal operations.

Introduction

PRODUCE SAFETY UNIVERSITY

Key Points

What

Discuss the importance of buying from a supplier who meets Federal, State and Local regulations.

Demonstrate how to maximize As Purchased to Edible Portion produce yields.

Why

Buying from a reputable supplier documents the procurement due diligence recommended practices.

How

FDA Food Safety Modernization Act (FSMA), USDA FNS Buy American Provision, CFR – Code of Federal Regulations, USDA FNS Numbered Memorandums, USDA Food Buying Guide

Book of Yields (Francis Lynch)

Buy Smart

Vendor Options

PRODUCE SAFETY UNIVERSITY

Global and Local Sources

- Distributors
  - Broad Line
  - Produce Specific

Local and Regional Sources

- Produce Cooperatives
- Food Hubs
- Direct from the Farm
- School Gardens

Vendor Options – Poll Question

PRODUCE SAFETY UNIVERSITY

Select the types of vendors supplying fresh fruits and vegetables to your school nutrition program (select all that apply):

- Broad Line Distributor
- Produce Distributor
- Produce Cooperative
- Food Hub
- Direct from the Farm
- School Garden

Food Safety Practices

PRODUCE SAFETY UNIVERSITY

Produce Distributors (including cooperatives and food hubs)

- Must adhere to FSMA rules including:
  - Current Good Manufacturing Practices (cGMP)
  - Food Traceability
  - Intentional Adulteration (Food Defense)
  - Sanitary Transportation

Food Safety Practices

PRODUCE SAFETY UNIVERSITY

Current Good Manufacturing Practices (cGMP)

- Written food safety plan includes:
  - Identified hazards with preventive controls
  - Monitoring and corrective actions
  - Verification procedures
  - Supply chain program
  - Product recall system

Food Traceability (New)

- Food Traceability List (FTL)
  - Includes Cucumbers, fresh herbs, leafy greens, melons, peppers, sprouts, tomatoes, tropical tree fruits, and all precut fruit and vegetables
- Create product traceability lot code
- Provide electronic, sortable spreadsheet upon FDA request

Food Safety Practices

PRODUCE SAFETY UNIVERSITY

Intentional Adulteration (Food Defense)

- Conduct vulnerability assessment
- Implement mitigation strategies

Food Safety Practices

PRODUCE SAFETY UNIVERSITY

Sanitary Transportation Rule

- Proper refrigeration
- Cleaning between loads
- Prevent cross contamination and cross contact of allergens

Buyer Recommendations

PRODUCE SAFETY UNIVERSITY

A Smart Buyer Will:

- Require a letter of food safety assurances or guarantee from all food vendors.
  - Submit letters with bid documents
  - Request applicable food safety certification documentation
- Visit your supplier to observe food safety practices.
- Determine food product liability insurance requirements and documentation.

Buyer Recommendations

PRODUCE SAFETY UNIVERSITY

A smart buyer will:

- Request Good Agricultural Practices documentation.
  - May require third-party GAP certification
  - May require signed checklist
- Make farm visits to review Good Agricultural Practices documentation.
- Determine food product liability insurance requirements and documentation.

Buy American Provision

Buy American

PRODUCE SAFETY UNIVERSITY

Provision requires nutrition operators to:

- Purchase to the maximum extent practicable, domestic commodity or product that is processed domestically using 51% U.S. grown foods by weight or volume.

Buy American

PRODUCE SAFETY UNIVERSITY

Provision exceptions:

- Domestic product is determined to be cost prohibitive.
- Product is not domestically grown in sufficient quantities & in satisfactory quality.

Save Smart

Save Smart

PRODUCE SAFETY UNIVERSITY

Maximize product shelf life or yield through:

- Conducting product receiving inspections.
- Utilizing the correct tool/equipment.
- Applying the recommended culinary techniques or cooking method.

Save Smart

PRODUCE SAFETY UNIVERSITY

As Purchased to Edible Portion – Know the Yield!

- USDA Food Buying Guide
  - Cantaloupe, peeled and diced (.56/lb)
  - Cucumber, diced (.98/lb)
  - Romaine, diced (.65/lb)
  - Watermelon, peeled and diced (.61/lb)

Save Smart

PRODUCE SAFETY UNIVERSITY

As Purchased to Edible Portion – Know the Yield!

- Book of Yields (Francis Lynch)

CILANTRO

AP Unit	ounce		Ounces per Bunch or per AP Unit	2.80
Garnish Leaves or Sprigs per Bunch	93		Garnish Leaves or Sprigs per AP Ounce	33.0
Ounces of Stemless Leaf per Bunch	1.30		Ounce Weight of 1 Tablespoon Chopped	.09
Yield: Tablespoons of Chopped Leaf per Purchased Ounce	5.0		Ounce Weight of 1 Cup, Chopped	1.49
Weight Yield Percent: Stemless Leaf per Bunch	46.43%			

YIELDS | COSTS

Serve or use by: Cups (Chopped Leaf)

Amount to serve: 2

Amount to buy (Ounces): 6.4

Buy American: Why?

PRODUCE SAFETY UNIVERSITY

Just to name a few…

- Jobs (24 million U.S. agriculture workers)
- Guaranteed quality of goods
- Food safety
- Support economy

Buy American Provision

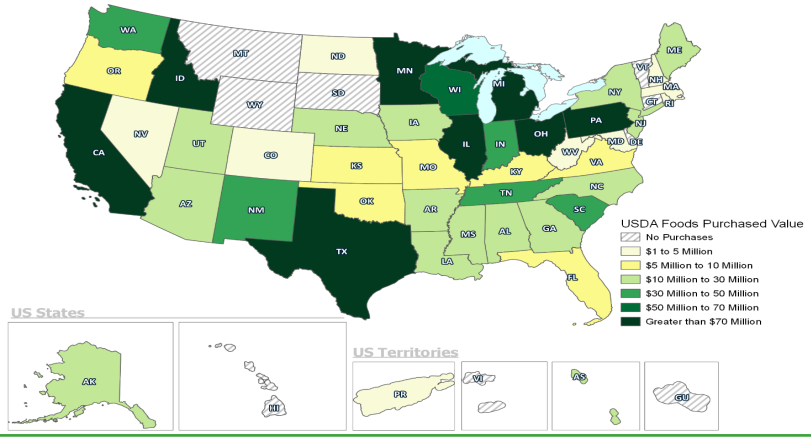
PRODUCE SAFETY UNIVERSITY

Purchase to the maximum extent practicable, domestic commodity or product

Processed domestically using 51% U.S. grown foods by weight or volume.

Buy American: USDA Foods

PRODUCE SAFETY UNIVERSITY



Value of USDA Foods Purchased by State of Origin, FY 2020

Buy American – Would you buy it?

PRODUCE SAFETY UNIVERSITY

Canned Fruit

51% USA grown and processed fruit in 100% juice (Imported juice)

Would you buy it?

PRODUCE SAFETY UNIVERSITY

Canned Fruit

Processed and Packed in the U.S.

California Style

USDA Approved

Would you buy it?

PRODUCE SAFETY UNIVERSITY

Canned Fruit

100% Imported fruit & juice

Would you buy it?

PRODUCE SAFETY UNIVERSITY

Fresh Fruit

Imported bananas

Would you buy it?

PRODUCE SAFETY UNIVERSITY

Mixed Fruit Cups

Water – 28.3%
USA peaches – 23.05%
USA pears – 28.8%
Imported pear juice – 14%

How would you decide if this meets the Buy American Provision?

Resource for Buy American Provision

PRODUCE SAFETY UNIVERSITY

Developed for California schools

https://californiaclingpeaches.com/buy-American

Insurance

Liability Insurance

PRODUCE SAFETY UNIVERSITY

Types of insurance

- Food product liability
- General farm liability
- Commercial business liability
- Automobile

Understand exclusions

- *Bodily injury does not include transmission of bacteria, viruses, parasite, or other organisms*

Summary

PRODUCE SAFETY UNIVERSITY

1. Buy from a reputable supplier.
2. Trust but verify practices and procedures.
3. Implement corrective actions.

PSU Save Smart Activity: As Purchased to Edible Portion

Instructions: Watch Chef Cyndie's live demonstration and record the answers for questions 1-4. After viewing the demo, answer question number 5 by calculating the yield using the formula provided.

1. What is the AP weight of Pepper 1 (Good)? _____oz
2. What is the AP weight of Pepper 2 (Poor)? _____oz
3. What is the EP weight of Pepper 1 (Good)? _____oz
4. What is the EP weight of Pepper 2 (Poor)? _____oz

Hint: AP weight will always be greater than EP weight.

5. Calculate the yield using the following formula: EP ÷ AP = _____ yield

_____ EP ÷ _____ AP = _____ yield – Good Condition Pepper

_____ EP ÷ _____ AP = _____ yield – Poor Condition Pepper

Recommend yield based on the USDA Food Buying Guide: .80

Step-by-Step Instructional Photos


Step 1 (AP 4.6 oz)


Step 2


Step 3


Step 4


Step 5


Step 6 (EP 3.8 oz)

Example Pepper: 3.8 oz (EP) ÷ 4.6 oz (AP) = .82 yield

Verifying On-Farm Food Safety

Prior to purchasing produce from a local farm, school nutrition operators should visit the farm to observe key food safety practices and ask questions about produce handling. Because a visit will require time from the farmer's schedule as well as your schedule, you may wish to organize a group visit with other school nutrition directors in your purchasing cooperative or local area. Information in this document can be used to ensure that you collect sufficient information on your visit to make an informed decision about purchasing from the farm.

Finding a Farm

Finding farms to work with is the first step. Follow these suggestions to locate farms that may be a good fit for your operation:

- Contact your state farm to school coordinator, if applicable. Check with the state department of ducation or agriculture to find out if there is a farm to school coordinator in your state.
- Contact your state department of agriculture or check their website for lists of farms in your area.
- Contact cooperative extension agent(s) in your area.
- Contact other school nutrition directors in your area who are purchasing local products from farms.
- Talk to famers at your local farmers' markets.
- Visit www.ams.usda.gov/gapghp for a list of farms that have been certified in Good Agricultural Practices/Good Handling Practices through USDA's third party audit program.
- Search on farm to school or community-based agriculture websites.

What Are Good Agricultural Practices (GAPs)?

GAPs are a collection of principles that apply to on-farm production and post-production processes. The Food and Drug Administration (FDA) published guidance in 1998 to outline eight basic principles of microbial food safety within the realm of growing, harvesting, packing, and transporting fresh produce. Using these principles, farmers can develop proactive, preventive controls to reduce the opportunity for microbiological, chemical, and physical hazards that affect the safety of the produce.

Resources:

- Guidance for Industry: Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables (FDA, 1998)
- National GAPs Education Program, Cornell University, http://www.gaps.cornell.edu/index.html
- Joint Institute for Food Safety and Applied Nutrition (JIFSAN) http://www.jifsan.umd.edu/training/gaps.php

Verifying On-Farm Food Safety, continued

Planning Your Farm Visits

Plan to visit the farm and observe food safety practices before purchasing produce. If you plan to purchase products from multiple farms, or are already buying from multiple farms, visit each one.

Initial Steps

- If you are not already buying from the farm, contact the farmer to explain who you are and your role as a potential buyer for your school nutrition program.
- Ask whether the farmer is interested in being a potential seller to your district. Several conversations may be necessary to determine whether the farmer may want to sell to your school district.
- Explain that your responsibility as a school nutrition director is to ensure that food is purchased from suppliers who have food safety practices in place.
- Explain to the farmer that you would like to observe on-farm food safety practices, such as how produce is harvested, how equipment and facilities are cleaned and sanitized, etc.
- Establish a form of communication. Ask whether it is best for future contact to be by telephone or email.

Scheduling the Visit

- Find out what produce is grown on the farm and when it is harvested. Ask if any produce might be available to observe in the field or after harvest during the visit. Ask whether the farmer will be able to discuss the growing and handling practices of produce that is not currently in season.
- Send the farmer the *Checklist for Retail Purchasing of Local Produce**, or a similar tool, prior to the visit. Explain that you would like to discuss the items on the checklist, and ask the farmer to review it prior to your visit. Explain why these are points of interest.
- Confirm school district requirements for farm liability insurance coverage for any products purchased from the farm. Discuss the requirements with the farmer.
- Determine a date and time to schedule a visit. Be flexible on time of day and day of week because farmers usually work long hours throughout the week that may not align with your hours of operation.
- Determine who will be visiting the farm and with whom you will be visiting at the farm.
- Discuss how much time will be available for the tour and how much time will be available after the tour for additional questions.
- Be sure to get the farm's address, driving directions and instructions on the best location for parking.
- Answer any questions the farmer has about your visit and your expectations.

Verifying On-Farm Food Safety, continued

Preparing for the Farm Visit

- Wear appropriate attire and bring items that may be needed, such as comfortable, closed-toed, sturdy shoes, hats, sunglasses, sunscreen, water, notebook, and pen/pencil. Be prepared to walk around the farm and be outside for extended periods of time.
- Restroom facilities may or may not be available. Ask ahead and plan appropriately.
- Ask the farmer if photographs or videos are allowed and explain how these may be used, such as appearing on the school district's website. This exposure may enhance the farmer's recognition in the community. If using photographs or videos, a signed release form is recommended and may be required by your district.
- Confirm employer insurance policies for accidents or injuries that could occur during the site visit.

Farm Operations to Observe

During your visit, ask questions about food safety practices related to each area of the operation. Review and discuss items on the *Checklist for Retail Purchasing of Local Produce**, or similar checklist, as appropriate. Be prepared to follow any sanitation and safety procedures required by the farm. You may be asked to wear hairnets, gloves, and shoe coverings. Observe as much of the farm operation as possible, including the following:

- Products currently growing in the field.
- Equipment and supplies, such as tractors, harvesting containers, harvesting equipment, cleaning and sanitizing equipment, and delivery trucks.
- Facilities, including packing sheds, on-site storage locations, and chemical storage facilities, if applicable.
- Storing, harvesting, or packing process, if possible.

Food Safety Discussion Topics

Discuss the following topics, using the *Checklist for Retail Purchasing of Local Produce** or a similar checklist, as a guide.

- Land use history
- Soil composition and testing
- Water sources
- Wildlife control
- Composting practices
- Chemical and pesticide management
- Crop selection
- Liability insurance
- Traceability methods
- GAPs audit results and documentation, if farm is GAPs certified
- Organic procedures, if applicable
- Handling and processing procedures, if applicable

Verifying On-Farm Food Safety, continued

Purchasing Discussion Topics

The farm's typical procedures for working with customers may differ from your school district's procedures for working with vendors. Learn how the farmer prefers to do business, and be willing to be flexible, if you can. Ask about delivery practices. Remember that farmers typically receive payment immediately and may not be willing or able to wait several weeks.

Delivery capacity

- Does the farmer deliver?
- Can the farmer deliver in refrigerated trucks?
- How often is the farmer willing to deliver?
- What day(s) of week and time(s) of day could deliveries take place? What day(s) of week and time(s) of day could produce be picked up, if deliveries are not possible.
- Does the farmer currently work with any distributors?

Ordering and Payment

- How does the farmer handle ordering?
- How does the farmer invoice?
- How does the farmer accept payment?
- Would the farmer be willing to negotiate an alternate arrangement to his/her standard practices?

Farm Operations to Observe

- Thank the farmer for his or her time.
- Provide any additional information requested by the farmer in a timely manner.
- Invite the farmer to visit your facility.

References

Cornell National GAPs Program http://www.gaps.cornell.edu/

*Iowa State University, Checklist for Retail Purchasing of Local Produce http://www.extension.iastate.edu/Publications/PM2046A.pdf

Iowa State University Resources, Local Foods: From Farm to Food Service http://www.extension.iastate.edu/HRIM/LocalFoods/From%20Farm%20to%20Foodservice.htm

Penn State University http://extension.psu.edu/food-safety/farm

University of California Davis GAPs http://ucgaps.ucdavis.edu/

Insurance Coverage Options for Fresh Produce Growers

Fresh produce growers today face several risks associated with foodborne illness outbreaks. First, consumers affected by these outbreaks can take legal action against growers to claim monetary damages due to illness (also called liability risk). Second, regulators can issue a product recall or warning because of the outbreak, causing a catastrophic drop in sales and damaging the farm's or product's reputation. As foodborne illness outbreaks increase, so does the risk of economic loss. Insurance against economic loss from foodborne illness helps growers safeguard their business operations. With the variety of insurance coverage or policies available, fresh produce growers should understand what policies best cover their farms.

General Farm Liability Insurance Policy

General farm liability insurance typically protects against claims for bodily injury and property damage that occur on the farm premises or as a result of farm operations (IRMI, 2008). These policies cover accidents that affect farmers, employees, guests, and customers.[1] Outlaw (2007) and the New England Small Farm Institute (2008) suggest that these general commercial or farm liability policies are appropriate for growers with pick-your-own operations and on-farm stands. The New England Small Farm Institute (2008) further explains that farm liability insurance covers lawsuits only from activities considered "farming," which is usually defined to include only agricultural production activities and on-farm roadside stands. These policies also typically cover the sale of produce in its raw, unprocessed state, whether sold on-farm or at a farmers' market. The sale of produce grown by another farmer, even if the produce is sold "raw and unprocessed," is not covered under a general farm liability policy.

Commercial Business Liability Insurance

Commercial business liability insurance may be necessary if the grower also undertakes activities that are not considered "agricultural" or "farming" (New England Small Farm Institute, 2008). It works essentially the same way as general farm liability insurance. The insurance is appropriate for growers who have fresh-produce processing facilities. This insurance is also appropriate for growers that sell in farmers' markets or sell more than a certain percentage of products that originate off-farm (New England Small Farm Institute, 2008).

Product Liability Insurance Policy

Many fresh produce growers mistakenly believe that their general farm liability policy protects against claims of injury from contaminated fresh produce that causes foodborne illness. But as Hamilton (1999) explains, this is not generally the case, because the injury usually happens off the farm premises. In this case, a product liability insurance policy is appropriate, as it protects against consumer claims of injury caused by a defective or hazardous product such as contaminated fresh produce. (Holland, 2007). A growing number of retail stores require that food products they carry have a minimum level of product liability coverage (normally a $1 million policy or more). It is important to understand, however, that food product liability insurance strictly covers claims of injured parties and not recall costs.

The cost of food product liability coverage is difficult to estimate. Insurance providers are often reluctant to provide quotes because there is no "standard" premium rate for food products, and the industry is very competitive. Instead, most insurance companies that offer this coverage provide an estimate only when growers submit a detailed description of their product and business operations (production, distribution, and marketing plans). However, an approximate rule of thumb in the industry is around $1,000 per year for a $1 million policy.

Based on an informal survey of insurance providers undertaken in May 1998, Holland (2007) indicates that the annual premiums for food product liability insurance ranged from $500 to $20,000 for a $1 million policy. The average food product liability premium was found to be $3,000 for a $1 million policy. The most significant factors contributing to the premium charged are: level of gross sales or annual payroll, prior claims (claims history), level of coverage, type of product, type of market, and recall plan.

Product Recall Insurance Policy

A product recall insurance policy typically covers only the actual or direct costs of a product recall, such as costs associated with getting the contami-

[1] *Note, however, that this policy does not replace Worker's Compensation insurance and only typically covers activities considered "farming."*

nated product off the shelf and destroyed, cost of replacing contaminated products, and transportation costs. It does not cover other indirect costs or losses due to the product recall or an outbreak warning, such as third party expenses, loss of profit, and business interruption losses. Third-party expenses refer to those costs that occur when a downstream retailer loses business as a result of the contamination.[2] Loss of profit refers to instances when the product recall or warning damages consumer confidence in the grower, negatively affecting revenues in the current or next business cycle. Business interruption losses are those losses resulting from a period where the growers' operations shut down.

An important issue to consider in the purchase of product recall insurance is that it covers recall costs only for growers responsible for contamination or outbreak. For those growers that were not a source of contamination but whose products were also taken off the shelf as a precaution, recall losses may not be covered. This can be a problem if, for example, no government entity officially traced or narrowed the source of the contamination (Odza, 2008).

Accidental or Product Contamination Policy

A more comprehensive policy that covers both the direct and indirect costs of product recall is the accidental or product contamination policy. It also insures growers against claims resulting from their own unintentional distribution of a product deemed unsafe. However, as with the product recall policy above, this coverage applies only to those growers whose product was contaminated. Those growers who suffered loss of profit or business interruption losses but were not contaminated (their product was rejected as a precaution or due to a market scare) typically will not be covered under this policy.

Malicious Tampering Insurance

Malicious tampering insurance is a more comprehensive insurance policy that covers losses from criminal actions of sabotage against the grower, as well as the losses covered in the accidental or product contamination policy (the indirect and direct recall costs). An example of a private company that sells this type of comprehensive coverage is MRM MacDougall Risk Management (Skees et al., 2001).[3] Damages due to malicious product tampering are indemnified for up to $75 million, while damages due to accidental product contamination are indemnified for up to $50 million. Under the accidental contamination provision of the policy, losses are categorized into four areas: (1) recall expenses, (2) lost gross profit, (3) rehabilitation expenses, and (4) crisis response. The second category covers loss for "12 months following discovery" or lost profit during a shorter period when the sales revenue remains lower that would have been reasonably projected had the product contamination not occurred. Indemnities are even paid to rebuild the lost market share. Table 1 (see back cover) provides examples of other companies that offer product recall insurance, accidental contamination insurance, malicious tampering insurance, and combinations thereof. Again, the shortcoming of this product, as with the product recall and accidental contamination, is that it applies only to growers whose product was contaminated.

Combination Policies

Some insurance companies offer combination or package policies. For example, the general farm liability policy and commercial business coverage can be combined with a homeowner's policy. A combination policy makes sense for growers whose farms have both residential and commercial characteristics. Such policies are especially appropriate for family- and individually-operated farms (rather than large corporate farming operations). Combination policies generally offer the additional advantage of a lower premium than for two policies purchased separately.

Excess/Umbrella/Surplus Lines of Insurance

Excess/Umbrella/Surplus lines of insurance are the terms used to describe insurance coverage that provides catastrophic loss protection when the underlying insurance is inadequate. For example, there are some risks that North Carolina-licensed insurance companies may not cover. The excess or surplus lines market is an insurance marketplace for unique or hard-to-place risks. For fresh produce growers, these excess or surplus lines provide additional protection above and beyond the losses covered under other policies. An excess or surplus insurance policy can be tailored to protect against losses from foodborne illness outbreaks even when the grower's product is not contaminated. The disadvantage of these types of policies is that premium rates are not regulated under state laws, and the Insurance Guaranty Association offers no protection for companies that sell these lines. Therefore, if the surplus lines insurer has financial difficulties, claims against the policy might not be paid. Note that product liability insurance in North Carolina sometimes falls under excess or surplus lines of insurance.

Adjusted Gross Revenue (AGR) or Adjusted Gross Revenue-Lite (AGR-Lite) Crop Insurance

All of the insurance policy options discussed so far are private-industry provided (and underwritten), and these policies are not a part of the government-supported Federal Crop Insurance (FCI) program.[4] Except for the excess/surplus lines, these privately provided insurance options cover only losses related to food-

[2] *Third party expenses may also include the liability the grower faces from downstream retailers whose brand names may be tarnished as a result of the contaminated fresh produce supplied to them.*

[3] *This policy is underwritten by Lloyd's of London.*

[4] *The FCI program is overseen by the United States (US) Dept. of Agriculture Risk Management Agency (USDA-RMA). This is a publicly supported, privately delivered program that provides insurance products that help protect farmers from yield/revenue losses due to natural perils (such as drought or flood.). AGR and AGR-Lite are offered under this program. AGR-Lite is currently available in North Carolina.*

borne illness outbreaks if the particular grower's fresh produce was contaminated. The insurance options previously discussed (except for the excess/surplus lines) do not cover growers that were not contaminated, even if they suffered product recall expenses such as loss of profit or business-interruption losses.

The Adjusted Gross Revenue (AGR) or the Adjusted Gross Revenue-Lite (AGR-Lite) insurance products offered under the FCI program may cover some of the lost profits or revenues due to a foodborne illness outbreak even if the grower's product is not contaminated. AGR and AGR-Lite are whole-farm revenue protection plans. They protect against low farm revenues due to unavoidable natural disasters or market fluctuations that affect income during the insurance year. This coverage extends to fresh produce, as well as to most farm-raised crops and animals (any source of non-value-added agricultural revenue in the farm). The plans can partially cover a catastrophic drop in fresh produce revenues due to a foodborne illness outbreak. The revenue loss can either be from a precipitous price drop or a substantially low (or zero) demand for the fresh produce due to the outbreak.[5]

AGR and AGR-Lite use a grower's five-year historical farm average revenue as reported on the IRS tax return form (Schedule F or equivalent) and an annual farm report as a basis to provide a level of guaranteed revenue for the insurance period. If actual revenue for the period falls under the revenue guarantee chosen by the grower, then the AGR or AGR-Lite policy will provide indemnity payments. Note, however, that there are limits to the amount of revenue that can be insured, depending on the coverage and payment rates chosen. Large corporate farms with revenues above these limits may not qualify. For more details on AGR and AGR-Lite, see the RMA factsheets about them (RMA, 2007).

For more details about which insurance may apply to their particular operation, growers should contact their *insurance agents*.

[5] *Note that this is the authors' interpretation of the policy. However, there is a clause in the AGR-Lite policy where losses from the following may not be covered: "inability to market the agricultural commodities due to quarantines, boycotts, or refusal of any person to accept your agricultural commodities." We have contacted RMA for clarification of this issue and were told that a product warning that causes a revenue reduction (due to an industry wide drop in prices, for example) would be covered under AGR-Lite. The warning that caused low prices is a "market fluctuation" and should be covered. However, we were unable to get a definitive interpretation of whether revenue losses from a direct, government-announced product recall falls under this clause.*

References and Further Information:

Hamilton, N. 1999. The Legal Guide for Direct Farm Marketing. Drake University Press: Des Moines, IA.

Holland, R. 2007. "Food Product Liability Insurance." Center for Profitable Agriculture Info. # 11, University of Tennessee, Knowxville, TN.

International Risk Management Institute (IRMI). 2008. "Glossary of Terms" In http://www.irmi.com (Last Accessed: June 20, 2008).

Long, J. 2008. *Guide to Insurance for Your Business*. North Carolina Department of Insurance, Raleigh, NC.

New England Small Farm Institute. 2008. "Risky Business" In http://www.smallfarm.org/nesfi_library/virtual/virtual/riskybusiness (Last Accessed: June 20, 2008).

North Carolina Dept. of Insurance. 2008."A Consumer's Guide to Surplus Lines of Insurance." NC Dept. of Insurance, Raleigh, NC.

Odza, K. 2008. "Tomato Fallout – Recall Insurance Coverage Disputes." In the Food Liability Law Blog. http://www.foodliabilitylaw.com (Last Accessed: June 20, 2008).

Outlaw, S. 2007. "Getting the Right Liability Insurance Coverage." Paper presentation in the workshop titled: Profitable Produce: A Workshop on Legal Liability and Handling Food Safety, Roxboro, NC (May, 15, 2007).

Risk Management Agency (RMA). 2007. "2007 Adjusted Gross Revenue Lite" Factsheet that can be downloaded from http://www.rma.usda.gov/pubs/rme/fctsht.html.

Skees, J.R., A. Botts, and K.A. Zeuli. 2001. "The Potential for Recall Insurance to Improve Food Safety." *International Food and Agribusiness Review.* 4(1):99-111.

For Assistance in Finding Authorized Insurance Services in North Carolina:
N.C. Department of Insurance

For assistance finding insurance, regularly licensed companies and surplus lines:

MAP (919) 733-9811
For help with unauthorized insurance
1-800-546-5664 consumer services
(919) 733-7487 agent services

Table 1. Examples of Product Recall, Contamination, and Malicious Tampering Policies offered by Private Companies (From Skees et al., 2001).

Company	Product	Description
AIG Insurance	Recall Plus	Includes First Party Recall, Third Party Product Recall Expenses, and Third Party Impaired Property Expenses. The First Party Recall covers the traditional recall expenses and also has a "rehabilitation coverage option that covers the cost of restoring the company's sales or market share to the level expected prior to the product recall."[a]
Fireman's Fund	Liability insurance and product withdrawal expense coverage	Covers expenses for recalls, including communications, office supplies, additional labor costs, shipping, and the costs to dispose withdrawn products. "If a defective product is discovered, you can act quickly and confidently by initiating a withdrawal without obtaining prior approval." Also offers business interruption coverage.[b]
Liberty Mutual	Product recall expense insurance	Covers expenses for recalls, including communications, overtime compensation, and product disposal. Included as a general liability endorsement.[c]
Triple S. Inc: Subsidiary of National Food Processors Assoc.	Product Contamination Insurance	Covers expenses to inspect, withdraw, and destroy product; value of product itself; and "extra expenses to rehabilitate and re-establish the product in the marketplace." For members of the National Food Processors Assoc. only.[d]
Chubb Group	Reputational damages liability insurance	Protects against claims for financial damages made by a customer or franchisee alleging that a foodborne illness harmed its reputation and resulted in a loss of income.[e]
Zurich, U.S.	Brand protection insurance	Covers recall expenses, including those of third party. Also covers "loss of profit relating to recall incident and costs to rehabilitate or re-establish processor's reputation and product's market share."[f]
IBS (Insurance Brokers Service)	Total recall plus	"Provide up to $25 million in protection from the unexpected costs of recall management and gross profit loss" and brand protection.[g]
CAN Commercial Insurance	FOOD program	Allows food companies to "take preventative action by getting products off the shelves quickly if there is any question of food safety."[g]
MRM MacDougall	Recall insurance	Offers up to $50 million in protection for a recall and $75 million for malicious tampering with food products. Insures recovery expenses as well as damage to sales and reputation.

[a] Source: Company Web site is: http://firemansfund.com/spd/cfm? spi=liability and Mancini, L. 1997. "Before disaster strikes:property and product liability insurance for food companies." Chilton's Food Engineering. 69(4): 95-98.

[c] Source: Company Web site is: http://www/libertymutual.com/business/specialp.html and Demetrakakes, P. 1999. "Backlash." Food Processing. 60(8): 16-21.

[d] Source: Company Web site is: http://www.nfpa-food.org/triplesbrochure and Mancini, L. 1997. "Before disaster strikes:property and product liability insurance for food companies." Chilton's Food Engineering. 69(4): 95-98.

[e] Source: by Goch "Chubb liability insurance designed for food industry," Best's Review – Property-Casualty Insurance Edition, November 1998, p. 86 and Company Press Release, Aug. 24, 1998 "Chubb protects food processors and suppliers from losses when customers and franchisees sue for 'reputational damages' stemming from foodborne illness."

[f] Source: Demetrakakes, P. 1999. "Backlash." Food Processing. 60(8): 16-21.

[g] Source: Dwyer, S. 1999. "Is your brand bulletproof?" Prepared Foods. 168(6): 29-30.

Produced by

Roderick M. Rejesus, Assistant Professor and Extension Specialist, NC State University

Annette Dunlap, NC Dept. of Ag. and Consumer Services

COLLEGE OF AGRICULTURE & LIFE SCIENCES

ACADEMICS ▲ RESEARCH ▲ EXTENSION

NC STATE UNIVERSITY

E09 51823

1/09—1M—VB/SSS

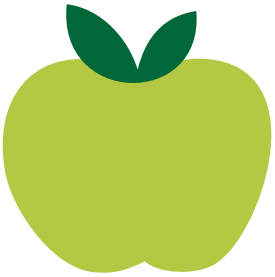
1,000 copies of this public document were printed at a cost of $310, or $.31 per copy.

AG-710

USDA

United States Department of Agriculture

DECISION TREE: How Will You Bring Local Foods into the Cafeteria with Your Next Food Purchase?



LOCAL can't be used as a product specification in a school food solicitation, but there are many ways to buy local products.

This chart presents several options for including your desire for local foods in the procurement process.

Is your purchase valued over the small purchase threshold that applies to you?

Tip: If your purchase is valued under $3,500, it is below the federal micropurchase threshold. This means that as long as your state or local rules aren't more restrictive, you can purchase products under this threshold without obtaining multiple bids.

Tip: The federal small purchase threshold is $150,000. Many states and localities set more restrictive thresholds, so be sure to contact your state department of education to find out what the applicable threshold is.

NO

YES

You can conduct an informal procurement.

Tip: When conducting an informal procurement, be sure to document specifications and record quotes.

You will conduct a formal procurement. Will price be the only evaluation factor?

YES

NO

Here are options for targeting local in an informal procurement.

You should issue an invitation for bids (IFB). Here are options for targeting local in an IFB.

You should issue a request for proposals (RFP). Here are options for targeting local in an RFP.

With an informal procurement, you may contact ONLY vendors offering local products.

In an informal or formal procurement, you can incorporate technical requirements, product specifications, or geographic preference in your solicitation to target local products.

With an RFP, you can also use evaluation criteria related to local.

Informal Procurement

The primary difference between formal and informal procurement is that a formal procurement must be publicly advertised. This means that when conducting an informal procurement, you are in control of who you request quotes from and you can choose to make requests only from vendors supplying local products. If there are not three local vendors to request quotes from, you can request products from both local and nonlocal sources and target local products by using product specifications, technical requirements or geographic preference. When conducting an informal procurement, you can collect quotes over the phone, via email, or even at the farmers market! Just be sure to document your requirements, specifications, and quotes in writing.

Technical Requirements and Product Specifications

In any type of procurement, you can use technical requirements and product specifications to target local products. In order for a vendor to be considered responsive and responsible, the vendor must meet the product specifications and other requirements outlined in your solicitation. Consider using requirements or specifications that target local products, such as:

* Freshness (e.g. "delivered within 48 hours of harvest");
* Harvest techniques;
* Production practices;
* State of origin labelling; and/or
* Ability to provide farm visits or visit classrooms.

Specifications such as these help increase the chances of getting products that are produced nearby, but do not explicitly require that the products be local. When using specifications related to particular crop varieties and freshness factors, be sure not to overly restrict competition; do the market research necessary to ensure there are multiple vendors able to meet your specifications.

Evaluation Criteria

In an RFP, you are not just evaluating price but the whole package of services and/or products the vendor is offering. Therefore RFPs allow you to give weight to factors in addition to price. RFPs should describe all evaluation criteria, their relative importance, and how they will be used to assess the proposals. The weight of each evaluation factor distinguishes which elements are most important, but elements included as evaluation criteria are not requirements.

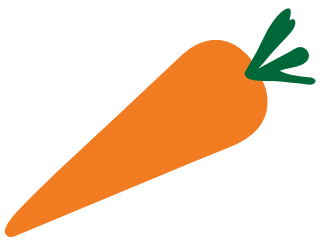
You can use some of the same measures mentioned in the technical requirements and product specifications section as evaluation criteria, noting that if these factors are used as evaluation criteria, their relative importance will be evaluated when reviewing proposals and if they are used as technical requirements or product specifications, the factors *must* be met in order for the bid or proposal to be considered.

Geographic Preference

The 2008 Farm Bill directed USDA to allow child nutrition program operators to use a geographic preference for the procurement of unprocessed, locally grown or raised agricultural products. See the resources listed below for more information.

Learn more

FNS's **Procuring Local Foods webpage** is chock full of resources to help you buy local including a comprehensive guide, **Procuring Local Foods for Child Nutrition Programs;** twelve webinars that dissect each step or method for buying local; and fact sheets on a range of procurement-related topics.



* *

For more information, and to sign up for the bi-weekly e-letter from the Food and Nutrition Service's Office of Community Food Systems, please visit www.usda.gov/farmtoschool.
Questions? Email us at farmtoschool@fns.usda.gov.

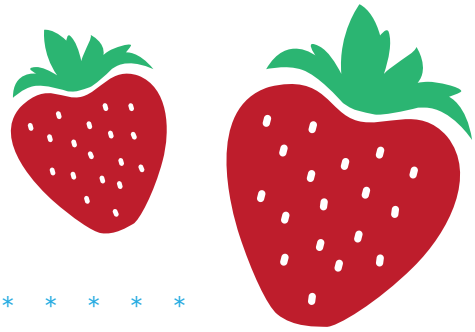
OFFICE *of*
COMMUNITY
FOOD SYSTEMS

USDA

United States Department of Agriculture

BUY AMERICAN:

SUPPORTING DOMESTIC AGRICULTURE IN SCHOOL MEALS



The **BUY AMERICAN PROVISION** safeguards the health and well-being of our Nation's children and supports the U.S. economy, American farmers, and small and local agricultural businesses (7 CFR 210.21 (d) and Memo SP 38-2017).

School food authorities (SFAs) in the continental United States* must purchase domestic agricultural commodities and food products. For foods that are unprocessed, the agricultural commodities must be domestic, and for foods that are processed, they must be processed domestically using domestic agricultural food components that are comprised of over 51% domestically grown items, by weight or volume. A domestic creditable food component is the portion that counts toward a reimbursable school meal (meats/meat alternates, grains, vegetables, fruits, and fluid milk).

- Foods and food products of Guam, American Samoa, U.S. Virgin Islands, Puerto Rico, and the Northern Mariana Islands are considered domestic.

How SFAs Can Buy American Foods

- Develop menus that include only domestic foods and domestic food products. **
- Include the Buy American provision and Geographic Preference option in written procurement procedures, specifications in solicitations, and contracts for food; be sure to monitor contractor performance.
- Require suppliers to attest that their final food products are either 100% domestic commodities or a food product containing over 51% domestic food components, by weight or volume.
- Use USDA Foods and food products processed in the United States using USDA Foods.
- Participate in **USDA's Farm to School Grant Program**.

Exceptions to Buy American

There are two limited exceptions when non-domestic foods may be purchased. These exceptions are determined by the SFA:

- The food or food product is not produced or manufactured in the United States in sufficient and reasonably available quantities of a satisfactory quality; or
- Competitive bids reveal the cost of a United States food or food product is significantly higher than the non-domestic product.

REMEMBER:
Document exceptions and keep records!

*SFAs in Alaska, Hawaii, and the U.S. territories are exempt from the Buy American provision. However, SFAs in Hawaii are required to purchase food products produced in Hawaii in sufficient quantities, as determined by the SFA, per 7 CFR 210.21(d)(3). Likewise, SFAs in Puerto Rico are required to purchase food products produced in Puerto Rico in sufficient quantities, under 42 USC 1760(n)(4).

Information on availability of domestic foods available at: **https://www.ams.usda.gov/market-news.

CHILD NUTRITION PROGRAMS

April 2019 | FNS 827 | USDA is an equal opportunity provider, employer, and lender.

BUY AMERICAN

7 CFR 210.21(D) AND MEMO SP 38-2017

START

Was the agricultural commodity or food product purchased using the nonprofit school food service account?

NO → Buy American does not apply.

YES → Buy American applies.

ASK: Is this a processed food product that uses agricultural commodities?

YES → The agricultural food product must be:

1) processed in the United States; and

2) of the creditable food components, over 51% must be domestic by weight or volume.*

Applies to Program and non-Program foods.

NO → This is an agricultural commodity (i.e., unprocessed). Agricultural commodities **must be produced in the United States.**

ASK: Do either of the exceptions apply?

ASK: Is the agricultural commodity or food product produced or manufactured in the United States in sufficient and reasonably available quantities of a satisfactory quality?*

YES → Do competitive bids reveal the United States agricultural commodity or food product is significantly more costly?*

NO → Buy American applies.

YES → A documented exception is permitted, and a non-domestic agricultural commodity or food product may be purchased.

NO → A documented exception is permitted, and a non-domestic agricultural commodity or food product may be purchased.

Document any exceptions used;

Consider domestic food alternatives prior to approving non-domestic foods;

Show documentation on procurement and administrative reviews.

* *

*As determined by the SFA.

SFAs can obtain information on Buy American at: **https://www.fns.usda.gov/school-meals/compliance-enforcement-buy-american** or by contacting their State agency.

CHILD NUTRITION PROGRAMS

INSERT "Farm to School" TAB

Farm to School

Safely Sourcing Local Foods

PRODUCE SAFETY UNIVERSITY

Travis Hearn
Program Analyst, Community Food Systems Division

USDA United States Department of Agriculture

Objectives

PRODUCE SAFETY UNIVERSITY

- Understand the concept of farm to school and food safety practices to employ.
- Learn how to use geographic preference to procure local food when writing specifications.
- Understand how robust farm to school programs can mitigate supply chain disruptions.

Introduction

PRODUCE SAFETY UNIVERSITY

Key Points

What

- Discuss the benefits of farm to school and how you can incorporate food safety best practices into your farm to school program.

Why

- Buying locally supports your community's economy and satisfies the Buy American requirement.
- Farm to School programs can help mitigate supply chain disruptions with greater transparency and predictability.

How

- Resources for Implementation
  - Farm to School fact sheets: https://www.fns.usda.gov/cfs/fact-sheets
  - FNS Farm to School Regional Leads: https://www.fns.usda.gov/cfs/usda-farm-school-staff

What is Farm to School?

PRODUCE SAFETY UNIVERSITY

Efforts including:

- Bringing locally or regionally produced foods into school cafeterias
- Hands-on learning activities
- The integration of food-related education into school curriculum

Poll Question

PRODUCE SAFETY UNIVERSITY

Poll

Does your school nutrition program use produce acquired through a farm to school program?

1. Yes
2. No
3. Not sure

Once your answer has been submitted, type in the chat why you implement farm to school or what you'd like to learn about farm to school.

Why Farm to School?

PRODUCE SAFETY UNIVERSITY

- Fresh, tasty food
- Willingness to try new foods
- Increased consumption of fruits and vegetables
- Improved knowledge and awareness regarding gardening, agriculture and healthy eating
- Increased program awareness and participation
- Creates markets for farmers, local economic benefit
- Helps meet meal pattern requirements

Defining Local

PRODUCE SAFETY UNIVERSITY

School Food Authorities define "local"

- Within a radius
- Within a county
- Within a state
- Within a region

- Could change depending on:
  - ✓ Season
  - ✓ Product
  - ✓ Special events

For example, "grown in New York," "Grown within a 100-mile radius of the school district," "Grown within New York or any bordering State."

Where to Find Local Foods

PRODUCE SAFETY UNIVERSITY

- ✓ Through distributors
- ✓ Through Food Service Management Companies
- ✓ From food processors
- ✓ Through DoD Fresh
- ✓ From individual producers
- ✓ From producer co-ops/food hubs
- ✓ From school gardens

Farm to School and Produce Safety

USDA Requirements

PRODUCE SAFETY UNIVERSITY

Important

USDA has no rules prohibiting school garden or local produce from being served in school cafeterias.

- Schools determine their own food safety standards for all vendors.

Local Foods and Food Safety

PRODUCE SAFETY UNIVERSITY

Good Agricultural Practices

GAPs are food safety best practices, not a federal requirement for school gardens or local farms

- A school may choose to make this a part of their food safety policy, but it's not federally required
- Food from local farms or school gardens is not inherently riskier than food from other sources
- Consult an expert!

Key Risk Areas

PRODUCE SAFETY UNIVERSITY

- **Design**
- **Soil**
- **Water source**
- **Growing**
- **Harvesting**
- **Washing**
- **Storage and Preparation (same for other products)**
- **Training**
- **Documentation**
- **State and Local Regulations**

Design

PRODUCE SAFETY UNIVERSITY

- Garden goals (if applicable)
- Site
- Size
- Soil and beds
- Crops and livestock
- Keeping pests out
- Other structures and spaces

Soil

PRODUCE SAFETY UNIVERSITY

- Free of biological and chemical contaminants
- Soil testing
  - Lead and other contaminants
  - Nutrient status
- Compost must be fully composted
- Natural or organic soil amendments

Water

PRODUCE SAFETY UNIVERSITY

- Municipal/tap water is tested for safety regularly!
- Surface water not recommended
- Rain barrel is acceptable in school gardens
  - ✓ Water the roots, not the leaves

Harvesting

PRODUCE SAFETY UNIVERSITY

- Follow Protocol
- Healthy Harvesters
- Wash hands
- Use clean harvest tools
- Observe, then harvest
- Harvest into clean, food grade containers – keep off ground
- Avoid washing, or shower
- Proper storage/cooling
- **Document everything!**

Know Your Produce!

PRODUCE SAFETY UNIVERSITY

- Know the difference between dirty and rotting
- Some dirt is expected
- Washing in kitchens encouraged over field washing
- Shower is better than bath
- Soil can contain beneficial bacteria!

Training

PRODUCE SAFETY UNIVERSITY

Farm employees
Volunteers
Students
Teachers
Harvesters
Cafeteria Staff
Custodial Staff

Documentation

PRODUCE SAFETY UNIVERSITY

Important

Request documentation demonstrating that:

- Good food safety practices are followed
- Stakeholders have been trained
- Soil and water sources are safe
- Harvest containers are cleaned and sanitized regularly
- Harvest details (products, harvesters, pounds, etc.)

Local Procurement

Writing Specifications for Local Food

PRODUCE SAFETY UNIVERSITY

DO

- Use product specifications
- Use additional requirements to determine vendor responsiveness

DO NOT

- Use local as a product specification
- Use language like:
  - ✓"This RFP is restricted to producers within the State."
  - ✓"We are soliciting bids from producers within a 150-mile radius"

Writing Specifications for Local Food

PRODUCE SAFETY UNIVERSITY

Potential Specifications, Requirements, and Evaluation Criteria to Target Local Products

- Varieties unique to the region
- Freshness (e.g., delivered within 48 hours)
- Size of farm
- Harvest techniques
- Crop diversity
- Origin labeling
- Able to provide cafeteria or class visits

Writing Specifications for Local Food

PRODUCE SAFETY UNIVERSITY

- **Be flexible**
- **Don't include unnecessary requirements**
- **Consider what a vendor new to the school food market might not know**
  - ✓ Condition upon receipt of product
  - ✓ Food safety needs
  - ✓ Size uniformity

Writing Specifications for Local Food

PRODUCE SAFETY UNIVERSITY

Geographic Preference

- Schools may express a preference for local food
  - ✓It's a preference, not a requirement or specification!
  - ✓Can be used for all procurement methods
  - ✓Can only be used with certain products
    - ➢"Unprocessed agricultural products" that retain their inherent character
      - » NOT heating, cooking, or canning

Geographic Preference Solicitation Example

PRODUCE SAFETY UNIVERSITY

	LAURIE'S LEGUMES	PAULA'S PULSES	GARY'S GRAINS
Price = 60	40	50	60
Three references, past history = 20	20	20	20
Able to provide farm/ facility tour or classroom visits = 5	0	5	5
Able to provide state of origin on all products = 5	0	5	5
Ability to provide products sourced within the state = 15	0	15	7
100 possible points	60	95	97

- Paula's Pulses sources 75% within the state = 15 points
- Gary's Grains can source 55% within the state = 7 points
- Laurie's legumes cannot guarantee any products within the state = 0 points

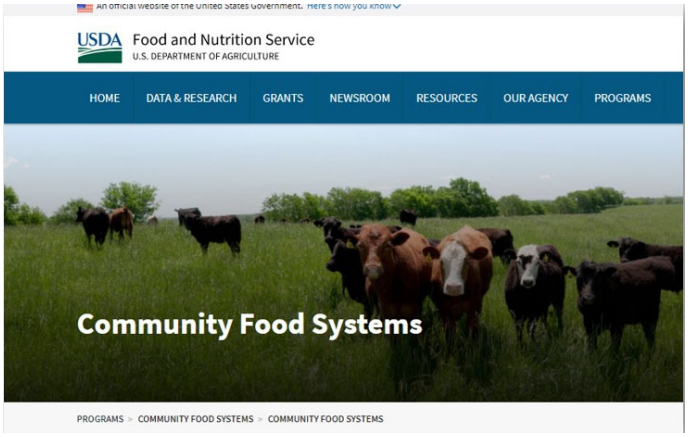
Writing Specifications for Local Food

PRODUCE SAFETY UNIVERSITY

- Define local
- Determine the procurement method to use
- Decide how much preference local products will receive
- Be very clear in the solicitation how the preference will be applied

Community Food Systems Division

PRODUCE SAFETY UNIVERSITY



Visit our website!

https://www.fns.usda.gov/cfs

GARDEN SAFETY CHECKLIST

Office of the State Superintendent of Education
School Garden and Farm to School Program

OSSE

d.c. healthyschools act

	Item #	ITEMS	YES	NO	N/A
Site Selection	1	Obtain historical information of the planned/ existing garden site and test the soil for toxins such as arsenic and lead.			
	2	Site garden away from hazards such as garbage, water run-off, flood zones and utilities.			
	3	Contact “Miss Utility” (1-800-257-7777) before digging in the soil.			
Soil & Compost	4	Compost bins are well maintained and prevent pests.			
	5	Compost collection station is staffed and monitored by an adult or a trained student.			
	6	Only properly treated, commercially-prepared manure is used. Soil testing is done every three years.			
	7	Label instructions for soils, compost, and fertilizers are followed. Fertilizers are only applied by adults.			
Food Handling & Preparation	8	Containers used to transport harvested items are food-grade, properly cleaned, and in good condition.			
	9	Persons who are currently ill or are known to be contagious are prevented from working in the garden or handling any food.			
	10	All persons have access to restrooms (with potable hot running water/soap/paper towels).			
	11	Proper personal hygiene practices are in place. All persons wash hands before harvesting food for public.			
	12	USDA “Best Practices for Handling Fresh Produce in Schools” procedures are being followed for items destined for consumption.			
	13	Harvested items are labeled and properly stored prior to use in cafeteria or otherwise consumed.			
Water & Irrigation	14	Gray water, waste water, and/or runoff water from surfaces that may contain toxins is not used to water edibles or wash produce.			
	15	Rainwater is collected from a roof with appropriate roofing material and stored in a food grade container.			
	16	Storage tanks such as cisterns or rain barrels are properly cleaned and flushed.			
	17	Backflow prevention devices are installed as part of the irrigation system.			
Garden Design	18	Non-toxic, non-leaching materials are used for edible garden beds.			
	19	Clear signage is provided regarding proper garden procedures such as composting, hand washing, and tool use.			
	20	Only non-allergenic and non-toxic plants are used.			
Tools	21	Tools and utensils are properly cleaned and sanitized.			
	22	Tools are properly stored and locked. Tools not suited for children such as sharp tools should be out of reach and closely monitored.			
Animals and Pests	23	Integrated Pest Management policies and procedures are followed.			
	24	Hands are washed with soap and water after being in an animal area and going back into the produce production area.			
	25	Animals are humanely housed in an enclosed area down-slope from the produce production area and are kept out of growing areas at all times.			
	26	There is no evidence of abuse from domestic and/or wild animals.			
	27	Bees are placed in a low traffic section of the garden that receives excellent sunlight.			
Health	28	A well-stocked first aid kit is readily available in the garden.			
	29	All persons are wearing closed-toed shoes, and are encouraged to wear appropriate clothing to protect themselves from sun, cold, and heat.			

GET THE FACTS ABOUT FOOD SAFETY

EACH YEAR, a growing number of schools are sourcing and serving safe, locally grown foods from nearby farmers or school gardens. Misconceptions about food safety should not keep schools from enjoying these nutritious and fresh food options. **Let's look at the facts:**

Grow Your Own

School Food Authorities (SFA) can use school garden produce in their school kitchens. There is no Federal regulation that prohibits the use of school garden or school farm produce in school meal programs. In fact, it is encouraged! SFAs have multiple options for using school garden produce to benefit school meals. For more information, refer to the United States Department of Agriculture (USDA) Food and Nutrition Service (FNS) policy memo **Farm to School and School Garden Expenses (SP06-2015)**.

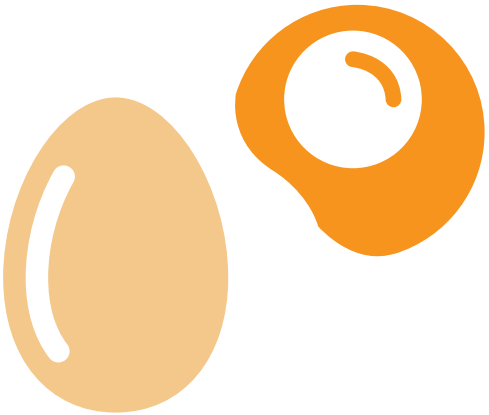
Keep in mind that there may be local, State, or Tribal laws governing the use of school garden or farm produce in the school cafeteria. It is important to be aware of any additional laws that exist, and how they may impact your program. For more information, contact your State Departments of Agriculture, Education, and/or Health.

Eggs at the Source

Schools are free to use "shell eggs" from campus chickens (chickens raised on school grounds) in their school meal programs; there are no Federal rules prohibiting this. For additional information, refer to FNS policy memo **Procuring Local Meat, Poultry, Game, and Eggs for Child Nutrition Programs (SP01-2016, CACFP 01-2016, SFSP 01-2016).**

Schools intending to use shell eggs from campus chickens in their meal program should consult with their State Departments of Agriculture, Education, and/or Health, to ensure that their campus chickens comply with both State animal health standards and food quality rules. Schools also should take special care to follow guidelines for proper storage and handling of shell eggs to mitigate the risk of foodborne illnesses.

For more information on egg safety, please refer to the **USDA Food Safety and Inspection Service, "Shell Eggs from Farm to Table"** fact sheet and **the Centers for Disease Control and Prevention (CDC) "Safe Handling Tips for Eggs**" guidance.



THE FARM to SCHOOL GRANT PROGRAM

OFFICE of COMMUNITY FOOD SYSTEMS

Practice Safety

Good Agricultural Practices (GAPs) are voluntary audits that a farm can request to verify that their fruits and vegetables are packed, handled, and stored as safely as possible to minimize the risk of microbial food safety hazards. GAPs are recommended but not required for local farms. The USDA Agricultural Marketing Service (AMS) maintains a database of farms and companies that meet GAP and Good Handling Practices (GHP) criteria. For more information, or to view the database, please visit the AMS GAP and GHP acceptance database **webpage** at **https://apps.ams.usda.gov/GAPGHP/reportG01.aspx.**

It is important to note that farms can implement GAPs without having a formal GAP certification. There is no Federal requirement for schools to purchase food from farms that have passed a GAP audit. Schools may purchase food directly from any farm that meets the applicable food safety requirements defined by the school as well as any existing State, local, and/or Tribal regulations.

Small and Mighty

Local foods are not riskier than food sourced from large-scale distributors.

The supply chain in a local food system is shorter and has fewer "touchpoints" than food that travels through a large-scale distribution system. In many cases, this means there are fewer opportunities for food safety issues to arise.

A growing number of large distributors now are sourcing and selling local food. It is the responsibility of the SFA to verify that they are purchasing food from a reputable supplier that engages in safe food practices. Be sure to ask questions and ensure your source is properly handling your food supply, whether it is a small farmer or a large distributor. For more information, refer to the **Food Safety Practices to Expect from your Fresh Produce Distributor** fact sheet and the **Verifying On-Farm Food Safety** fact sheet.

Looking Out for You

The U. S. Department of Agriculture works with the Food and Drug Administration (FDA) to ensure America's overall food supply is safe.

The FDA is the Federal agency responsible for ensuring the security and safety of much of America's food, including fresh fruits and vegetables. Most farms are required to comply with the FDA Food Safety Modernization Act (FSMA) Produce Safety Rule. However, there are **exemptions** for small farms and businesses.

USDA has specific food safety requirements for food supplied through USDA Foods and the Department of Defense Fresh Fruit and Vegetable programs. All fresh fruit and vegetables purchased directly by USDA must come from a vendor that has passed a USDA GAP as well as a GHP audit.

While USDA does not require farms to have insurance in order to sell to schools, it may be beneficial to partner with farmers who do have insurance coverage if that coverage applies to visitor-related injuries, such as those that could happen on a school field trip, and risks associated with the sale of farm products, including any illnesses caused by farm-related products.

November 2018 FNS-795

THE FARM to SCHOOL GRANT PROGRAM

OFFICE of COMMUNITY FOOD SYSTEMS

INSERT "Quality & Condition" TAB

Quality and Condition

PRODUCE SAFETY UNIVERSITY

Olivia Banks
Agriculture Marketing Specialist
Specialty Crops Inspection Division
USDA AMS

USDA United States Department of Agriculture

Objectives

PRODUCE SAFETY UNIVERSITY

- Define and explain the difference between quality and condition defects.
- Understand the relationship between defects/grade and cost.
- Differentiate between cosmetic defects, defects that impact taste, and defects that are food safety concerns.

Introduction

PRODUCE SAFETY UNIVERSITY

Key Points

What

- Identify the differences between quality and condition and discuss U.S. Standards for Grade of fresh produce.
- Discuss the benefits of ensuring produce quality and condition and how to identify food safety issues associated to condition of produce.

Why

- Identifying and verifying quality will ensure the best products reach your school nutrition programs.
- Identifying and verifying condition will ensure the freshest and safest produce is delivered to your programs.

How

- Gain understanding of the differences between quality and condition and what they mean to your programs.
- Become familiar with inspection resources available and how to apply them during quality and condition verification.

Quality

Quality

PRODUCE SAFETY UNIVERSITY

Quality Defects

What does quality mean?

The standard of something as measured against other things of a similar kind; the degree of excellence of something; a distinctive attribute or characteristic possessed by someone or something.

- Reputable symbols of the quality and integrity of American agricultural products.
- Common language.
- Official grade standards and processed product standards are developed, maintained and interpreted by USDA's Agricultural Marketing Service.

Communication

PRODUCE SAFETY UNIVERSITY

Communication

Clearly defined "terms" allow you to know what you are buying without seeing the product.

- At the farmers' market or grocery store you can select the exact piece of produce you plan to buy, decide if it meets your standards, and if you are willing to pay the price charged.
- Purchasing in bulk and making advance orders, you will **NOT** see the produce before you decide to buy.
- Quality standards allow you to communicate directly with industry using common language that is "standard" throughout the produce life cycle.

Defects

PRODUCE SAFETY UNIVERSITY

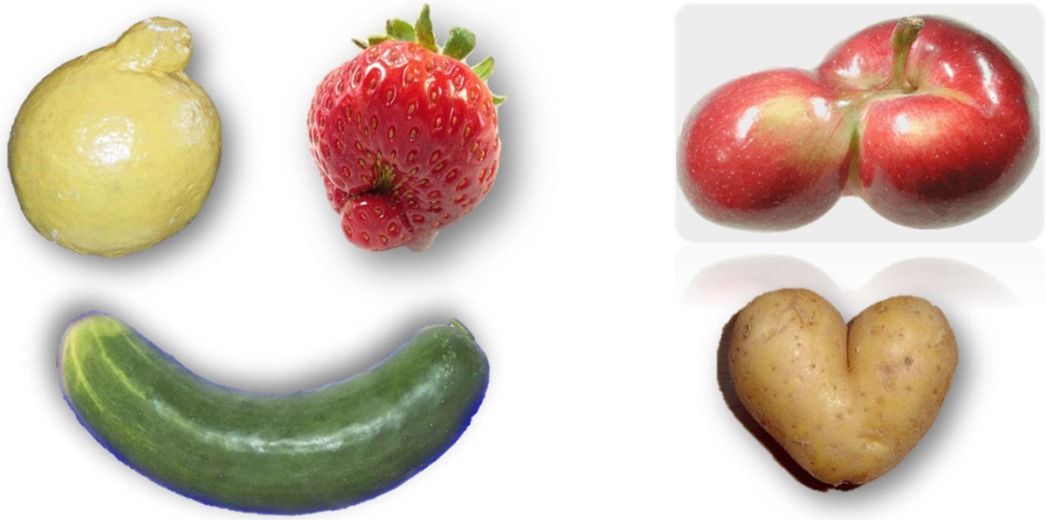
Quality defects are permanent factors that affect produce that will not change.

Commonly referred to as ***"Grade"*** defects.
Directly determine the "U.S. grade designated".

Examples:
Scars, misshapen, undersize.

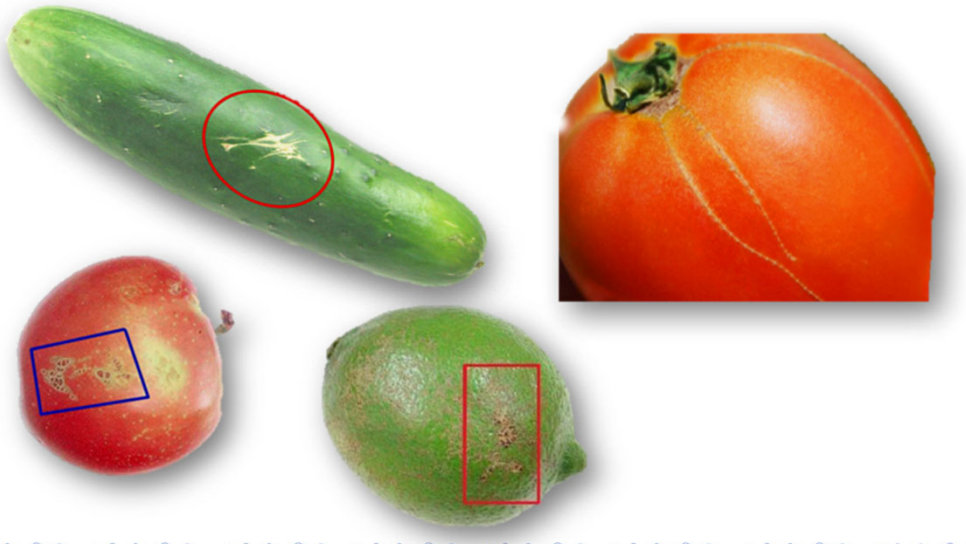
Quality - Misshapen

PRODUCE SAFETY UNIVERSITY



Quality - Scars

PRODUCE SAFETY UNIVERSITY



Quality – Poorly Colored

PRODUCE SAFETY UNIVERSITY

Quality - Size

PRODUCE SAFETY UNIVERSITY

Russet Burbank or Norkotah SIZES	Minimum OUNCES	Maximum OUNCES
Under 50	15	--
50 count	12	19
60 count	10	16
70 count	9	15
80 count	8	13
90 count	7	12
100 count	6	10
110 count	5	9
120 and over	4	8

- Many products have a minimum/maximum size
- U.S. No.1, potatoes 1 7/8 inches in diameter

Quality - Plant Diseases

PRODUCE SAFETY UNIVERSITY

Fusarium Wilt Bananas

- A **bacterial** plant disease wiped; out the Gros Michel variety.
- Cavendish variety now being affected.

Quality- Insects

PRODUCE SAFETY UNIVERSITY

Brown Marmorated Stink Bug

- Injury not immediately noticed at harvest.
- Insect sting at indentation site.
- Underlying flesh appears as brown corked areas.
- Affects price of unaffected apples.

Condition

Condition

PRODUCE SAFETY UNIVERSITY

Condition Defects

What is a condition defect?

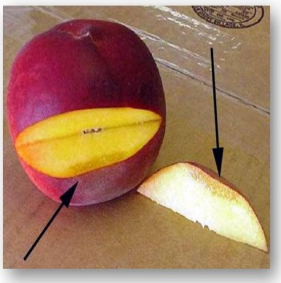
Condition is the relative degree of soundness or preservation of a product and includes, but is not necessarily limited to, its firmness, or stages of

- ripeness,
- decay,
- shriveling,
- or any other progressive factor which affects its marketability.

Condition - Bruising

PRODUCE SAFETY UNIVERSITY

Depth

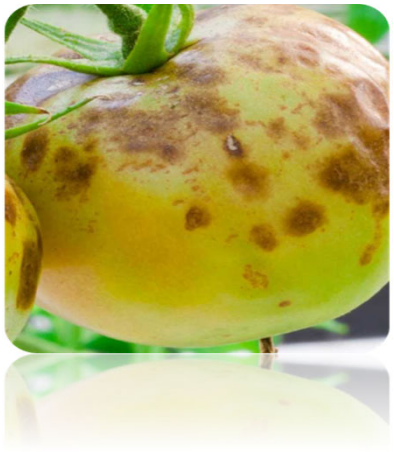


Area

- Bruises present ideal conditions for microbial growth and serve as an entryway for surface micro-organisms leading to breakdown and decay.
- You can measure the depth of a bruise as shown by making slice through the center of suspected area and then removing a half moon section to see the depth affected.

Condition – Sunken Discolored Areas

PRODUCE SAFETY UNIVERSITY



Discoloration will usually progress.

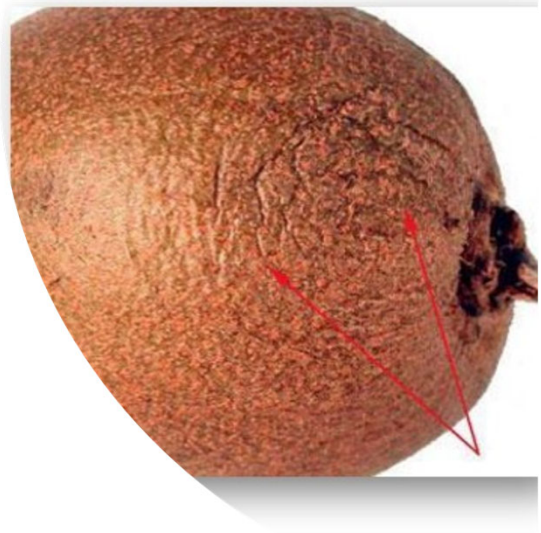
They may be caused by a multitude of factors.

- Low temperatures
- Rubbing
- Bruising
- Storage with something that might cause discoloration.

Condition – Shriveling

PRODUCE SAFETY UNIVERSITY

- Shriveling, another condition factor is caused by loss of moisture.
- The longer produce is held in storage, it loses moisture causing it to shrivel.
- Products become flabby or wilted as a result of shriveling.
- Exposure to cold temperature can also cause some products to shrivel.



Condition – Discoloration

PRODUCE SAFETY UNIVERSITY

Discoloration will usually progress.
It may be caused by a multitude of factors:

- Low temperatures
- Rubbing
- Bruising
- Storage with something that might cause discoloration.

Condition – Russet Spotting

PRODUCE SAFETY UNIVERSITY

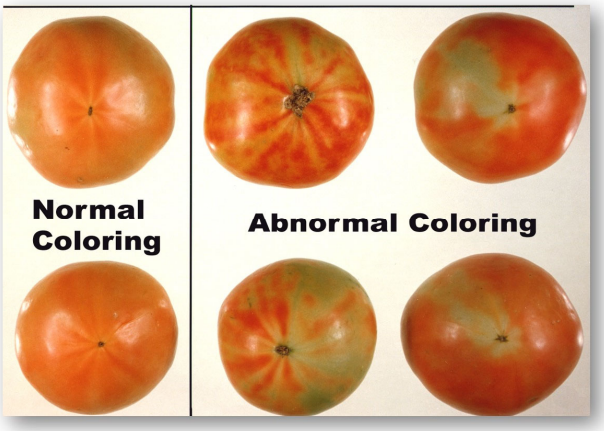
- This occurs over time, especially when lettuce is stored with fruits that generate ethylene, a natural ripening agent.
- Two well known ethylene emitters are apples and bananas.
- Don't store lettuce in the same refrigeration unit as either of these, as Russet Spotting will result.

Condition – Leaf Discoloration

PRODUCE SAFETY UNIVERSITY

Condition – Abnormal Color

PRODUCE SAFETY UNIVERSITY



During the ripening process tomatoes will typically begin to ripen from the blossom end first, and progress to the walls and shoulders.

Abnormal color differs from well colored requirements of the grade.

Abnormal color typically has no impact on food safety. It will affect the taste and texture of the fruit.

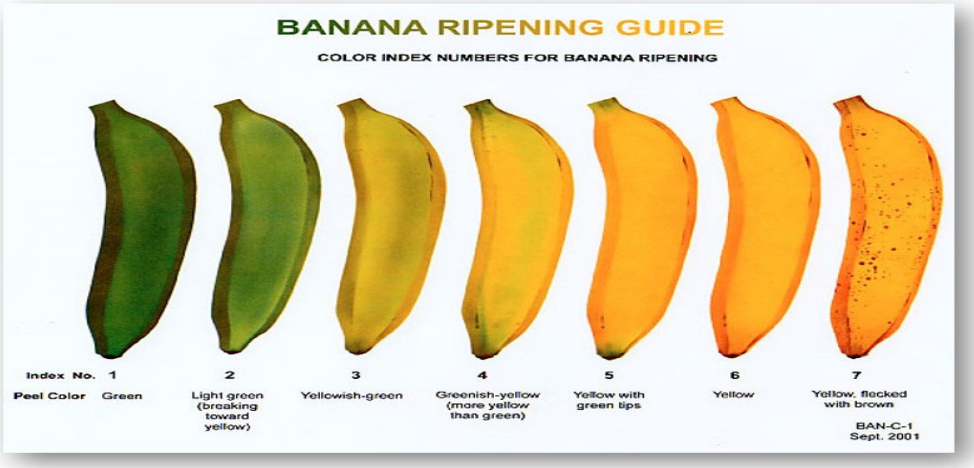
Condition – Decay

PRODUCE SAFETY UNIVERSITY

- Early – approximately 10% or less of the surface or specimens affected.
- Moderate – approximately 11 to 25% of the surface or specimen affected.
- Advanced – approximately 26% or more of the surface or specimen affected.

Condition - Color

PRODUCE SAFETY UNIVERSITY



Condition – Firmness

PRODUCE SAFETY UNIVERSITY

- **Apples**
  - Firm
  - Firm ripe
  - Ripe
  - *Over-ripe*
- **Determine firmness:**
  - Chewing Test
  - Cutting
  - Pressure Test

Condition – Internal Quality

PRODUCE SAFETY UNIVERSITY

The U.S. No. 1 Grade for Cantaloupes requires the following for internal quality:

- Good internal quality
- 9% Soluble solids which is measured using a hand refractometer.

Condition - Ripeness

PRODUCE SAFETY UNIVERSITY

Cantaloupes

- Hard
- Firm
- Ripe & Firm
- Overripe

Ground Color

- Dark Green
- Light Green
- Turning Yellow

Making the Grade

Grades

PRODUCE SAFETY UNIVERSITY

- Recognized by the fruit, vegetable, nut, and specialty crop industry as an essential element in resolving disputes of product quality.
- Promote efficiency in marketing and procurement.
- A common language for trading where the commodity cannot be readily displayed or examined by the prospective buyers.
- Available at no cost on the USDA Grades and Standards web site.

Grade and Price

PRODUCE SAFETY UNIVERSITY

U.S. Extra Fancy $25.00 - $28.00 U.S. Fancy $22.00 - $23.00 U.S. No. 1 $15.00 – 16.00

Grade Standards

PRODUCE SAFETY UNIVERSITY

312

U.S. Grade Standards for Fruit, Vegetable, and Specialty Crops

Now we will take a quick look at the USDA Grades and Standards website so you can see just how much information is available to you.

Questions?

INSERT "Market News" TAB

Market News

PRODUCE SAFETY UNIVERSITY

Tom Schwartz
Master Trainer
Specialty Crops Inspection Division, USDA AMS

Chef Cyndie Story
K-12 Consultant
Culinary Solution Centers, LLC

USDA United States Department of Agriculture

Objectives

PRODUCE SAFETY UNIVERSITY

- Identify information in AMS Market News reports to aid in child nutrition procurement decisions, including Buy American.
- Use AMS Market News to determine the market value of produce and factors that impact cost.
- Use AMS Market News to check for seasonal availability and associated costs.

Introduction

PRODUCE SAFETY UNIVERSITY

Key Points

What

- Demonstrate how Market News can aid in child nutrition procurement decisions.

Why

- Illustrate comparative prices on purchased produce, creates better purchase decisions.

How

- Resource: https://www.ams.usda.gov/market-news

Market News Video

PRODUCE SAFETY UNIVERSITY

Objectives

PRODUCE SAFETY UNIVERSITY

- Identify information in AMS Market News reports to aid in child nutrition procurement decisions, including Buy American.
- Use AMS Market News to determine the market value of produce and factors that impact cost.
- Use AMS Market News to check for seasonal availability and associated costs.

Include "local preferred" in purchasing specifications!

Before We Begin

PRODUCE SAFETY UNIVERSITY

Have you used AMS Market News Fresh Fruit and Vegetable information to make purchasing decisions?

1. Yes
2. No
3. Never heard of AMS Market News

Benefits of Market News

PRODUCE SAFETY UNIVERSITY

You can use Market News to:

Identify and compare current market to verify:

- Bid price
- Vendor adherence to bid terms and conditions
- Justify exemptions to Buy American Provisions

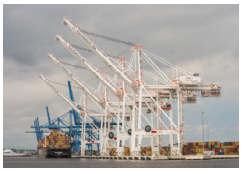
How do you know if you are getting the right price? Check the true price from Market News!

Structure of F&V Market News

PRODUCE SAFETY UNIVERSITY

Levels of Market Coverage

- Shipping Point
- Wholesale or Terminal Markets
- Retail

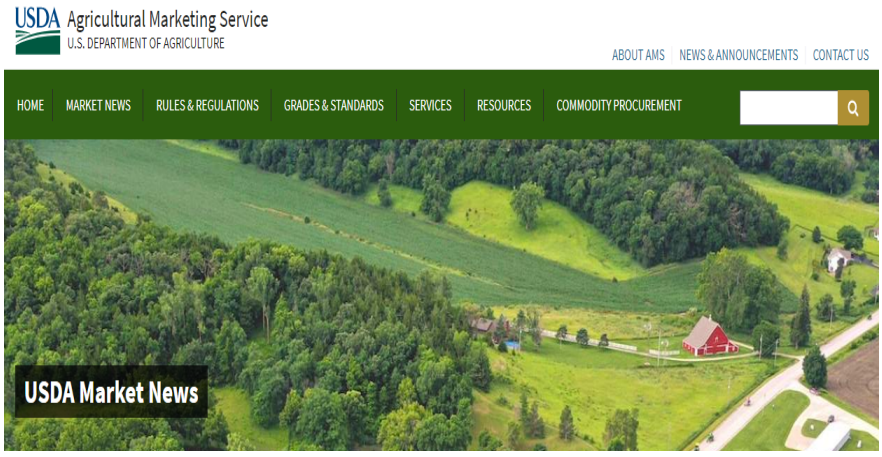


Market News Portal

Getting Started

PRODUCE SAFETY UNIVERSITY

www.usda.gov



Getting Started

PRODUCE SAFETY UNIVERSITY

https://www.ams.usda.gov/market-news

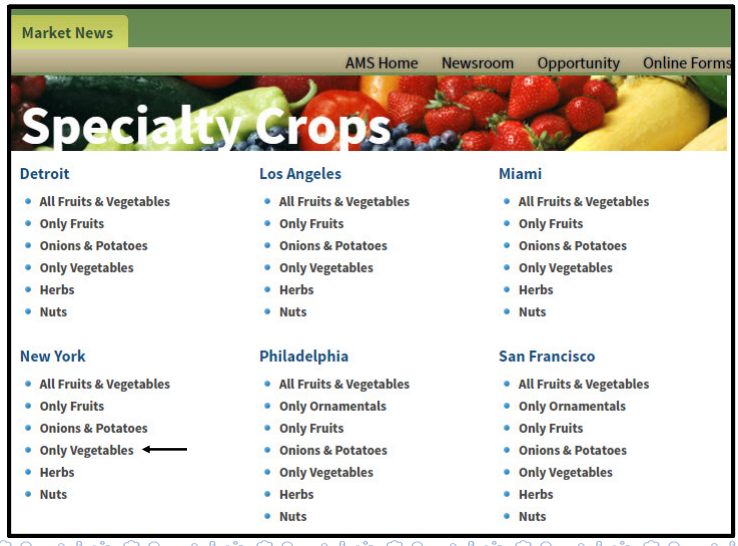
Selections By Commodity

PRODUCE SAFETY UNIVERSITY

https://www.ams.usda.gov/market-news

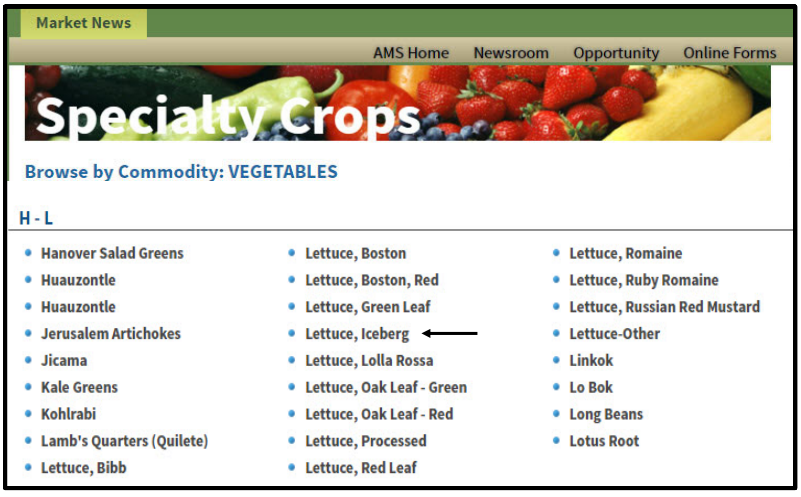
Select location

PRODUCE SAFETY UNIVERSITY



Commodity Selection

PRODUCE SAFETY UNIVERSITY



Select Commodity NY Iceberg Lettuce

PRODUCE SAFETY UNIVERSITY

Report Results

Location: New York
Commodity: LETTUCE, ICEBERG **Report Type:** Terminal Market
Aggregate by: Daily **Date(s):** 11/17/2021

Download as: Excel Text XML PDF (adobe reader required) Printable View (adobe reader required)

Refine results

Commodity: LETTUCE, ICEBERG **Environment:** All
Type: No Organic Hide Empty Columns:
Date: 11/17/2021 Go
Date Format: mm/dd/yyyy

Lettuce ranges from $25.00 to $46.00

NEW YORK : LETTUCE, ICEBERG Market : SLIGHTLY LOWER.
LETTUCE, ICEBERG Package: cartons

Date	Low-High Price	Mostly Low-High Price	Origin	Origin District	Item S	Condition	Storage	Appearance
11/17/2021	40.00 - 42.00		ARIZONA		24s flmv			
11/17/2021	36.00 - 38.00		CALIFORNIA		24s flmv	HOLDOVERS		
11/17/2021	25.00 - 25.00		CALIFORNIA		24s flmv	FR COND		FR APPEAR
11/17/2021	44.00 - 46.00		CALIFORNIA		24s flmv			
11/17/2021	30.00 - 30.00		CALIFORNIA		24s flmv	HOLDOVERS		FR APPEAR
11/17/2021	25.00 - 25.00		CALIFORNIA		30s flmv	HOLDOVERS		FR APPEAR
11/17/2021	34.00 - 34.00		MEXICO		24s flmv			

Commodity Chicago Iceberg Lettuce

PRODUCE SAFETY UNIVERSITY

Report Results

Location: Chicago
Commodity: LETTUCE, ICEBERG **Report Type:** Terminal Market
Aggregate by: Daily **Date(s):** 11/17/2021

Download as: Excel Text XML PDF (adobe reader required) Printable View (adobe reader required)

Refine results

Commodity: LETTUCE, ICEBERG **Environment:** All
Type: No Organic Hide Empty Columns:
Date: 11/17/2021 Go
Date Format: mm/dd/yyyy

Price ranges from $35.00 to $59.00

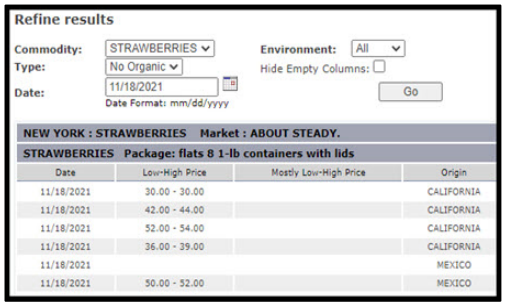
CHICAGO : LETTUCE, ICEBERG Market : STEADY. Comments : wide range in qualilty & condition.
LETTUCE, ICEBERG Package: cartons

Date	Low-High Price	Mostly Low-High Price	Origin	Origin District	Item Si	Appearance	Crop
11/17/2021	35.00 - 35.00		CALIFORNIA		flm lined		
11/17/2021	48.00 - 48.00		CALIFORNIA		flm lined	FINEAPPEAR	
11/17/2021	35.00 - 35.00		CALIFORNIA		24s flmv		
11/17/2021	44.00 - 45.00		CALIFORNIA		24s flmv	FINEAPPEAR	
11/17/2021	59.00 - 59.00		CALIFORNIA		30s flmv	FINEAPPEAR	
11/17/2021	35.00 - 35.00		NEW MEXICO		24s flmv		

Commodity Location

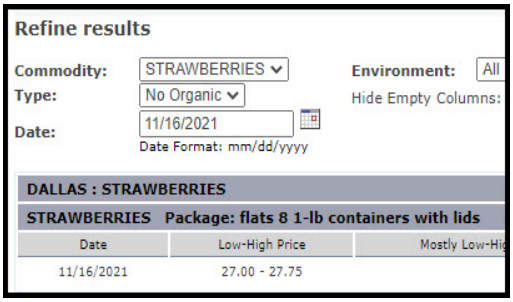
PRODUCE SAFETY UNIVERSITY

New York Strawberry 8/1lb.



Price range NY $30.00 to $54.00

Dallas Strawberry 8lb.



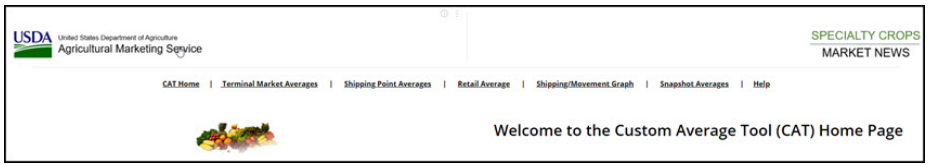
Dallas TX, $27.00 to $27.75

Custom Averaging Tool (CAT)

PRODUCE SAFETY UNIVERSITY

CAT – Selections

PRODUCE SAFETY UNIVERSITY



Custom Average Prices and Graphs

Terminal Market Averages ←

- Provides custom average price information for terminal market data on a weekly, monthly, quarterly or annual time period

Shipping Point Averages

- Provides custom average price information for shipping point data on a weekly, monthly, quarterly, seasonal or annual time period

Retail Averages

- Provides custom average price information for retail data on a weekly, monthly, quarterly or annual time period

Shipping Point/Movement Graphs

- Provides custom average price information compared to movement for shipping points on a weekly or monthly time period

CAT – Terminal Market

PRODUCE SAFETY UNIVERSITY

Shows, Bananas 1/1/21 to 11/2021
Bananas>Non-organic>New York Mkt> 40lb.
Price range $24.74 to year end $19.75.

Truck Rates

PRODUCE SAFETY UNIVERSITY

Truck rates affecting Market price (Philadelphia destination)
800 cases of Iceberg Lettuce per truck (Average $ 11,000)
Equals + $13.75 per case. Average F.O.B. Cost $23.00

--BROCCOLI, CAULIFLOWER, CELERY, LETTUCE, BOSTON, LETTUCE, GREEN LEAF, LETTUCE, ICEBERG, LETTUCE, RED LEAF AND LETTUCE, ROMAINE

		RANGE	MOSTLY	
Atlanta	Shortage	8800-10600	9500-10400	(+1)
Boston	Shortage	10800-12800	12200-12500	(+2)
Chicago	Shortage	7900-10000	8800-9500	(+3)
Dallas	Shortage	7000-9000	7800-8800	(+8)
Miami	Shortage	10600-12500	11200-11500	(+2)
Philadelphia	Shortage	10200-12000	10900-11700	(+2)

Market News Activity

CID'S and U.S. GRADE STANDARDS

INSERT "Fresh Cut Produce" TAB

Fresh-Cut Produce

PRODUCE SAFETY UNIVERSITY

Lauren McClean
Food Safety Specialist
USDA FNS Office of Food Safety

USDA United States Department of Agriculture

Objectives

PRODUCE SAFETY UNIVERSITY

- Learn about regulations and best practices of the commercial fresh-cut industry and what to look for at your processor.
- Identify best practices, including food safety practices, and the importance of mitigating microbial hazards in fresh-cut produce operations.

Introduction

PRODUCE SAFETY UNIVERSITY

Key Points

What

- Food safety risks associated with fresh-cut produce and how the risks can be mitigated using food safety best practices

Why

- Foodborne illness outbreaks associated with fresh produce continue to be a concern.
- Understanding what the food safety risks are and how to reduce them helps to prevent illness among students and ensure that meals are safe.

How

- The resource below highlights food safety practices that your fresh-cut produce processor should follow to help ensure the safety of fresh-cut produce that you receive.
- **Food Safety Practices to Expect from Your Fresh-Cut Produce Processor**

What is Fresh-Cut Produce and What Makes It Different?

Fresh-Cut Produce

PRODUCE SAFETY UNIVERSITY

Fresh fruits and vegetables that have been **minimally processed and altered in form** by peeling, slicing, chopping, shredding, coring, or trimming, with or without washing, prior to being packaged for use.

Fresh-cut produce is not cooked or frozen.

Fresh-Cut Produce

PRODUCE SAFETY UNIVERSITY

- May be **less expensive** to get whole produce and cut in-house
- May be more **visually appealing**
- May be **easier to handle** for younger children and therefore **more likely to be eaten**

Fresh-Cut Produce

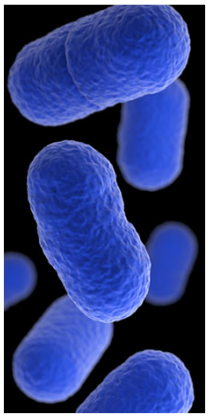
PRODUCE SAFETY UNIVERSITY

Fresh-cut, by definition, indicates that the plant's **protective cell layers are injured**.

The natural exterior barrier is broken.

Microbial Hazards in Fresh-Cut Produce

PRODUCE SAFETY UNIVERSITY



Processing fresh-cut products increases the risk of **microbial contamination and growth.**

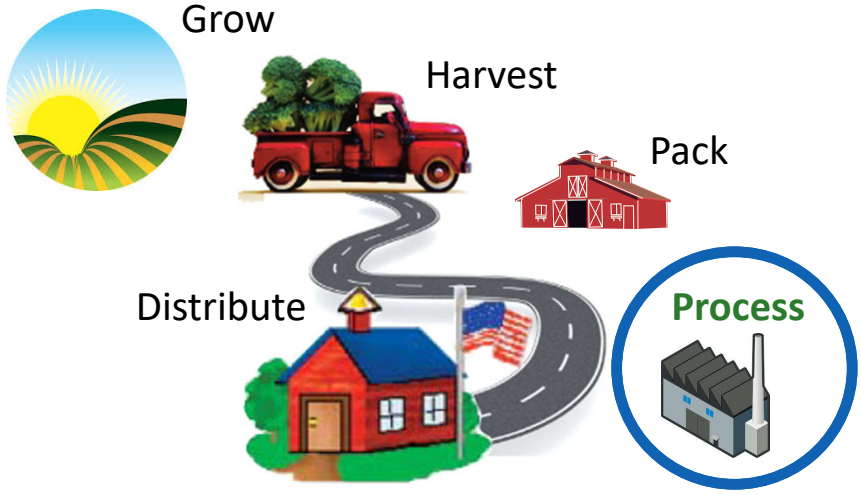
Pathogens may be transferred and may grow if the environment is ideal.

There is no fresh-cut processing step that eliminates microbial hazards!

Commercial Fresh-Cut Industry Regulations and Guidance

The Produce Supply Chain

PRODUCE SAFETY UNIVERSITY



Federal Oversight and Regulation of Produce

PRODUCE SAFETY UNIVERSITY

The **FDA** is the federal agency responsible for the safety of produce including fresh-cut produce

Regulations are issued to implement FDA's statutory authority – they create binding obligations

Guidance represents FDA's current thinking on a topic - it does not bind the FDA or the Public

Guidance for Produce Industry

PRODUCE SAFETY UNIVERSITY

Guide to Minimize Microbial Food Safety Hazards of Fresh-Cut Fruits and Vegetables

- First issued in 1998
- Can be used by domestic and foreign producers
- Focuses on enhancing the **safety of domestic and imported produce**

The Food Safety Modernization Act (FSMA)

PRODUCE SAFETY UNIVERSITY

The FSMA was enacted in 2011:

- Focuses on **preventing foodborne illness**
- Implemented by the **FDA**
- Comprises **7 rules**

FSMA: Preventive Controls for Human Food Rule

PRODUCE SAFETY UNIVERSITY

Key requirements include:

- A **Food Safety Plan** that includes Hazard Analysis and Risk-Based Preventive Controls (HARPC) for Human Food
- **Current Good Manufacturing Practices** (cGMPs)

Hazard Analysis and Risk Based Preventive Controls (HARPC)

PRODUCE SAFETY UNIVERSITY

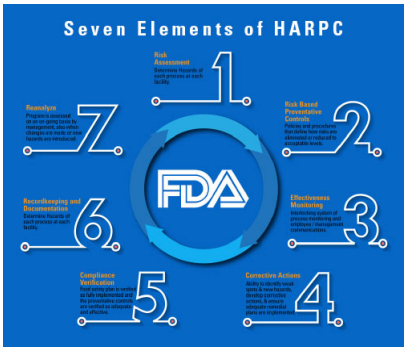
A preventive system to reduce the risk of foodborne illness

1. Written analysis of hazards
2. Identification of preventive controls
3. Monitoring of preventive controls
4. Corrective actions for ineffective or absent preventive controls
5. Verification of preventive controls
6. Preventive control records

HARPC and HACCP

PRODUCE SAFETY UNIVERSITY

A **preventive control** is a reasonably appropriate **procedure, practice, or process** employed to significantly minimize/prevent hazards.



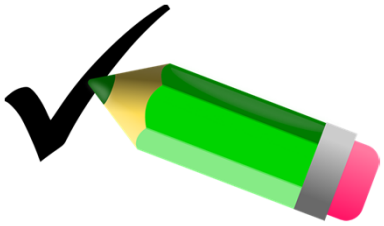
A **critical control point** is a **step** at which control can be applied and is essential to eliminating/reducing a hazard.

Verification is Key

PRODUCE SAFETY UNIVERSITY

Verify your supplier's food safety practices

Facilities are required to register with the FDA (under section 415 of the Federal Food, Drug, and Cosmetic Act).



Current Good Manufacturing Practices (cGMPs)

PRODUCE SAFETY UNIVERSITY

- Personnel
- Equipment & Utensils
- Plant & Grounds
- Processes & Controls
- Sanitary Operations
- Warehousing & Distribution
- Sanitary Facilities & Controls
- Defect Action Levels

Current Good Manufacturing Practices (cGMPs)

PRODUCE SAFETY UNIVERSITY

- Facility Exterior (Food Defense)
- Pest and Animal Control
- Facility Interior & Layout
- Equipment
- Personnel (Training, Health & Hygiene)

Current Good Manufacturing Practices (cGMPs)

PRODUCE SAFETY UNIVERSITY

- Receiving, Storing, Processing, Packaging & Shipping Practices
- Traceability
- Sanitation Plan (With Allergen Controls)
- Microbiological Testing Program

GMP: Microbiological Testing Program

PRODUCE SAFETY UNIVERSITY

- Written procedures for conducting routine microbiological tests to **verify the effectiveness of sanitation practices** are required.
- Examples of tests include environmental monitoring and product testing

GMP: Processing Water

PRODUCE SAFETY UNIVERSITY

Processing water is **tested frequently for adequate levels of sanitizing chemical**.
Commonly used sanitizers include:

- Chlorine
- Chlorine derivatives (e.g., hypochlorous acid)
- Ozonated water
- Peracetic acid

GMP: Documentation

PRODUCE SAFETY UNIVERSITY

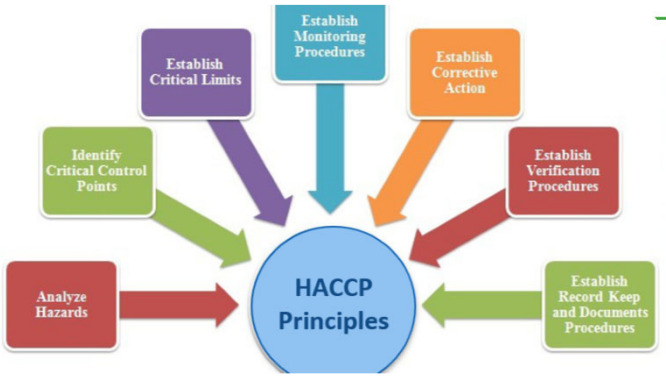
- Sanitation
- Product Batches
- Corrective Actions
- Pest Control Actions
- Distribution
- Inspections
- Employee Training
- Temperature Control
- Equipment Monitoring & Maintenance
- Calibration
- Water Quality Monitoring & Treatment

Fresh-Cut Produce in Schools: Requirements and Best Practices

A School Food Safety Program Based on HACCP Principles

PRODUCE SAFETY UNIVERSITY

A school food safety program must include:



- **Standard operating procedures** (SOPs)
- A **written plan** at each site for applying HACCP principles using the Process Approach

A School Food Safety Program Based on HACCP Principles

PRODUCE SAFETY UNIVERSITY

Commercial Practice	School Practice	
Raw Receiving	Receiving	Specifications, temperature, product condition
Washing	Washing	Sanitation, employee practices, temperature
Peeling	Peeling Cutting	Sanitized food contact surfaces, hand washing, glove use, cross contamination, employee health, removal of damaged product, temperature
Cutting		
Washing		
Drying	Drying	Temperature, product condition, location-cooler
Packaging	Serving Storage	Specifications, temperature, product condition, storage location in cooler
Warehouse, Shipping		

FDA Food Code Requirements

PRODUCE SAFETY UNIVERSITY

Model to develop or update food safety rules and regulations for retail food service operations

Time/temperature control for safety (TCS) foods:

- Raw seed sprouts
- Cut melons
- Cut leafy greens
- Cut tomatoes

Pre-Washed Fresh-Cut Produce

PRODUCE SAFETY UNIVERSITY

- Pre-washed produce in sealed bags **can be used without further washing.**
- Produce is washed and ready-to-eat.
- Rewashing may result in contamination.

INSERT "Mock Recall Activity" TAB

Mock Produce Recall

An Activity

USDA United States Department of Agriculture

PRODUCE SAFETY UNIVERSITY

Chef Cyndie Story

K-12 Consultant

Culinary Solution Centers, LLC

District Overview

PRODUCE SAFETY UNIVERSITY

Welcome to Stone Fruit School Nutrition Services
"Nourishing young scholars in every season"

- Cherry High School
- Apricot Middle School
- Peach Elementary School
- Plum Elementary School

Activity Instructions

PRODUCE SAFETY UNIVERSITY

Teams will:

- Determine produce recall efficacy rate.
- Identify areas of improvement.
- Develop a corrective action plan based on identified areas of improvement.

Breakout Into Teams

Cherry High School

PRODUCE SAFETY UNIVERSITY

Cherry High School

PRODUCE SAFETY UNIVERSITY

A Amount delivered _____

B Amount in inventory _____

C Amount in food production _____

D Amount served or consumed _____

Instructions: The effectiveness of the mock recall exercise can be measured by using a simple formula.

% Mock Recall Effectiveness: $\frac{B+C+D}{A} \times 100 =$ Percent Effective

Cherry High School

PRODUCE SAFETY UNIVERSITY

Record the amounts stated in the above Recall Report in the formula below to calculate percent effectiveness at Cherry High.

_____Amt. in Inventory + _____Amt. in Food Production + _____Amt. Served/Consumed = _____ ÷ Amt. Delivered

= _____X 100 = _____% Effectiveness

Discussion

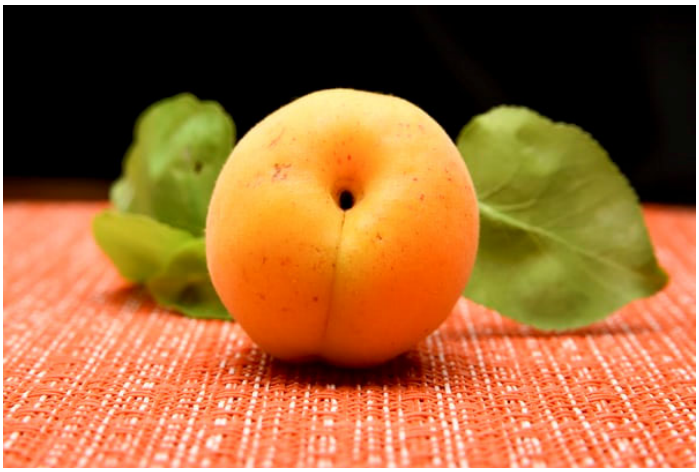
PRODUCE SAFETY UNIVERSITY

Cherry High

- What are some areas where errors may have occurred at this campus?
- What corrective actions are recommended for improvement?

Apricot Middle School

PRODUCE SAFETY UNIVERSITY



Apricot Middle School

PRODUCE SAFETY UNIVERSITY

A Amount delivered _____

B Amount in inventory _____

C Amount in food production _____

D Amount served or consumed _____

Instructions: The effectiveness of the mock recall exercise can be measured by using a simple formula.

% Mock Recall Effectiveness: $\frac{B+C+D}{A} \times 100 =$ Percent Effective

Apricot Middle School

PRODUCE SAFETY UNIVERSITY

Record the amounts stated in the above Recall Report in the formula below to calculate percent effectiveness at Cherry High.

_____Amt. in Inventory + _____Amt. in Food Production
+ _____Amt. Served/Consumed = _____ ÷ Amt. Delivered
= _____X 100 = _____% Effectiveness

Discussion

PRODUCE SAFETY UNIVERSITY

Apricot Middle

- What are some areas where errors may have occurred at this campus?
- What corrective actions are recommended for improvement?

Plum Elementary School

PRODUCE SAFETY UNIVERSITY

Plum Elementary School

PRODUCE SAFETY UNIVERSITY

A Amount delivered _____

B Amount in inventory _____

C Amount in food production _____

D Amount served or consumed _____

Instructions: The effectiveness of the mock recall exercise can be measured by using a simple formula.

% Mock Recall Effectiveness: $\frac{B+C+D}{A} \times 100 =$ Percent Effective

Plum Elementary School

PRODUCE SAFETY UNIVERSITY

Record the amounts stated in the above Recall Report in the formula below to calculate percent effectiveness at Cherry High.

_____Amt. in Inventory + _____Amt. in Food Production

+ _____Amt. Served/Consumed = _____ ÷ Amt. Delivered

= _____X 100 = _____% Effectiveness

Discussion

PRODUCE SAFETY UNIVERSITY

Plum Elementary

- What are some areas where errors may have occurred at this campus?
- What corrective actions are recommended for improvement?

Peach Elementary School

PRODUCE SAFETY UNIVERSITY

Peach Elementary School

PRODUCE SAFETY UNIVERSITY

A Amount delivered _____

B Amount in inventory _____

C Amount in food production _____

D Amount served or consumed _____

Instructions: The effectiveness of the mock recall exercise can be measured by using a simple formula.

% Mock Recall Effectiveness: $\frac{B+C+D}{A} \times 100 =$ Percent Effective

Peach Elementary School

PRODUCE SAFETY UNIVERSITY

Record the amounts stated in the above Recall Report in the formula below to calculate percent effectiveness at Cherry High.

_____Amt. in Inventory + _____Amt. in Food Production

+ _____Amt. Served/Consumed = _____ ÷ Amt. Delivered

= _____X 100 = _____% Effectiveness

Discussion

PRODUCE SAFETY UNIVERSITY

Peach Elementary

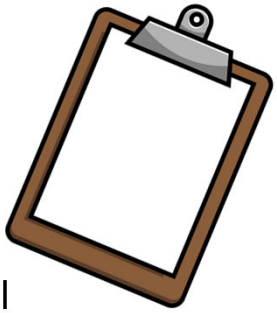
- What are some areas where errors may have occurred at this campus?
- What corrective actions are recommended for improvement?

Poll Question

PRODUCE SAFETY UNIVERSITY

Do you plan to conduct a mock produce recall in your school district?

1. Yes
2. No
3. Uncertain
4. Recently conducted a mock recall
5. Do not work in a school district



Key Takeaways

PRODUCE SAFETY UNIVERSITY

Remember to:

- Test crisis response plans before you need them.
- Use mock recalls to identify potential:
  - Food safety risks
  - Inventory mismanagement
  - Storage needs
  - Poor recordkeeping practices

Key Takeaways

PRODUCE SAFETY UNIVERSITY

Remember to:

- Test crisis response plans before you need them.
- Use mock recalls to identify potential:
  - Food safety risks
  - Inventory mismanagement
  - Storage needs
  - Poor recordkeeping practices

Mock Recall of Fresh Produce Activity
Stone Fruit School Nutrition Program Description

The nutrition program is planning a district-wide mock produce recall activity. The district consists of four schools: Plum Elementary School, Peach Elementary School, Apricot Middle School and Cherry High School. Each school receives produce deliveries, prepare, and serve all meals on site. Some of the challenges that the district has been experiencing include high staff turnover, inexperienced staff, inventory mismanagement/excessive inventory, and logistical challenges with limited cold storage.

This is the first time that Stone Fruit School District has conducted a mock produce recall. Due to the prevalence of food recalls in the U.S., the Nutrition Director has decided that this is an essential activity to determine their weaknesses and areas for improvement to enhance their food safety program and keep all of their customers safe. During the managers' meeting last month, the Nutrition Director discussed the procedures for handling a food recall and collected updated contact list information. The Director does not alert the school nutrition staff that the recall is a mock recall so that the strengths and weaknesses in the district can be accurately evaluated.

The Nutrition Director worked with the fresh produce vendor to select fresh spinach as the mock recall product. The batch/lot numbers in the recall are: 18494 and 18513. The recall will take place Thursday morning. The Nutrition Director will call each school manager to start the traceback using the batch/lot numbers. The vendor will ship 50 cases in total to the four sites – Cherry HS (20 cs.), Apricot MS (15 cs.), Plum ES (8 cs), and Peach ES (7 cs.).

Site Challenges:

Peach Elementary School

- Seasoned manager with fear of running out of food; inventory extremely high

Plum Elementary School

- Understaffed, frequent substitute staff

Apricot Middle School

- Produce taken out of original packaging and discarded due to storage constraints; poor record keeping

Cherry High School

- New manager at high school with previous restaurant experience

Cherry High School

When the staff receives the call from the Nutrition Director, they immediately jump into action. They locate all of the spinach in inventory, 7 cases, and then match the lot numbers provided by the Nutrition Director. Strawberry-Spinach Salad is on the menu today, so they check today's Food Production Records to determine how many cases have been prepared for the day—5 cs. Luckily, the first class has not come through the line, so no salad has been served yet. 20 cases were delivered on Tuesday, but they cannot account for the other 8 cases that are missing. The only other recipe on the menu that includes spinach was Cheesy Spinach, but it calls for frozen spinach. The manager calls the Director and provides as much of the requested information as she can.

Objectives:

I. Determine the efficacy of the Mock Recall Activity conducted by Stone Fruit SD.

II. Identify areas where the district/campus can improve.

III. Develop Corrective Action Plan for the area(s) of improvement.

Recall Report from Cherry High

A	Amount delivered	_____
B	Amount in inventory	_____
C	Amount in food production	_____
D	Amount served or consumed	_____

Instructions: The effectiveness of the mock recall exercise can be measured by using a simple formula.

$$\%\ \text{Mock Recall Effectiveness: } \frac{B+C+D}{A} \times 100 = \text{Percent Effectiveness}$$

Record the amounts stated in the above Recall Report in the formula below to calculate percent effectiveness at Cherry High.

_____Amt. in Inventory + _____Amt. in Food Production + _____Amt. Served/Consumed = _____ ÷ Amt. Delivered = _____X 100 = _____% Effectiveness

Group Discussion Questions:

1. What are some areas where errors may have occurred at this campus?
2. What corrective actions are recommended for improvement?

Apricot Middle School

This campus has very limited cold storage space and the staff has gotten creative with storage solutions. When the staff received the 15 cases of spinach on Tuesday, they unpacked the spinach, put away the bags, and tossed the empty boxes to make space in the cooler.

When the Director called, the manager shared the practice of removing the cases to maximize storage space. The director was surprised by the news. Unfortunately, they don't have the tracking information for the spinach, and they are unsure as to whether the spinach in inventory is part of the recall. The staff provides the inventory report based on what they have at this time, which is 6 cases. On the day of the recall, the staff prepared Strawberry-Spinach Salads and extra Cheesy Spinach than what was listed on the Food Production Record, because the students prefer it over the salads, and they were afraid of running out. It is a common that the Food Production Record forecasting figures are not accurate. They used fresh spinach instead of frozen because the manager forgot to order frozen spinach. 10 cases are currently in food production and 2 cases of Strawberry Spinach Salad have already been served.

Objectives:

I. Determine the efficacy of the Mock Recall Activity conducted by Stone Fruit SD.

II. Identify areas where the district/campus can improve.

III. Develop Corrective Action Plan for the area(s) of improvement.

Recall Report from Apricot Middle

A	Amount delivered	_____
B	Amount in inventory	_____
C	Amount in food production	_____
D	Amount served or consumed	_____

Instructions: The effectiveness of the mock recall exercise can be measured by using a simple formula.

$$\% \text{ Mock Recall Effectiveness: } \frac{B+C+D}{A} \times 100 = \text{Percent Effectiveness}$$

Record the amounts stated in the above Recall Report in the formula below to calculate percent effectiveness at Cherry High.

_____Amt. in Inventory + _____Amt. in Food Production + _____Amt. Served/Consumed = _____ ÷ Amt. Delivered = _____X 100 = _____% Effectiveness

Group Discussion Questions:

1. What are some areas where errors may have occurred at this campus?
2. What corrective actions are recommended for improvement?

Plum Elementary School

It has been a challenging school year so far due to being short-staffed. The manager spends most of her day in the kitchen helping with production. When the Director begins the mock recall, she tries to reach someone at Plum Elementary for over an hour before she finally speaks with someone. The staff begin looking in the cooler at the cases of spinach in inventory to match with the lot numbers that the Director provided. There are 5 cases in inventory, and in looking at the invoice, 8 cases were received on Tuesday morning. Strawberry Spinach Salad is on the menu today, so they check the Food Production Records to determine how many cases were prepared. They see that it is 2 ½ cases. Two classes have already gone through for lunch, so they count how many salads were already served. One case makes ~120 salads and they determine that ½ case has already been served. The manager returns the phone call to the Director to report that all cases have been accounted for.

Objectives:

I. Determine the efficacy of the Mock Recall Activity conducted by Stone Fruit SD.

II. Identify areas where the district/campus can improve.

III. Develop Corrective Action Plan for the area(s) of improvement.

Recall Report from Plum Elementary

A	Amount delivered	_____
B	Amount in inventory	_____
C	Amount in food production	_____
D	Amount served or consumed	_____

Instructions: The effectiveness of the mock recall exercise can be measured by using a simple formula.

$$\% \text{ Mock Recall Effectiveness: } \frac{B+C+D}{A} \times 100 = \text{Percent Effectiveness}$$

Record the amounts stated in the above Recall Report in the formula below to calculate percent effectiveness at Cherry High.

_____Amt. in Inventory + _____Amt. in Food Production + _____Amt. Served/Consumed = _____ ÷ Amt. Delivered = _____X 100 = _____% Effectiveness

Group Discussion Questions:

1. What are some areas where errors may have occurred at this campus?
2. What corrective actions are recommended for improvement?

Peach Elementary School

The staff receives the call from the Director as they are finishing serving 2nd and 3rd grade lunch. Two staff go into the walk-in to take inventory of the spinach. According to the invoice, they received 7 cases with Tuesday's delivery. The manager reviews the Food Production Records and sees that the staff has prepared 2 cases of spinach for the Strawberry Spinach Salad. Since two classes have already eaten lunch, she determines that one of those cases has already been served. Meanwhile, the two staff in the walk-in are having a lot of difficulty locating the spinach because there is just so much inventory. They can locate two cases, hidden behind cases of baby carrots and on top of a case of ground beef. They eventually get frustrated and cold and give up. They report to the manager that there were 2 cases that matched the lot numbers in the cooler.

Objectives:

I. Determine the efficacy of the Mock Recall Activity conducted by Stone Fruit SD.

II. Identify areas where the district/campus can improve.

III. Develop Corrective Action Plan for the area(s) of improvement.

Recall Report from Peach Elementary

A	Amount delivered	_____
B	Amount in inventory	_____
C	Amount in food production	_____
D	Amount served or consumed	_____

Instructions: The effectiveness of the mock recall exercise can be measured by using a simple formula.

$$\% \text{ Mock Recall Effectiveness: } \frac{B+C+D}{A} \times 100 = \text{Percent Effectiveness}$$

Record the amounts stated in the above Recall Report in the formula below to calculate percent effectiveness at Cherry High.

_____Amt. in Inventory + _____Amt. in Food Production + _____Amt. Served/Consumed = _____ ÷ Amt. Delivered = _____X 100 = _____% Effectiveness

Group Discussion Questions:

1. What are some areas where errors may have occurred at this campus?
2. What corrective actions are recommended for improvement?

INSERT "Writing Specifications" TAB

Writing Specifications

PRODUCE SAFETY UNIVERSITY

Chef Cyndie Story
K-12 Consultant
Culinary Solution Centers, LLC

USDA United States Department of Agriculture

Objectives

PRODUCE SAFETY UNIVERSITY

Understand how to interpret and use US grade standards when writing specifications.

Learn how to communicate with vendors to ensure seasonal availability of produce for your school.

Understand the consequences of poorly written specifications, and how to write clear specifications that encourage competition.

Introduction

PRODUCE SAFETY UNIVERSITY

Key Points

What

- Write product specifications to:
  - Get the product you want.
  - Receive the quality & condition you are paying for.
  - Buy at a competitive price.

Why

- Clear, product specifications communicate required product safety, quality, condition, and provide for open and fair competition among vendors.

How

- USDA AMS Grade Standards, USDA FNS Fruits & Vegetables Galore
- Produce Marketing Association, OFS Produce Safety University Produce Information Sheets, USDA Commercial Item Descriptions (CIDs), Commercial Market, Universities and Extension Offices

Right Product, Right Price

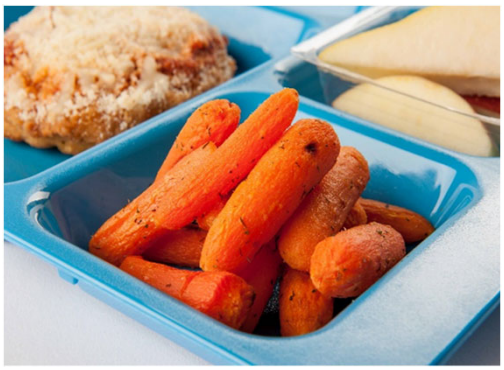
PRODUCE SAFETY UNIVERSITY

Four-Step Process

- Create the cycle menu (e.g., menu item & portion size)
  - ➢Consider customer preferences, nutrition requirements, available equipment, staffing, food safety, storage space, and more
- Determine product availability
- Write product specifications and conduct competitive procurement
- Receive the specified product

What's on the Menu

PRODUCE SAFETY UNIVERSITY



What's on the Menu

PRODUCE SAFETY UNIVERSITY

What's on the Menu

PRODUCE SAFETY UNIVERSITY



What's on the Menu

PRODUCE SAFETY UNIVERSITY

What's on the Menu

PRODUCE SAFETY UNIVERSITY

Specification Resources

Specification Resources

PRODUCE SAFETY UNIVERSITY

USDA
United States Department of Agriculture

U.S. Grade Standards

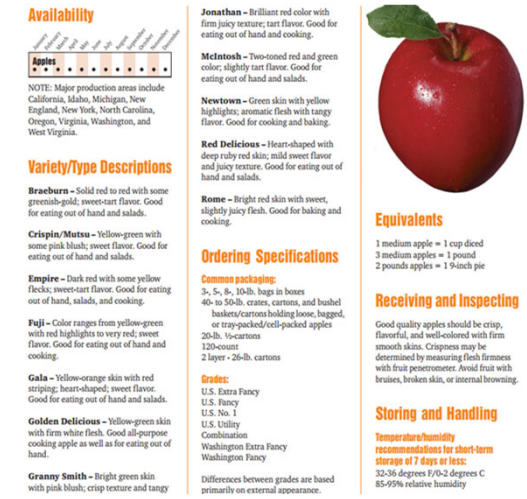
Specification Resources

PRODUCE SAFETY UNIVERSITY

USDA AMS Commercial Item Descriptions (CIDs)

Fresh Produce Manual

PRODUCE SAFETY UNIVERSITY



Availability

Apples

NOTE: Major production areas include California, Idaho, Michigan, New England, New York, North Carolina, Oregon, Virginia, Washington, and West Virginia.

Variety/Type Descriptions

Braeburn – Solid red to red with some greenish-gold; sweet-tart flavor. Good for eating out of hand and salads.

Crispin/Mutsu – Yellow-green with some pink blush; sweet flavor. Good for eating out of hand and salads.

Empire – Dark red with some yellow flecks; sweet-tart flavor. Good for eating out of hand, salads, and cooking.

Fuji – Color ranges from yellow-green with red highlights to very red; sweet flavor. Good for eating out of hand and cooking.

Gala – Yellow-orange skin with red striping; heart-shaped; sweet flavor. Good for eating out of hand and salads.

Golden Delicious – Yellow-green skin with firm white flesh. Good all-purpose cooking apple as well as for eating out of hand.

Granny Smith – Bright green skin with pink blush; crisp texture and tangy

Jonathan – Brilliant red color with firm juicy texture; tart flavor. Good for eating out of hand and cooking.

McIntosh – Two-toned red and green color; slightly tart flavor. Good for eating out of hand and salads.

Newtown – Green skin with yellow highlights; aromatic flesh with tangy flavor. Good for cooking and baking.

Red Delicious – Heart-shaped with deep ruby red skin; mild sweet flavor and juicy texture. Good for eating out of hand and salads.

Rome – Bright red skin with sweet, slightly juicy flesh. Good for baking and cooking.

Ordering Specifications

Common packaging:

3-, 5-, 8-, 10-lb. bags in boxes
40- to 50-lb. crates, cartons, and bushel baskets/cartons holding loose, bagged, or tray-packed/cell-packed apples
20-lb. ½-cartons
120-count
2 layer - 26-lb. cartons

Grades:

U.S. Extra Fancy
U.S. Fancy
U.S. No. 1
U.S. Utility
Combination
Washington Extra Fancy
Washington Fancy

Differences between grades are based primarily on external appearance.

Equivalents

1 medium apple = 1 cup diced
3 medium apples = 1 pound
2 pounds apples = 1 9-inch pie

Receiving and Inspecting

Good quality apples should be crisp, flavorful, and well-colored with firm smooth skins. Crispness may be determined by measuring flesh firmness with fruit penetrometer. Avoid fruit with bruises, broken skin, or internal browning.

Storing and Handling

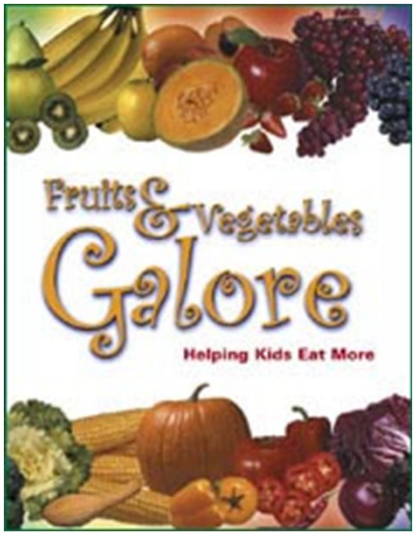
Temperature/humidity recommendations for short-term storage of 7 days or less:

32-36 degrees F/0-2 degrees C
85-95% relative humidity

Produce Marketing Association
Fresh Produce Manual
Free online!

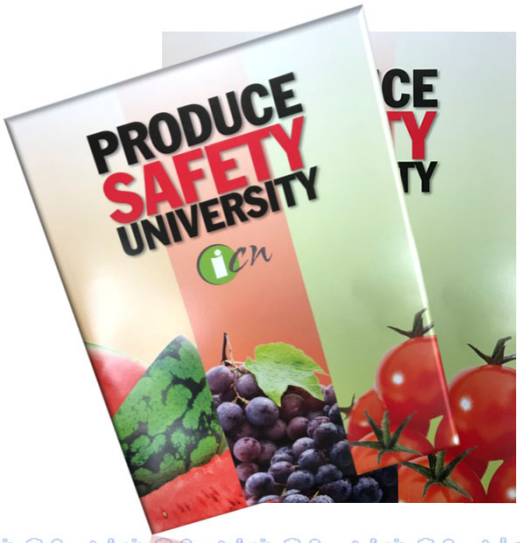
Specification Resources

PRODUCE SAFETY UNIVERSITY



The Rainbow Book!

PRODUCE SAFETY UNIVERSITY



USDA FNS Office of Food Safety and Institute of Child Nutrition Produce Information Sheets

Specification Resources

PRODUCE SAFETY UNIVERSITY

Industry

- Distributors
- Manufacturers
- Fresh Cut Processors

Specification Resources

PRODUCE SAFETY UNIVERSITY

Higher Education & Partnerships

- UC Davis Postharvest Center
- Extension offices (Iowa State, Penn State)
- North Carolina Center for Environmental Farming Systems (CEFS)

Write & Communicate Expectations

Specification Resources

PRODUCE SAFETY UNIVERSITY

What's in a spec?

- Variety, if applicable
- Size
- Color requirement, if applicable
- Shape
- U.S. Grade (quality and condition)
  - Shipping or destination point

Specification Resources

PRODUCE SAFETY UNIVERSITY

Specification Resources

PRODUCE SAFETY UNIVERSITY

What's in a spec?

- Other requirements:
  - ❑ Temperature
  - ❑ Packaging
    - Type
    - Weight
    - Count
  - ❑ Origin labeling
  - ❑ Menu item

Specification Resources

PRODUCE SAFETY UNIVERSITY

What would you add?

Procurement Principles

PRODUCE SAFETY UNIVERSITY

Local or non-local product, guiding principles apply to every purchase every time.

NOTE: These principles except Buy American apply to all purchases, local and non-local product.

1. Federal, State, and Local Regulations
2. Competition
3. Responsive and Responsible
4. Buy American*

Vendor Options – Poll Question

PRODUCE SAFETY UNIVERSITY

Describe the current condition of your fresh fruit and vegetable specifications and revisions needed after PSU?

- Excellent - no need for revisions
- Good - not many revisions needed
- Fair - need to make a lot of revisions
- Poor – all specifications need to be revised
- I didn't know I needed fresh produce specifications
- Does not apply to my job


Specification Writing Activity
Time to Buy Tomatoes

Writing Produce Specifications Activity

PRODUCE SAFETY UNIVERSITY

USDA United States Department of Agriculture

Writing Specifications for a Local Farmer

PRODUCE SAFETY UNIVERSITY

Together We Will:

- Review the handout: *United States Standard for Grades of Fresh Tomatoes.*
- Using the template below, we will draft a sample specification for the item assigned.
- Think of USDA grade and defects allowed at **shipping point** for quality and condition as described in the grade standard.

Example One (With Instructor)

PRODUCE SAFETY UNIVERSITY

Specification (not all may apply)

Name of product:

Menu item:

Variety, if applicable:

Bid period:

Quantity to be purchased during bid period:

Bid unit:

Type of packaging:

Size of container:

Weight of container:

Size of product:

Weight of product:

Example One (With Instructor)

PRODUCE SAFETY UNIVERSITY

Shape of product:

Color requirement:

Quality:

Condition:

Degree of ripeness: (maximum and minimum*):

Shipping temperature:

*If you don't plan to use all your tomatoes at once, you might want to specify that a certain amount be riper than others, so they don't all peak at the same time.

Now Let's Try It Without Assistance!

Example Two (PSU Cohort)

PRODUCE SAFETY UNIVERSITY

Specification (not all may apply)

Name of product:

Menu item:

Variety, if applicable:

Bid period:

Quantity to be purchased during bid period:

Bid unit:

Type of packaging:

Size of container:

Weight of container:

Size of product:

Weight of product:

Example Two (PSU Cohort)

PRODUCE SAFETY UNIVERSITY

Specification (not all may apply)

Shape of product:

Color requirement:

Quality:

Condition:

Degree of ripeness: (maximum and minimum*):

Shipping temperature:

* If you don't plan to use all your tomatoes at once, you might want to specify that a certain amount be riper than others, so they don't all peak at the same time.

United States
Department of
Agriculture

Agricultural
Marketing
Service

Fruit and
Vegetable
Division

Fresh
Products
Branch

United States Standards for Grades of Fresh Tomatoes

Effective October 1, 1991

(Reprinted - January 1997)

United States Standards for Grades of Fresh Tomatoes [1]

Grades

§51.1855 U.S. No. 1.

"U.S. No. 1" consists of tomatoes which meet the following requirements:

(a) Basic requirements:

(1) Similar varietal characteristics;

[1] Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug and Cosmetic Act, or with applicable State laws and regulations.

(2) Mature;
(3) Not overripe or soft;
(4) Clean;
(5) Well developed;
(6) Fairly well formed; and,
(7) Fairly smooth.
(b) Free from:
(1) Decay;
(2) Freezing injury; and
(3) Sunscald.
(c) Not damaged by any other cause.
(d) For tolerances see §51.1861.

§51.1856 U.S. Combination.

"U.S. Combination" consists of a combination of U.S. No. 1 and U.S. No. 2 tomatoes: **Provided,** That at least 60 percent, by count, meet the requirements of U.S. No. 1 grade.
(a) For tolerances see §51.1861.

§51.1857 U.S. No. 2.

"U.S. No. 2" consists of tomatoes which meet the following requirements:
(a) Basic requirements:
(1) Similar varietal characteristics;
(2) Mature;
(3) Not overripe or soft;
(4) Clean;
(5) Well developed;
(6) Reasonably well formed; and,
(7) Not more than slightly rough.
(b) Free from:
(1) Decay;
(2) Freezing injury; and,
(3) Sunscald.
(c) Not seriously damaged by any other cause.
(d) For tolerances see §51.1861.

§51.1858 U.S. No. 3.

"U.S. No. 3" consists of tomatoes which meet the following requirements:
(a) Basic requirements:
(1) Similar varietal characteristics;
(2) Mature;
(3) Not overripe or soft;
(4) Clean;
(5) Well developed; and,
(6) May be misshapen.
(b) Free from:
(1) Decay; and,

(2) Freezing injury.
(c) Not seriously damaged by:
(1) Sunscald.
(d) Not very seriously damaged by any other cause.
(e) For tolerances see §51.1861.

Size

§51.1859 Size.

(a) The size of tomatoes packed in any standard type shipping container shall be specified and marked according to one of the size designations set forth in Table I. Individual containers shall not be marked with more than one size designation. Consumer packages and their master container are exempt; however, if they are marked, the same requirements would apply.
(1) When containers are marked in accordance with Table I, the markings on at least 85 percent of the containers in a lot must be legible.
(2) In determining compliance with the size designations, the measurement for minimum diameter shall be the largest diameter of the tomato measured at right angles to a line from the stem end to the blossom end. The measurement for maximum diameter shall be the smallest dimension of the tomato determined by passing the tomato through a round opening in any position.
(b) In lieu of marking containers in accordance with (a) above or specifying size in accordance with the dimensions defined in Table I, for Cerasiforme type tomatoes commonly referred to as cherry tomatoes and Pyriforme type tomatoes commonly referred to as pear shaped tomatoes, and other similar types, size may be specified in terms of minimum diameter or minimum and maximum diameter expressed in whole inches, and not less than thirty-second inch fractions thereof, or millimeters in accordance with the facts.
(1) Tomatoes of these types are exempt from marking requirements. However, when marked to a minimum or minimum and maximum diameter, the markings on at least 85 percent of the containers in a lot must be legible.
(c) For tolerances see §51.1861.

Table I

Size Designations	Inches	
	Minimum Diameter[1]	Maximum Diameter[2]
Small	2-4/32	2-9/32
Medium	2-8/32	2-17/32
Large	2-16/32	2-25/32
Extra Large	2-24/32	

[1]Will not pass through a round opening of the designated diameter when tomato is placed with the greatest transverse diameter across the opening.

[2]Will pass through a round opening of the designated diameter in any position.

Color Classification

§51.1860 Color classification.

(a) The following terms may be used, when specified in connection with the grade statement, in describing the color as an indication of the stage of ripeness of any lot of mature tomatoes of a red fleshed variety:

(1) **Green**. "Green" means that the surface of the tomato is completely green in color. The shade of green color may vary from light to dark;

(2) **Breakers**. "Breakers" means that there is a definite break in color from green to tannish-yellow, pink or red on not more than 10 percent of the surface;

(3) **Turning**. "Turning" means that more than 10 percent but not more than 30 percent of the surface, in the aggregate, shows a definite change in color from green to tannish-yellow, pink, red, or a combination thereof;

(4) **Pink**. "Pink" means that more than 30 percent but not more than 60 percent of the surface, in the aggregate, shows pink or red color;

(5) **Light red**. "Light red" means that more than 60 percent of the surface, in the aggregate, shows pinkish-red or red: **Provided,** That not more than 90 percent of the surface is red color; and,

(6) **Red**. "Red" means that more than 90 percent of the surface, in the aggregate, shows red color.

(b) Any lot of tomatoes which does not meet the requirements of any of the above color designations may be designated as "Mixed Color".

(c) For tolerances see §51.1861.

(d) Tomato color standards U.S.D.A. Visual Aid TM- L-1 consists of a chart containing twelve color photographs illustrating the color classification requirements, as set forth in this section. This visual aid may be examined in the Fruit and Vegetable Division, AMS, U.S. Department of Agriculture, South Building, Washington, D.C. 20250; in any field office of the Fresh Fruit and Vegetable Inspection Service; or upon request of any authorized inspector of such Service. Duplicates of this visual aid may be purchased from The John Henry Co., Post Office Box 1410, Lansing, Michigan 48904.

Tolerances

§51.1861 Tolerances.

In order to allow for variations incident to proper grading and handling in each of the foregoing grades, the following tolerances, by count, are provided as specified:

(a) **U.S. No. 1 -** (1) **For defects at shipping point.**[2] Ten percent for tomatoes in any lot which fail to meet the requirements for this grade: **Provided,** That not more than one-half of this tolerance, or 5 percent, shall be allowed for defects causing very serious damage, including therein not more than 1 percent for tomatoes which are soft or affected by decay; and,

(2) **For defects en route or at destination.** Fifteen percent for tomatoes in any lot which fail to meet the requirements for this grade: **Provided,** That included in this amount not more than the following percentages shall be allowed for defects listed:

---

[2]Shipping point, as used in these standards, means the point of origin of the shipment in producing area or at port of loading for ship stores or overseas shipment, or in the case of shipments from outside the continental United States, the port of entry into the United States.

(i) Five percent for tomatoes which are soft or affected by decay;
(ii) Ten percent for tomatoes which are damaged by shoulder bruises or by discolored or sunken scars on any parts of the tomatoes; and,
(iii) Ten percent for tomatoes which are otherwise defective: **And provided further,** That not more than 5 percent shall be allowed for tomatoes which are very seriously damaged by any cause, exclusive of soft or decayed tomatoes.
(b) **U.S. Combination** - (1) **For defects at shipping point.**[2] Ten percent for tomatoes in any lot which fail to meet the requirements of the U.S. No. 2 grade: **Provided,** That not more than one-half of this tolerance, or 5 percent, shall be allowed for defects causing very serious damage, including 1 percent for tomatoes which are soft or affected by decay; and,
(2) **For defects en route or at destination**. Fifteen percent for tomatoes in any lot which fail to meet the requirements of the U.S. No. 2 grade: **Provided,** That included in this amount not more than the following percentages shall be allowed for defects listed:
(i) Five percent for tomatoes which are soft or affected by decay;
(ii) Ten percent for tomatoes which are seriously damaged by shoulder bruises or by discolored or sunken scars on any parts of the tomatoes; and,
(iii) Ten percent for tomatoes which are otherwise defective: **And provided further,** That not more than 5 percent shall be allowed for tomatoes which are very seriously damaged by any cause, exclusive of soft or decayed tomatoes.
(c) **U.S. No. 2** - (1) **For defects at shipping point.**[2] Ten percent for tomatoes in any lot which fail to meet the requirements of this grade: **Provided,** That not more than one-half of this tolerance, or 5 percent, shall be allowed for defects causing very serious damage, including therein not more than 1 percent for tomatoes which are soft or affected by decay; and,
(2) **For defects en route or at destination.** Fifteen percent for tomatoes in any lot which fail to meet the requirements for this grade: **Provided,** That included in this amount not more than the following percentages shall be allowed for defects listed:
(i) Five percent for tomatoes which are soft or affected by decay;
(ii) Ten percent for tomatoes which are seriously damaged by shoulder bruises or by discolored or sunken scars on any parts of the tomatoes; and,
(iii) Ten percent for tomatoes which are otherwise defective: **And provided further,** That not more than 5 percent shall be allowed for tomatoes which are very seriously damaged by any cause, exclusive of soft or decayed tomatoes.
(d) **U.S. No. 3** - (1) **For defects at shipping point.**[2] Ten percent for tomatoes in any lot which fail to meet the requirements of this grade: **Provided,** That not more than one-half of this tolerance, or 5 percent, shall be allowed for tomatoes which are very seriously damaged by insects and not more than one-tenth of the tolerance, or 1 percent, for tomatoes which are soft or affected by decay; and,
(2) **For defects en route or at destination.** Fifteen percent for tomatoes in any lot which fail to meet the requirements for this grade: **Provided,** That included in this amount not more than the

[2]Shipping point, as used in these standards, means the point of origin of the shipment in producing area or at port of loading for ship stores or overseas shipment, or in the case of shipments from outside the continental United States, the port of entry into the United States.

following percentages shall be allowed for defects listed:
(i) Five percent for tomatoes which are soft or affected by decay;
(ii) Ten percent for tomatoes which are very seriously damaged by shoulder bruises or by discolored or sunken scars on any parts of the tomatoes; and,
(iii) Ten percent for tomatoes which are otherwise defective: **And provided further,** That not more than 5 percent shall be allowed for tomatoes which are very seriously damaged by insects.
(e) **For off-size.** Ten percent for tomatoes in any lot which are smaller than the specified minimum diameter, or larger than the specified maximum diameter.
(f) **For off color.** Ten percent for tomatoes in any lot which fail to meet the color specified, including therein not more than 5 percent for tomatoes which are green in color, when any term other than "Green" is specified.

Application of Tolerances

§51.1862 Application of tolerances.

The contents of individual packages in the lot, based on sample inspection, are subject to the following limitations:
(a) For packages which contain more than 5 pounds (2.27 kg), and a tolerance of 10 percent or more is provided, individual packages shall have not more than 1-1/2 times the tolerance specified, and for a tolerance of less than 10 percent individual packages shall have not more than double the tolerance specified, except that at least one defective and one off-size specimen may be allowed in any package: **Provided,** That the averages for the entire lot are within the tolerances specified for the grade; and,
(b) For packages which contain 5 pounds (2.27 kg) or less individual packages shall have not more than 4 times the tolerance specified, except that at least one tomato which is soft, or affected by decay, and one off-size specimen may be permitted in any package: **Provided,** That the averages for the entire lot are within the tolerances specified for the grade.

Standard Weight

§51.1863 Standard weight.

(a) When packages are marked to a net weight of 15 pounds (6.80 kg) or more, the net weight of the contents shall not be less than the designated net weight and shall not exceed the designated weight by more than 2 pounds (0.91 kg).
(b) In order to allow for variations incident to proper sizing, not more than 15 percent, by count, of the packages in any lot may fail to meet the requirements for standard weight.

Definitions

§51.1864 Similar varietal characteristics.

"Similar varietal characteristics" means that the tomatoes are alike as to firmness of flesh and shade of color (for example, soft-fleshed, early maturing varieties are not mixed with firm-fleshed, midseason or late varieties, or bright red varieties mixed with varieties having a purplish tinge).

§51.1865 Mature.

"Mature" means that the tomato has reached the stage of development which will insure a proper completion of the ripening process, and that the contents of two or more seed cavities have developed a jelly-like consistency and the seeds are well developed.

§51.1866 Soft.
"Soft" means that the tomato yields readily to slight pressure.
§51.1867 Clean.
"Clean" means that the tomato is practically free from dirt or other foreign material.
§51.1868 Well developed.
"Well developed" means that the tomato shows normal growth. Tomatoes which are ridged and peaked at the stem end, contain dry tissue, and usually contain open spaces below the level of the stem scar, are not considered well developed.
§51.1869 Fairly well formed.
"Fairly well formed" means that the tomato is not more than moderately kidney-shaped, lop-sided, elongated, angular, or otherwise moderately deformed.
§51.1870 Fairly smooth.
"Fairly smooth" means that the tomato is not conspicuously ridged or rough.
§51.1871 Damage.
"Damage" means any specific defect described in §51.1877, Table II; or an equally objectionable variation of any one of these defects, any other defect, or any combination of defects, which materially detracts from the appearance, or the edible or marketing quality of the tomato.
§51.1872 Reasonably well formed.
"Reasonably well formed" means that the tomato is not decidedly kidney-shaped, lop-sided, elongated, angular, or otherwise decidedly deformed.
§51.1873 Slightly rough.
"Slightly rough" means that the tomato is not decidedly ridged or grooved.
§51.1874 Serious damage.
"Serious damage" means any specific defect described in §51.1877, Table II; or an equally objectionable variation of any one of these defects, any other defect, or any combination of defects, which seriously detracts from the appearance, or the edible or marketing quality of the tomato.
§51.1875 Misshapen.
"Misshapen" means that the tomato is decidedly kidney-shaped, lop-sided, elongated, angular or otherwise decidedly deformed: **Provided,** That the shape is not affected to an extent that the appearance or the edible quality of the tomato is very seriously affected.
§51.1876 Very serious damage.
"Very serious damage" means any specific defect described in §51.1877, Table II; or an equally objectionable variation of any one of these defects, any other defect, or any combination of defects, which very seriously detracts from the appearance, or the edible or marketing quality of the tomato.

§51.1877 Classification of defects.

Table II

References to Area, Aggregate Area, Length or Aggregate Length are based on a tomato having a diameter of 2-1/2 inches (64 mm)[1]

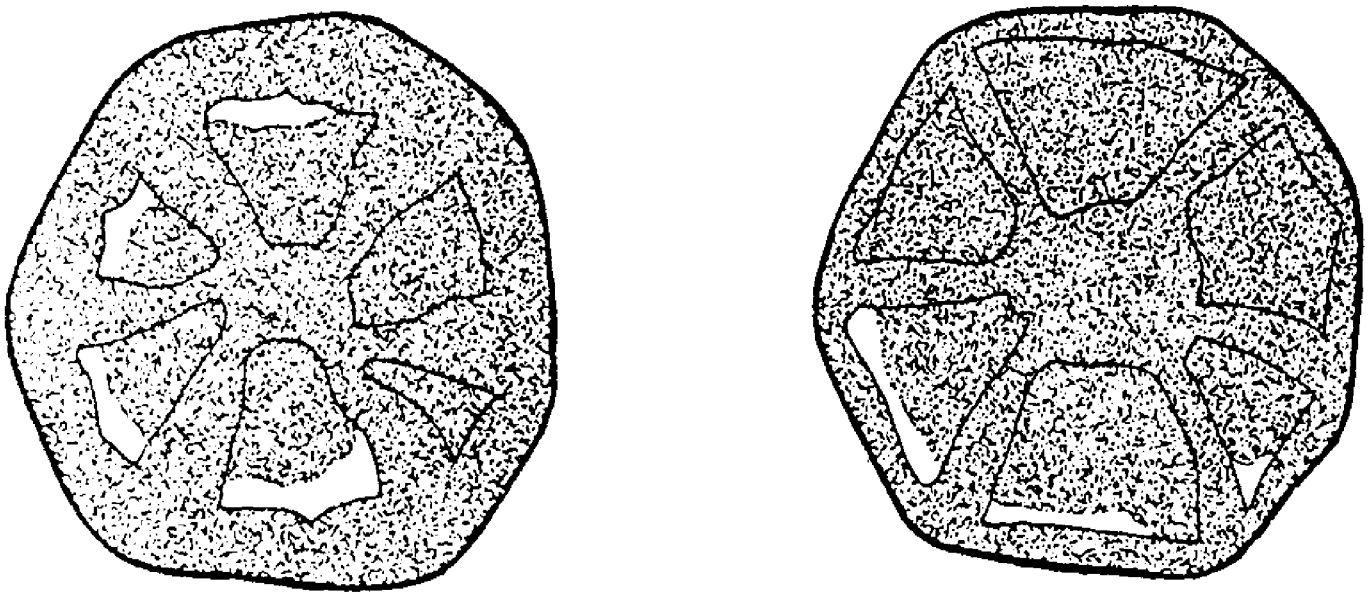
Factor	Damage	Serious Damage	Very serious damage
Cuts and broken skins	Not shallow or not well healed, or shallow, well healed cut more than 1/2 inch (13 mm) in length, or other shallow, well healed skin breaks aggregating more than a circle 3/8 inch (10 mm) in diameter.	Not shallow or not well healed, or shallow, well healed cut more than 1/2 inch (13 mm) in length, or other shallow, well healed skin breaks aggregating more than a circle 1/2 inch (13 mm) in diameter.	Fresh or healed and extending through the tomato wall.
Puffiness	Open space in 1 or more locules materially detracts from appearance of tomato cut through center at right angles to a line from stem to blossom end.	Open space in 1 or more locules seriously detracts from appearance of tomato cut through center at right angles to a line from stem to blossom end.	Open space in 2 or more locules very seriously detracts from appearance of tomato cut through center at right angles to a line from stem to blossom end.
Catfaces	Scars are rough or deep, channels are very deep or wide, channels extend into a locule, or a fairly smooth catface aggregating more than a circle 1/2 inch (13 mm) in diameter.	Scars are rough or deep, channels are very deep or wide, channels extend into a locule, or a fairly smooth catface aggregating more than a circle 3/4 inch (19 mm) in diameter.	Channels extend into the locule, wall has been weakened to the extent that slight pressure will cause a tomato to leak, or a fairly smooth catface aggregating more than a circle 1 inch (25 mm) in diameter.
Scars (other than catfaces).	No depth and aggregating more than a circle 3/8 (10 mm) in diameter.	No depth and aggregating more than a circle 5/8 (16 mm) in diameter.	No depth and aggregating more than a circle 1 inch (25 mm) in diameter.

[1]Conversion to metric equivalent, made to nearest whole millimeter.

Growth cracks (radiating from or concentric to stem scar).	Not well healed, more than 1/8 inch (3 mm) in depth, individual radial cracks more than 1/2 inch (13 mm) in length, aggregate length of all radial cracks more than 1 inch (25 mm) measured from edge of stem scar. Any lot of tomatoes which are at least turning may have cracks which are not well healed provided they are not leaking.	Not well healed, more than 1/8 inch (3 mm) in depth, individual radial cracks more than 3/4 inch (19 mm) in length, aggregate length of all radial cracks more than 1-3/4 inch (44 mm) measured from edge of stem scar. Any lot of tomatoes which are at least turning may have cracks which are not well healed provided they are not leaking.	Not well healed, more than 1/4 inch (6 mm) in depth, individual radial cracks more than 1 inch (25 mm) in length, aggregate length of all radial cracks more than 2-7/8 inches (73 mm) measured from edge of stem scar. Any lot of tomatoes which are at least turning may have cracks which are not well healed provided they are not leaking, not more than 1/8 inch (3 mm) in depth, individual radial cracks are not more than 3/4 inch (19 mm) in length.
Hail	Deep, rough, not well healed and corked over, or fairly smooth, shallow hail marks aggregating more than a circle 3/8 inch (10 mm) in diameter.	Deep, rough, not well healed and corked over, or fairly smooth, shallow hail marks aggregating more than a circle 5/8 inch (16 mm) in diameter.	Fresh, very deep or fairly smooth, shallow hail marks aggregating more than a circle 1 inch (25 mm) in diameter.
Insect Injury	Materially detracts from the appearance or any insect is present in the fruit.	Seriously detracts from the appearance or any insect is present in the fruit.	Very seriously detracts from the appearance or any insect is present in the fruit.

[1]Conversion to metric equivalent, made to nearest whole millimeter.

PUFFINESS

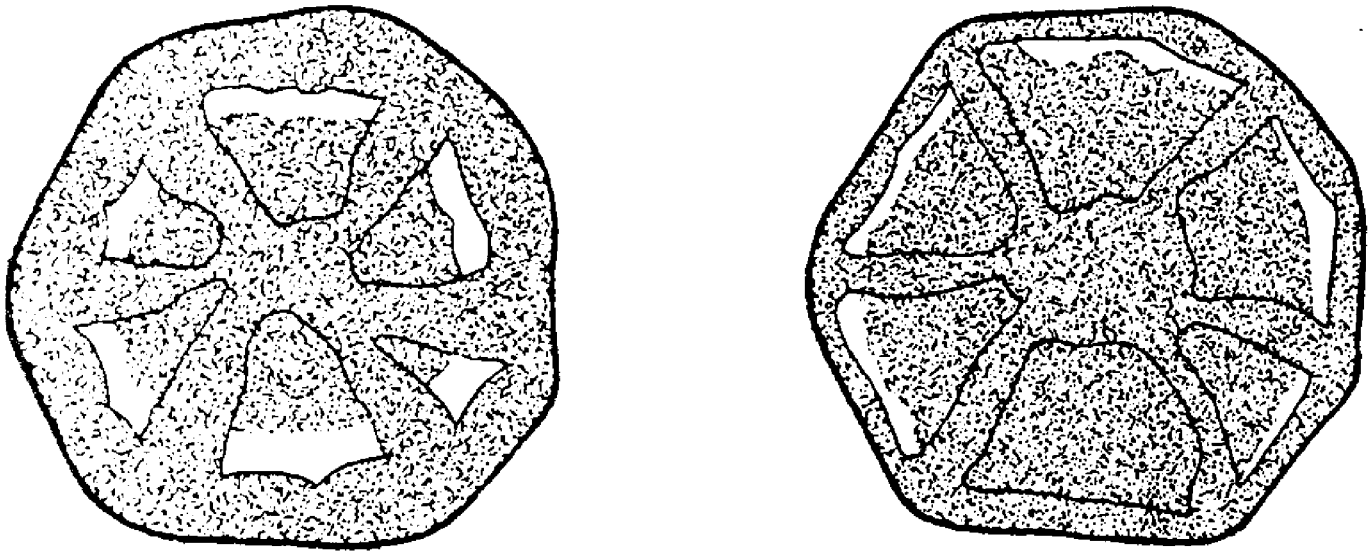


LOWER LIMIT U.S. NO. 1

The proportion of open space permitted is dependent upon the thickness of walls. Tomatoes with thicker walls than those in the above illustrations may have proportionately greater amounts of open space. Tomatoes with thinner walls than illustrated shall have proportionately lesser amounts of open space.

Illustration TOMFR 1

PUFFINESS

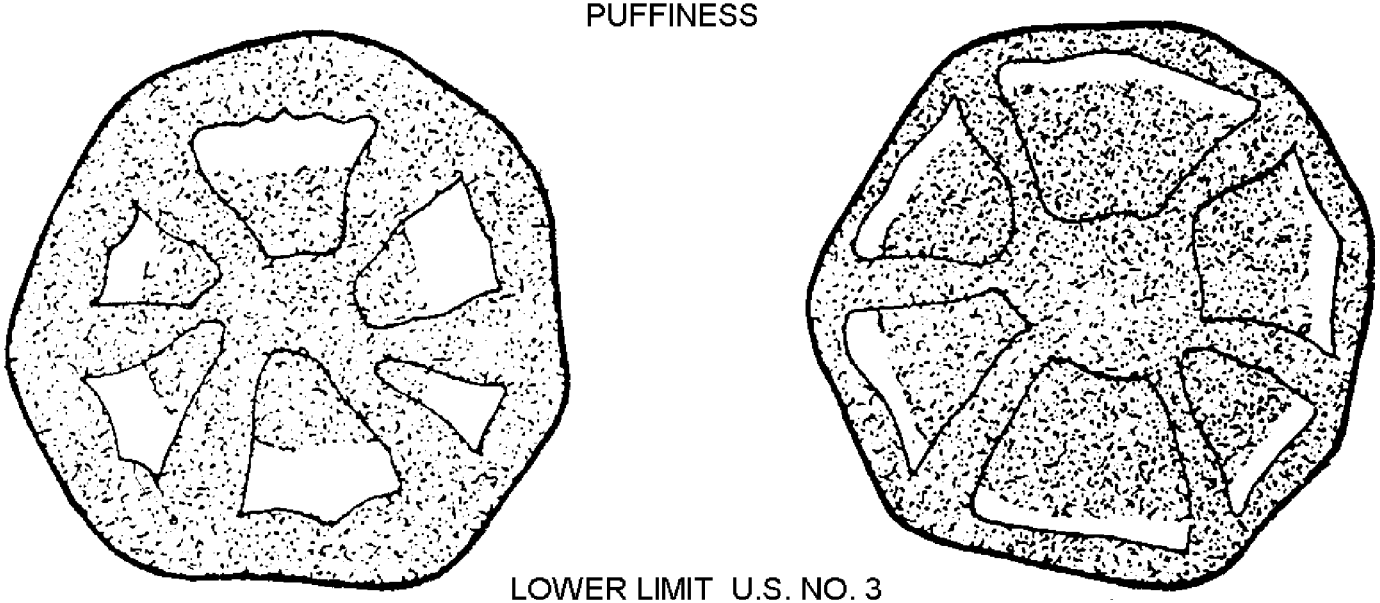


LOWER LIMIT U.S. NO. 2

The proportion of open space permitted is dependent upon the thickness of walls. Tomatoes with thicker walls than those in the above illustrations may have proportionately greater amounts of open space. Tomatoes with thinner walls than illustrated shall have proportionately lesser amounts of open space.

Illustration TOMFR 2

PUFFINESS

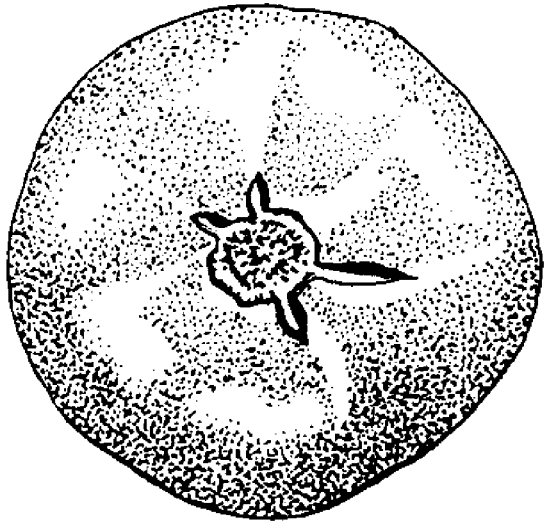


LOWER LIMIT U.S. NO. 3

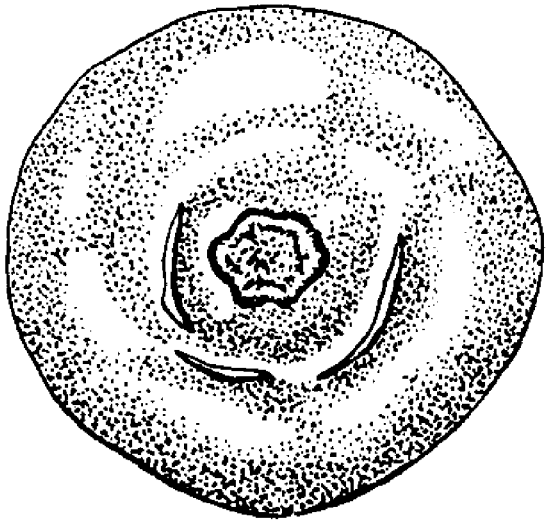
The proportion of open space permitted is dependent upon the thickness of walls. Tomatoes with thicker walls than those in the above illustrations may have proportionately greater amounts of open space. Tomatoes with thinner walls than illustrated shall have proportionately lesser amounts of open space.

Illustration TOMFR 3

GROWTH CRACKS



Maximum aggregate length of radial growth cracks permitted on 2 1/2 inch tomato in U.S. No. 1 grade.



Concentric growth cracks which affect appearance to same extent as maximum aggregate length of radial growth cracks permitted in U.S. No. 1 grade.

The above limitations apply to all stages of maturity.

Illustration TOMFR 4

Is An Apple Always An Apple?

The question is – if I can't find the size of the apple I purchase in the Food Buying Guide, how do I determine how to credit the apple?

Using the Food Buying Guide to determine the meal contribution of different sizes of apples:

- ✓ There are 14.80 (column 3) - ¼ cup servings (column 4) per pound (column 2) of edible portion (EP) for 125-138 count whole unpeeled, uncored apples (column 1).
- ✓ That equals .91 lb. or 3 2/3 cups of ready-to-cook or serve raw, cored, unpeeled apples for every pound of apples as purchased (AP) (column 6).
- ✓ The Serving Size per Meal Contribution column (column 4) in the Food Buying Guide gives you the information that there are about 4 – ¼ cup serving (1 cup) per apple.

However, if you are purchasing a 150-163 count apple, how would you determine how many ¼ cup servings you would get from each apple?

Try This:

Divide the case weight by the largest number of apples in the case to equal the average weight per apple. The next step is, times the average weight per apple by the amount of edible portions per cup. The answer is the meal contribution.

Example:

40 ÷ 163 = .2453

.2453 X 3.66 = .89 round down to .75

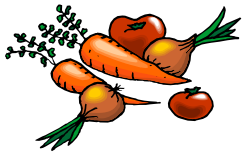
1. 40# case weight ÷ by 163 as the number of apples in a case = .2453 which is the average weight of each apple.
2. .2453 (average weight of each apple) X 3.66 (cups of edible portion per as purchased pound = .89 rounded down to .75 which would equal ¾ cup is the amount of meal contribution of a 163 count apple.

What if I don't know how many apples are in the case?

Try This:

1. Go to the USDA Team Nutrition book - Fruits and Vegetables Galore. Use the section on Quality Food Quality Meals-Buying Fruits and Vegetables. Look up apples on page 30. You can compare your apple to the size chart or measure the diameter by cutting crosswise through the thickest part of the apple and then comparing it to the count size chart. Now you are ready to use the formula above.
2. You can cut the apple close to the core and then cube the apple and place in a dry measure cup. How many ¼ cup serving does the apple equal?

It's not just apples; these steps can be used for many other fruits and vegetables. Use the Food Buying Guide and Fruits and Vegetables Galore as guides for fruit and vegetable size contribution calculations.



INSERT "Receiving and Storage" TAB

Receiving and Storage

PRODUCE SAFETY UNIVERSITY

Olivia Banks
Agriculture Marketing Specialist
Specialty Crops Inspection Division,
USDA AMS

USDA United States Department of Agriculture

Objectives

PRODUCE SAFETY UNIVERSITY

- Recognize how proper storage techniques can improve shelf life.
- Understand the impact of storage conditions such as temperature, humidity, and ethylene on produce safety and freshness.

Introduction

PRODUCE SAFETY UNIVERSITY

Key Points

What

- Recognize how proper storage techniques can improve shelf life.
- Discuss the benefits of ensuring produce quality and condition at receipt.

Why

- Identifying and verifying quality will ensure the best products are received by you school nutrition programs.
- Identifying and verifying condition will insure the freshest and safest produce are received by your school nutrition programs.

How

- Understand the impact of storage conditions such as temperature, humidity, and ethylene on produce safety and freshness.
- Become familiar with inspection resources available and how to apply them during quality and condition verification.

Receiving

Receiving Produce

PRODUCE SAFETY UNIVERSITY

Check produce <u>BEFORE</u> the truck leaves

- Verify quantity
- Check temperature
- Evaluate quality & condition
- Cut for internal defects & ripeness
- Check dates of fresh-cut products
- Check marked weights
- Check all sections of containers

Receiving Produce

PRODUCE SAFETY UNIVERSITY

-**Take action** if produce does not meet specifications.

-**Train staff** to receive and store your <u>specified</u> produce.

-**Do not** accept poor quality fresh fruits and vegetables.

Receiving temperature

PRODUCE SAFETY UNIVERSITY

Infrared temperature readings

- May only register **surface** temperature.

Receiving - Tips

PRODUCE SAFETY UNIVERSITY

Check Carton Weights (25 lb. NET WT)

Receiving - Tips

PRODUCE SAFETY UNIVERSITY

Open cartons from bottom to inspect contents.

Receiving - Tips

PRODUCE SAFETY UNIVERSITY

Julian Calendar Date:
Mark Cartons
001 = Jan 1st

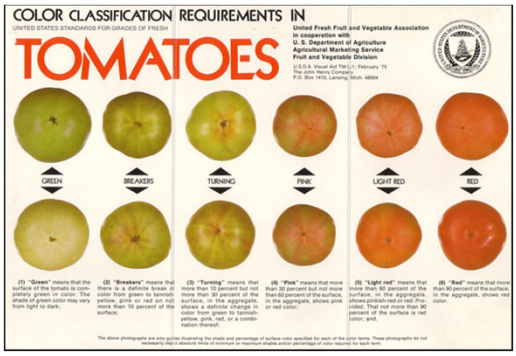
JULIAN DATE CALENDAR
PERPETUAL

						Jun	Jul	Aug	Sep	Oct	Nov	Dec	Day
						152	182	213	244	274	305	335	1
						153	183	214	245	275	306	336	2
						154	184	215	246	276	307	337	3
						155	185	216	247	277	308	338	4
						156	186	217	248	278	309	339	5
						157	187	218	249	279	310	340	6
						158	188	219	250	280	311	341	7
						159	189	220	251	281	312	342	8
						160	190	221	252	282	313	343	9
						161	191	222	253	283	314	344	10
						162	192	223	254	284	315	345	11
12	012	043	071	102	132	163	193	224	255	285	316	346	12
13	013	044	072	103	133	164	194	225	256	286	317	347	13
14	014	045	073	104	134	165	195	226	257	287	318	348	14
15	015	046	074	105	135	166	196	227	258	288	319	349	15
16	016	047	075	106	136	167	197	228	259	289	320	350	16
17	017	048	076	107	137	168	198	229	260	290	321	351	17
18	018	049	077	108	138	169	199	230	261	291	322	352	18
19	019	050	078	109	139	170	200	231	262	292	323	353	19
20	020	051	079	110	140	171	201	232	263	293	324	354	20
21	021	052	080	111	141	172	202	233	264	294	325	355	21
22	022	053	081	112	142	173	203	234	265	295	326	356	22
23	023	054	082	113	143	174	204	235	266	296	327	357	23
24	024	055	083	114	144	175	205	236	267	297	328	358	24
25	025	056	084	115	145	176	206	237	268	298	329	359	25
26	026	057	085	116	146	177	207	238	269	299	330	360	26
27	027	058	086	117	147	178	208	239	270	300	331	361	27
28	028	059	087	118	148	179	209	240	271	301	332	362	28
29	029		088	119	149	180	210	241	272	302	333	363	29
30	030		089	120	150	181	211	242	273	303	334	364	30
31	031		090		151		212	243		304		365	31

Receiving - Tips

PRODUCE SAFETY UNIVERSITY

Check Color

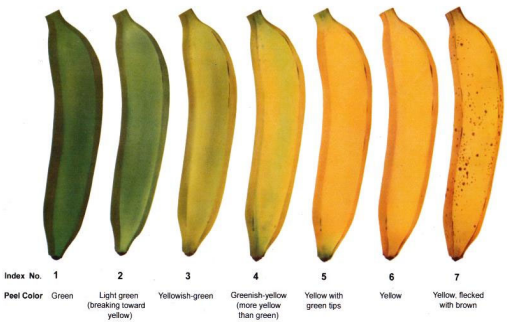


Color is an indication of Ripeness

Receiving - Tips

PRODUCE SAFETY UNIVERSITY

Check Color



Color is an indication of Ripeness

Storage

Storage

PRODUCE SAFETY UNIVERSITY

Does produce need to be refrigerated?
At what temperature? Ethylene producer or ethylene sensitive?

*The best way to **improve shelf life** of produce is to receive in good condition and store properly.*

Ethylene / Ripeness

PRODUCE SAFETY UNIVERSITY

Ethylene is "<u>introduced</u>" to ensure "<u>uniform</u>" ripening of:

- Avocados
- Bananas
- Mangoes
- Tomatoes

Separate

PRODUCE SAFETY UNIVERSITY

Ethylene Sensitive

Ethylene Producer

Ethylene Sensitivity

PRODUCE SAFETY UNIVERSITY

Ethylene Sensitive	Ethylene Producers
Broccoli	Apples
Cabbage	Avocados
Cauliflower	Bananas
Leafy Greens	Melons
Lettuce	Pears
	Stone Fruits
	Tomatoes
	Squash

Refrigerate

PRODUCE SAFETY UNIVERSITY

Which Crisper Drawer Should Produce Go Into

High Humidity (a.k.a. Vegetable Drawer)	Low Humidity (a.k.a. Fruit Drawer)
Asparagus	Apples
Broccoli	Avocados
Carrots	Berries
Cauliflower	Citrus
Cucumbers	Grapes
Green beans	Green onions
Leafy greens	Kiwi
Lettuce	Melons
Peas	Mushrooms
Peppers	Nectarines and peaches
Spinach	Okra
Summer squash	Pears
Zucchini	Plums

* Ideal to store at 45-50°F

Dry Storage

PRODUCE SAFETY UNIVERSITY

Store at 55-65°F	
Bananas	Garlic
Onions	Potatoes
Pumpkins	Tomatoes
Sweet Potatoes	Watermelons
Winter Squash	

Storing

PRODUCE SAFETY UNIVERSITY

Do not wash fresh fruits and vegetables before storing.

Dampness encourages bacterial growth, so WAIT TO WASH!

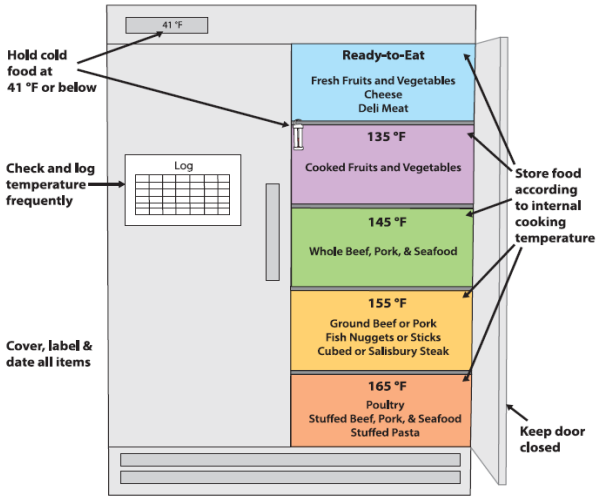
Storing

PRODUCE SAFETY UNIVERSITY

Ready to Eat Product

Iced or Wet

Fully Cooked And Leftovers



Storage Surprise Activity

Check out the Storage Guide 3-2-1!

3

Take 3 minutes to review the guide.

Does anything surprise you?

2

Take 2 minutes to identify at least 2 actions you can make to improve storage.

Write them down on your Action Notes sheet.

1

Take 1 minute to share your actions with the group and hear theirs.

Like their actions? Add it to your Action Notes sheet.

OPTIMUM STORAGE TEMPERATURE AND FACTOR GUIDE

Product	Optimal Storage Temperature		Chill Point		Freezing Point	Optimal Humidity	Top Ice Accepted [1]	Water Sprinkle Accepted [2]	Ethylene Production	Sensitive to Ethylene [3]	Approximate Storage Life	Comments
	(°F)	*(°C)*	*(°F)*	*(°C)*	*(°F)*	*%*						
Apples	30-40	-1-4			29.3	90-95	No	No	High	Yes	1-12 months	Chill sensitive stored at 35-40 F (2-4 C)
Apricots	31-32	-1-0			30.1	90-95	No	No	High	Yes	1-3 weeks	
Artichokes	32-35	0-2				90-95	Yes	Yes	No	No		
Artichokes, Jerusalem	31-32	0-2			28.0	90-95	No	No	No	No	4-5 months	
Asparagus	32-35				30.9	95-100	No	Yes	No	Yes	2-3 weeks	
Avocados, ripe	38-45	3-7	36	2		85-95	No	No	High	Yes		
Avocados, unripe	45-50	7-10	45	7		85-95	No	No	Low	Yes, Very		Keep away from ethylene producing fruits
Bananas, green	62-70	17-21	56	13		85-95	No	No	Low	Yes		
Bananas, ripe	56-60	13-16	54	12		85-95	No	No	Medium	No		
Basil	52-59	11-15	50	10		90-95	No	Yes	No	Yes		
Beans, dry	40-50					40-50					6-10 months	
Beans, green or snap	40-45				30.7	95					7-10 days	
Beans, sprouts	32	0				95-100					7-9 days	

OPTIMUM STORAGE TEMPERATURE AND FACTOR GUIDE

Product	Optimal Storage Temperature		Chill Point		Freezing Point	Optimal Humidity	Top Ice Accepted [1]	Water Sprinkle Accepted [2]	Ethylene Production	Sensitive to Ethylene [3]	Approximate Storage Life	Comments
	(°F)	*(°C)*	*(°F)*	*(°C)*	*(°F)*	*%*						
Beans. Lima	37-41	0			31.0	95					5-7 days	
Beets	32-35	0-2				90-95	Yes	Yes	No	Yes		
Beets, bunched	32	0			31.3	98-100					10-14 days	
Beets, topped	32	0			30.3	98-100					4-6 months	
Blackberries	32-33	0-1			30.5	90-95	No	No	Very Low	No	2-3 days	
Blueberries	32-35	0-2				90-95	No	No	Very Low	No		
Bok Choy	32-35	0-2				90-95	No	Yes	No	Yes		
Broccoli	32	0			30.9	95-100	Yes	Yes	No	Yes	10-14 days	
Brussels Sprouts	32	0			30.5	90-95	Yes	Yes	No	Yes	3-5 weeks	
Bunched Greens	32	0				90-95	Yes	Yes	No	Yes		Beets, Chard, Green Onions, Mustard, Parsley, Radish, Spinach, Turnip
Cabbage, Chinese	32	0				95-100	No	No	No	Yes	2-3 months	
Cabbage, early	32	0			30.4	98-100	Yes	Yes	No	Yes	3-6 weeks	
Cabbage, late	32	0			30.4	98-100					5-6 months	

OPTIMUM STORAGE TEMPERATURE AND FACTOR GUIDE

Product	Optimal Storage Temperature		Chill Point		Freezing Point	Optimal Humidity	Top Ice Accepted [1]	Water Sprinkle Accepted [2]	Ethylene Production	Sensitive to Ethylene [3]	Approximate Storage Life	Comments
	(°F)	*(°C)*	*(°F)*	*(°C)*	*(°F)*	*%*						
Cantaloupe	36-38	2-3	34	1		90-95	No	No	Medium	Yes		
Carrots, bunched	32	0				95-100	Yes	Yes	No	Yes	2 weeks	Ethylene may cause a bitter flavor
Carrots, immature	32	0			29.5	98-100					4-6 weeks	
Carrots, mature	32	0			29.5	98-100					7-9 months	
Cauliflower	32	0			30.6	95-98					3-4 weeks	
Cauliflower	32-35	0-2				90-95	No	No	No	Yes		
Celery	32	0			31.1	98-100	Yes	Yes	No	Yes	2-3 months	
Celeriac	32	0			30.3	97-99					6-8 months	
Chard	32	0				95-100					10-14 days	
Cherries	32-35	0-2				90-95	No	No	Very Low	No		
Cherries, sour	32	0			29.0	90-95					3-7 days	
Cherries, sweet	30-31				28.8	90-95					2-3 weeks	
Chicory	32-35	0-2				90-95	Yes	Yes	No	No		

OPTIMUM STORAGE TEMPERATURE AND FACTOR GUIDE

Product	Optimal Storage Temperature		Chill Point		Freezing Point	Optimal Humidity	Top Ice Accepted [1]	Water Sprinkle Accepted [2]	Ethylene Production	Sensitive to Ethylene [3]	Approximate Storage Life	Comments
	(°F)	*(°C)*	*(°F)*	*(°C)*	*(°F)*	*%*						
Chicory, witloof	32	0				95-100					2-4 weeks	
Chinese Pea Pods	32-35	0-2				90-95	No	No	No	No		
Coconuts	55-60	13-16				80-85	No	No	No	No		Extended storage 32-35 F (0-2 C)
Collards	32	0			30.6	95-100					10-14 days	
Corn, sweet	32	0			30.9	95-98	Yes	Yes	No	No	5-8 days	
Cranberries	38-42	3-6	36	2		90-95	Yes	No	No	No		
Cucumbers	50-55		40	4	31.1	95	No	No	Very Low	Yes	10-14 days	
Currants	31-32				30.2	90-95					1-4 weeks	
Eggplant	46-54		45	7	30.6	90-95	No	No	No	Yes	1 week	
Elderberries	31-32					90-95					1-2 weeks	
Endive	32	0			31.9	95-100	Yes	Yes	No	No	2-3 weeks	
Escarole	32-35	0-2				90-95	Yes	Yes	No	No		
Escarole	32	0			31.9	95-100					2-3 weeks	
Figs	32-35	0-2				90-95	No	No	Low	No		

OPTIMUM STORAGE TEMPERATURE AND FACTOR GUIDE

Product	Optimal Storage Temperature		Chill Point		Freezing Point	Optimal Humidity	Top Ice Accepted [1]	Water Sprinkle Accepted [2]	Ethylene Production	Sensitive to Ethylene [3]	Approximate Storage Life	Comments
	(°F)	*(°C)*	*(°F)*	*(°C)*	*(°F)*	*%*						
Garlic	32	0			30.5	65-70	No	No	No	No	6-7 months	May be stored at 55-70 F (13-21 C) for shorter periods
Ginger Root	60-65	16-18	55	13		65-70	No	No	No	No		
Gooseberries	31-32				30.0	90-95					3-4 weeks	
Grapefruit	55-60	13-16	50	10		90-95	No	No	Very Low	No		
Grapes	31-32				29.7	85	No	No	Very Low	Yes	2-8 weeks	
Green Beans	40-45	4-7	38	3		90-95	No	No	No	Yes		
Green Peas	32-35	0-2				90-95	No	No	No	Yes		
Greens, leafy	32	0				95-100					10-14 days	
Guavas	45-50	7-10	40	4		90-95	No	No	Medium	Yes		
Herbs	32-35	0-2				90-95	No	Yes	No	Yes		
Horseradish	30-32				28.7	98-100					10-12 months	
Jicama	55-65					65-70					1-2 months	
Kale	32				31.1	95-100					2-3 weeks	
Kiwi, ripe	32-35	0-2				90-95	No	No	High	Yes		
Kiwi, unripe	32-35	0-2				90-95	Ne	No	Low	Yes, Very		

OPTIMUM STORAGE TEMPERATURE AND FACTOR GUIDE

Product	Optimal Storage Temperature		Chill Point		Freezing Point	Optimal Humidity	Top Ice Accepted [1]	Water Sprinkle Accepted [2]	Ethylene Production	Sensitive to Ethylene [3]	Approximate Storage Life	Comments
	(°F)	*(°C)*	*(°F)*	*(°C)*	*(°F)*	*%*						
Kohlrabi	32	0			30.2	98-100	Yes	Yes	No	No	2-3 months	
Leeks	32	0			30.7	95-100	Yes	Yes	No	Yes	2-3 months	
Lemons	52-55	11-13	50	10		90-95	No	No	Very Low	No		
Lettuce	32	0			31.7	98-100	No	Yes	No	Yes	2-3 weeks	
Limes	48-55	9-13	45	7		90-95	No	No	Very Low	No		
Lychees	40-45	4-7	36	2		90-95	No	No	Very Low	No		
Mangos	50-55	10-13	50	10		85-95	No	No	Medium	Yes		
Melons, Casaba/Persian	50-55	10-13	45	7		85-95	No	No	Very Low	Yes		Riper melons may be stored at 45-50 F (7-10 C)
Melons, Crenshaw	50-55	10-13	45	7		85-95	No	No	Low	Yes		Riper melons may be stored at 45-50 F (7-10 C)
Melons, Honey Dew	50-55	10-13	41	5		85-95	No	No	Medium	Yes		Riper melons may be stored at 45-50 F (7-10 C)
Mushrooms	32	0			30.4	95	No	Yes	No	Yes	3-4 days	
Napa	32-35	0-2				90-95	No	No	No	Yes		
Nectarines	31-32				30.4	90-95	No	No	High	No	2-4 weeks	

OPTIMUM STORAGE TEMPERATURE AND FACTOR GUIDE

Product	Optimal Storage Temperature		Chill Point		Freezing Point	Optimal Humidity	Top Ice Accepted [1]	Water Sprinkle Accepted [2]	Ethylene Production	Sensitive to Ethylene [3]	Approximate Storage Life	Comments
	(°F)	*(°C)*	*(°F)*	*(°C)*	*(°F)*	*%*						
Okra	45-50		45	7	28.7	90-95	No	No	Very Low	Yes	7-10 days	
Onions	32-35	0-2				65-75	No	No	No	No		May be stored at 55-70 F (13-21 C) for shorter period
Oranges	40-45	4-7	38	3		90-95	No	No	Very Low	No		
Papayas	50-55	10-13	45	7		85-95	No	No	Medium	Yes		
Parsley	32	0			30.0	95-100					2-3 months	
Parsnips	32	0			30.4	98-100	Yes	Yes	No	Yes	4-6 months	
Peaches	31-32				30.3	90-95	No	No	High	Yes	2-4 weeks	
Pears	29-31				29.2	90-95	No	No	High	Yes	2-7 months	
Peas, green	32	0			30.9	95-98					1-2 weeks	
Peas, southern	40-41					95					6-8 days	
Peppers, hot chili	32-50					60-70	No	No	No	Yes	6 months	
Peppers, sweet	45-55	7-10	42	6	30.7	90-95	No	No	No	No	2-3 weeks	
Persimmons	32-35	0-2				90-95	No	No	No	Yes, Very		
Pineapples	50-55	10-13	45	7		85-95	No	No	Very Low	No		Odor may influence avocados

OPTIMUM STORAGE TEMPERATURE AND FACTOR GUIDE

Product	Optimal Storage Temperature		Chill Point		Freezing Point	Optimal Humidity	Top Ice Accepted [1]	Water Sprinkle Accepted [2]	Ethylene Production	Sensitive to Ethylene [3]	Approximate Storage Life	Comments
	(°F)	*(°C)*	*(°F)*	*(°C)*	*(°F)*	*%*						
Plums	31-32				30.5	90-95	No	No	High	Yes	2-5 weeks	
Pomegranates	41-50	5-10	41	5		90-95	No	No	No	No		
Potatoes	45-50	7-10	38	3		90-95	No	No	No	Yes		
Precut Fruit	32-36	0-2				90-95	No	No	Low	No		
Precut Vegetables	32-36	0-2				90-95	No	No	No	Yes		
Prunes	31-32				30.5	90-95	No	No	High	Yes	2-5 weeks	
Pumpkins	50-55		50	10	30.5	65-70	No	No	No	Yes	2-3 months	
Quinces	31-32				28.4	90					2-3 months	
Quinces	32-35	0-2				90-95	No	No	High	Yes		
Radishes, spring	32	0			30.7	95-100	Yes	Yes	No	Yes	3-4 weeks	
Radishes, winter	32					95-100					2-4 months	
Raspberries	31-32				30.0	90-95	No	No	Very Low	No	2-3 days	
Rhubarb	32	0			30.3	95-100	No	Yes	No	No	2-4 weeks	
Rutabagas	32	0			30.0	98-100	Yes	Yes	No	Yes	4-6 months	
Salad Mixes	32-35	0-2				90-95	No	Yes	No	Yes		

OPTIMUM STORAGE TEMPERATURE AND FACTOR GUIDE

Product	Optimal Storage Temperature		Chill Point		Freezing Point	Optimal Humidity	Top Ice Accepted [1]	Water Sprinkle Accepted [2]	Ethylene Production	Sensitive to Ethylene [3]	Approximate Storage Life	Comments
	(°F)	*(°C)*	*(°F)*	*(°C)*	*(°F)*	*%*						
Salsify	32				30.0	95-98					2-4 months	
Spinach	32				31.5	95-100					10-14 days	
Sprouts	32-35	0-2				90-95	No	No	No	Yes		
Squashes, summer	41-50		40	4	31.1	95	No	No	No	Yes	1-2 weeks	
Squashes, winter	50				30.5	50-70	No	No	No	Yes	1-6 months	
Strawberries	32	0			30.6	90-95	No	No	Very Low	No	3-7 days	
Sweet Potatoes	55-60		54	12	29.7	85-90	No	No	No	Yes	4-7 months	
Tangerines	32-35	0-2				90-95	No	No	Very Low	No		
Tangerines	40-45	4-7	38	3		90-95	No	No	Very Low	No		
Tomatoes, mature green	55-70				31.0	90-95	No	No	Low	Yes	1-3 weeks	Ripening can be delayed by storing at 55-60 F (13-16 C)
Tomatoes, ripe	55-70				31.1	90-95	No	No	Medium	No	4-7 days	
Turnip greens	32				31.7	95-100					10-14 days	
Turnips	32	0			30.1	95	Yes	Yes	No	Yes	4-5 months	

OPTIMUM STORAGE TEMPERATURE AND FACTOR GUIDE

Product	Optimal Storage Temperature		Chill Point		Freezing Point	Optimal Humidity	Top Ice Accepted [1]	Water Sprinkle Accepted [2]	Ethylene Production	Sensitive to Ethylene [3]	Approximate Storage Life	Comments
	(°F)	*(°C)*	*(°F)*	*(°C)*	*(°F)*	*%*						
Watercress	32				31.4	95-100					2-3 weeks	
Watermelon	55-70	13-21	50	10		85-95	No	No	No	Yes, Very		Keep away from ethylene producing fruits

[1] Top icing the products may be very effective keeping the temperature low and the product surface close to *100%* humidity.

[2] Spraying with water may be effective by keeping the temperature low and the surface *100%* humid.

[3] Products sensitive to ethylene should not be stored together with products producing ethylene. Exposure to ethylene may soften the flesh, adding bitter taste to the product or/and accelerate ripening

Proper storage conditions - temperature and humidity - are required to maximize storage life and maintain quality of harvested fruits and vegetables.

Fresh fruits need low temperatures and high relative humidity to reduce respiration and slow down metabolic processes. The table below indicates optimal temperatures and moisture conditions for some common fruits and vegetables.

From: The Engineering ToolBox

Fruit and Vegetable Storage

INSERT "Safe Prep and Service" TAB

Safe Preparation and Service

PRODUCE SAFETY UNIVERSITY

Chef Cyndie Story

K-12 Consultant

Culinary Solution Centers, LLC

USDA United States Department of Agriculture

Objectives

PRODUCE SAFETY UNIVERSITY

Categorize fruit and vegetable cycle menu items into HACCP processes

Identify food safety practices in the preparation and service of fresh produce in child nutrition programs.

Apply effective culinary methods and marketing strategies to increase student consumption of fruits and vegetables.

Introduction

PRODUCE SAFETY UNIVERSITY

Key Points

What

- Retail HACCP requirements in school meal operations to reduce or eliminate food safety risks.
- Food production methods and merchandizing strategies that produce eye appealing foods to encourage student selection and consumption.

Why

- Eating fruits and vegetables in the school nutrition environment can help shape lifelong healthy eating behaviors (CDC, 2021)

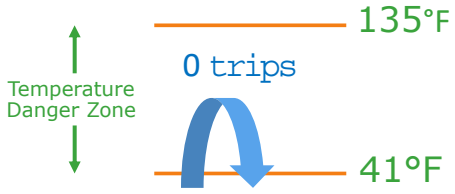
How

- Utilizing the following resource partners USDA FNS Office of Food Safety, Institute of Child Nutrition, USDA FNS Team Nutrition, Iowa State UC Davis and State agencies

HACCP Menu Category

PRODUCE SAFETY UNIVERSITY

Process 1: Ready-to-Eat (RTE)



CONTROL STEPS

Receiving, Storing, Preparing, Holding, Serving

Fruit, Precut, Bagged*
Leafy Greens, All varieties
Melons, Fresh, Cut, All varieties
Tomatoes, Fresh, Cut
Vegetables, Precut, Bagged*

*Receive and hold at or below 41°F, based on package label.

Process 1: Non-TCS Examples

PRODUCE SAFETY UNIVERSITY

Fruit, Canned
Fruit, Dried
Fruit, Fresh (except cut melons)
Fruit Cups, Canned
Fruit Cups, Frozen
Fruit, Juice, Shelf Stable
Vegetables, Fresh (except leafy greens and sliced tomatoes)

Follow manufacturer's instructions.

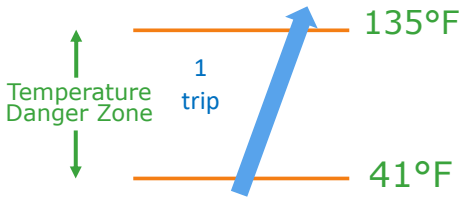
Best practice is to always use temperature control.

5

HACCP Menu Category

PRODUCE SAFETY UNIVERSITY

Process 2: Same Day Service



CONTROL STEPS

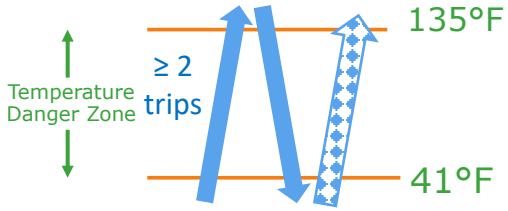
Receiving, Storing, Preparing, Cooking/Reheating for Hot Holding, Serving

Fruit, Hot
Vegetables, Hot

HACCP Menu Category

PRODUCE SAFETY UNIVERSITY

Process 3: Complex



CONTROL STEPS
Receiving, Storing, Preparing, Cooking, Cooling, Reheating, Hot Holding, Serving

Fruit, Hot *Cooked, Cooled, Reheated*
Vegetables, Hot *Cooked, Cooled, Reheated*

Food Safety – Reduce the Risks

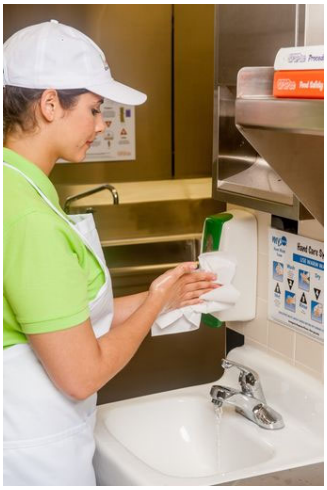
Reduce the Risks – Storing

PRODUCE SAFETY UNIVERSITY

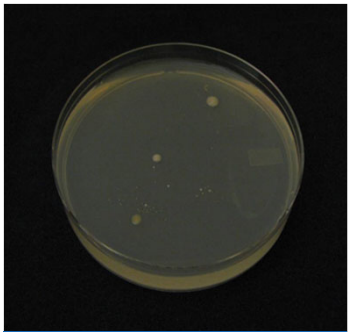
- Monitor refrigerated storage at least daily
- Date mark and rotate stock
  - First In; First Out (FIFO)
  - First Expired; First Out (FEFO)
- Ensure traceability system is up-to-date
- Prevent cross contamination
  - Store ready to eat above raw meats, poultry, and shell eggs
  - Keep foods covered
  - Repair leaks

Reduce the Risks – Food Preparation

PRODUCE SAFETY UNIVERSITY



WASH YOUR HANDS!



Microorganisms from hands washed for the recommended 20 seconds

Microorganisms from unwashed hands after using the restroom

Source: Iowa State University Extension Service

Reduce the Risks – Food Preparation

PRODUCE SAFETY UNIVERSITY

Source: Ford, E.W., Boyer, B.T., Menachemi, N. & Huerta T.R. (2014). Increasing hand washing with a simple visual cue. *American Journal of Public Health*, 10, 1851 – 1856

Simple cues may increase handwashing

- Control group: Towel not presented
- Intervention group: Towel presented

11

Reduce the Risks – Food Preparation

PRODUCE SAFETY UNIVERSITY

Avoid bare-hand contact by:

- Properly wearing single-use gloves
- Using utensils & deli paper
- Dispensing equipment

Reduce the Risks – Food Preparation

PRODUCE SAFETY UNIVERSITY

16%

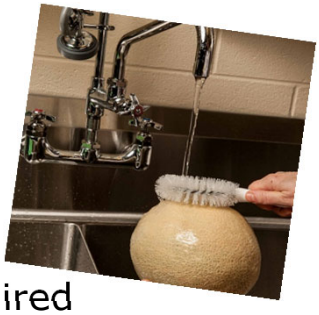
Foodborne outbreaks (2006 – 2016) implicated contaminated gloves or glove cross contamination.

Reduce the Risks – Food Preparation

PRODUCE SAFETY UNIVERSITY

Handling fresh produce

- Wash under running water before cutting, peeling, eating or cooking
- Scrub using a vegetable brush
  - Melons, potatoes
- Identify designated produce sink
- Do NOT wash ready-to-eat produce
- Never use unapproved chemicals
- Commercial produce wash is not required

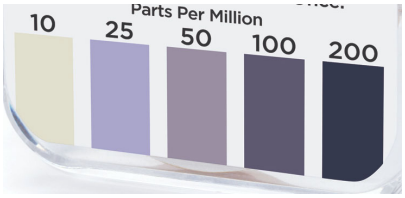


Reduce the Risks – Food Preparation

PRODUCE SAFETY UNIVERSITY

Commercial Produce Washes

- Mechanical produce wash with anti-microbial chemicals
- Ozonated water systems
- Electrolyzed Oxidizing Water (EOW)
  - Hypochlorous acid mixture (200 ppm)
  - No rinse, non-irritating
  - *USDA Organic* designation



Poll Question

PRODUCE SAFETY UNIVERSITY

Does your school district use any of the following as a produce wash? (Select All That Apply)

- Apple cider vinegar
- Baking soda
- Bleach
- Lemon juice
- Salt
- White vinegar
- Not applicable – Do not work in a school district

Reduce the Risks – Food Preparation

PRODUCE SAFETY UNIVERSITY

Remove excess moisture to improve quality and safety by:

- Draining in colander or perforated pan
- Drying with disposable paper towel
- Air drying in clean, perforated pan
- Using a commercial salad spinner

Hey, Leafy Greens; Want to go for a spin?

Reduce the Risks – Food Preparation

PRODUCE SAFETY UNIVERSITY

NSF

Use Approved Equipment

National Sanitation Foundation

- Cutting boards, knifes
- Food Processors/blenders
  - Manual
  - Mechanical

Reduce the Risks – Holding and Serving

PRODUCE SAFETY UNIVERSITY

- Monitor time and temperature during holding and serving.
- Maintain chopped and/or RTE leafy greens, cut melons and cut tomatoes at or below 41°F.
- Practice good personal hygiene & prevent cross contamination.

Merchandizing for Improved Student Appeal

Merchandize – Entrée Salads

PRODUCE SAFETY UNIVERSITY

21

Merchandize – Entrée Salads

PRODUCE SAFETY UNIVERSITY

22

Merchandize – Grab and Go

PRODUCE SAFETY UNIVERSITY

23

Merchandize – Mixed Salads

PRODUCE SAFETY UNIVERSITY

24

Merchandize – Entrees (Beef and Sweet Potato Chili)

PRODUCE SAFETY UNIVERSITY

25

Merchandize – Entrees (Teriyaki Noodles)

PRODUCE SAFETY UNIVERSITY

26

Merchandize – Improve Appeal

PRODUCE SAFETY UNIVERSITY

Trim Celery: 15 minutes to process 5 lb bag: 32 ½ c servings

27

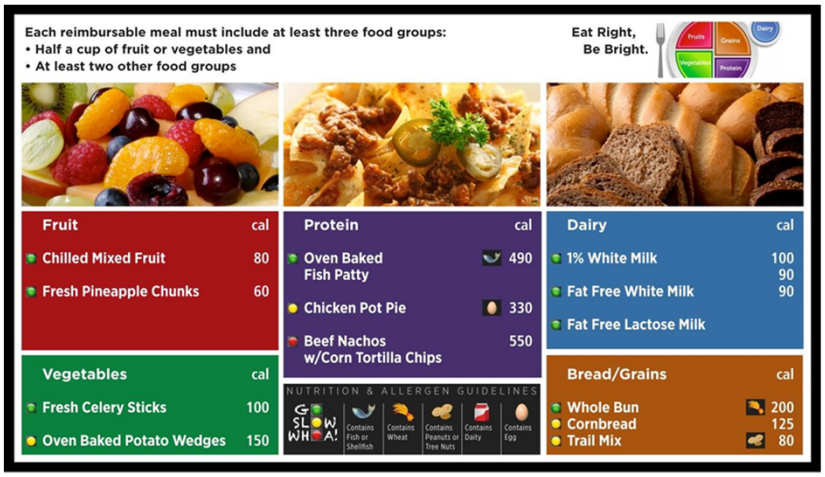
Merchandize – Improve Appeal

PRODUCE SAFETY UNIVERSITY

28

Merchandize in the Serving Area

PRODUCE SAFETY UNIVERSITY



Customer Service

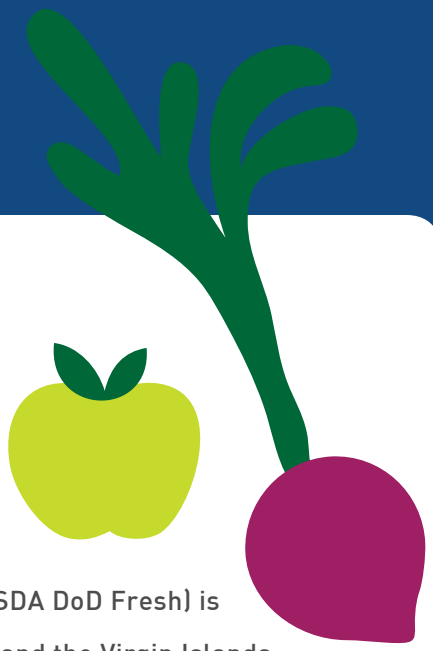
PRODUCE SAFETY UNIVERSITY

The Key to Your Program's Success!

30

USDA

United States Department of Agriculture



USING USDA DOD FRESH TO PURCHASE LOCAL PRODUCE

* *

THE USDA DEPARTMENT OF DEFENSE Fresh Fruit and Vegetable Program (USDA DoD Fresh) is available to schools in 48 States, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands. More than 22,000 schools receive fresh fruits and vegetables from this program. Schools interested in participating in the USDA DoD Fresh program should reach out to the State Distributing Agency.

How Does It Work?

USDA DoD Fresh is a partnership between USDA and the Department of Defense (DoD) Defense Logistics Agency (DLA). This program leverages DoD's procurement system to provide a variety of nutritious U.S.-grown fresh fruits and vegetables to schools. Schools receive two types of support from the USDA. The majority of the support is provided in the form of cash reimbursement for the meals served, and the second form of support is the ability to order foods that USDA purchases ("USDA Foods") which can make up about 15-20% of the value of the food served in the National School Lunch Program. USDA DoD Fresh is one option that schools can use to spend their entitlement.

What are the Advantages of DoD Fresh?

* **Flexibility:** USDA DoD Fresh is another choice in a request-driven system to help States and school districts manage and utilize USDA Foods entitlement more effectively.

* **Consistency:** USDA DoD Fresh vendors update the catalog weekly and schools can receive deliveries as frequently as every week, making orders timely, fresh, and responsive to market fluctuations.

* **High quality:** DoD maintains high quality standards through Produce Quality Audits, requires vendors to follow Good Agricultural Practices (GAP) and Good Handling Practices (GHP), and requires that pre-cut produce is sourced from approved suppliers.

* **Variety:** USDA DoD Fresh offers many different types and varieties of produce, all grown in the United States. School districts can choose between different package sizes, whole or pre-cut options, and can select locally grown produce when in season.

* **Easy ordering and funds tracking:** Schools place orders via the web-based Fresh Fruit and Vegetable Order/Receipt System (FFAVORS). The prices listed in the FFAVORS catalog reflect the prices that schools will be billed for the product. FFAVORS tracks schools' entitlement fund balances and total order costs. DoD manages vendor payment and reconciliation.

OFFICE *of* COMMUNITY FOOD SYSTEMS

CASE QUANTITY	ITEM CODE	DESCRIPTION		STATE OF ORIGIN	CASE CONTENTS	CASE PRICE
	14M10	APPLES R/D 125-138 CT 40 LBS CS		MI, PA, WA	40 LB	$25.98
	14M33	CARROTS WHL 5 LB BG	*Local Grown	GA	5 LB	$5.20
	15A85	PEPPERS SWT CHL GRN DICE 5 LB BG	*Local Grown	FL	35 LB	$13.58
	15M94	ORANGES CHIL 50/4.7 OZ CO		CA	15 LB	$30.45
	15Q29	KALE GREEN 1/20 LB CS	*Local Grown	GA,SC	20 LB	$17.95
	18B17	TOMATOES FRESH 5X6 5 LB CS	*Local Grown	FL	5 LB	$7.56
	18A54	BLUEBERRIES FRESH 12/6 OZ EA 4.5 LB CS	*Local Grown	CA, NC	5 LB	$19.40

The FFAVORS catalog indicates which foods are grown locally.

Local Produce through USDA DoD Fresh

All produce is required to be grown in the United States. Vendors provide the state of origin for each product. Local produce is defined as produce from within the state or adjacent states. Vendors are encouraged to provide local products in season. Local produce must meet contract requirements for quality and food safety and be priced competitively.

What Should States and School Districts Do if They Want to Source Local Foods Through USDA DoD Fresh?

States and schools that want to purchase local foods through USDA DoD Fresh should start by looking for products already marked with the state or origin in the FFAVORS catalog. States and schools can also contact their USDA DoD Fresh produce vendor to find out which local products the vendor expects to carry throughout the year, or to make their interest in local produce known to the USDA DoD Fresh vendor.

How is the Program Funded?

States work with schools to manage how much USDA Foods entitlement to allocate to USDA DoD Fresh and to ensure entitlement is fully utilized.

Learn More

The **Defense Logistics Agency website** provides background information about DoD and links to each vendor's contract.

The **Food and Nutrition Service website** provides contact information for farm to school personnel in your area, and a helpful history of the DoD Fresh program.

* *

For more information, and to sign up for the bi-weekly e-letter from the Food and Nutrition Service's Office of Community Food Systems, please visit www.fns.usda.gov/farmtoschool.
Questions? Email us at farmtoschool@fns.usda.gov.

OFFICE *of* COMMUNITY FOOD SYSTEMS

INSERT "Lab Log" TAB

PRODUCE SAFETY UNIVERSITY

Lab Log

PSU Lab Log Guidance

Samples by count:

- ✓ For individual commodities like watermelons the sample size will be the individual melon.
- ✓ For packaged commodities like strawberries, potatoes, and cases of oranges, the sample size will be a count of the number of individual produce items. For example, a clamshell of strawberries may have a sample size of 25 berries.
- ✓ Record the sample number in the designated column.

Size Diameter:

- ✓ Using the provided grading inspection sizing tools: measure and record the diameter of the smallest and largest piece of produce in the sample. Record the diameter average in the designated column.

Defects:

- ✓ Record the number of quality defects in each sample into the defects column.
- ✓ Record a description of the specific quality defects found in the notes section.
- ✓ Record the number of other defects listed in the appropriate row and column.
- ✓ Record additional defects not listed in the table in the notes section.

Percent:

- ✓ Calculate the percentage of defects for each sample using the formula: Defects ÷ number in sample = %
- ✓ Record the calculated percentages in the appropriate row and column.
- ✓ Calculate the total percentage of each type of defect by adding the percentages from each sample.

Sample Size					
Sample 1	**Sample 2**				
11	10				
	Smallest		**Largest**		**Average**
Size Diameter (in)	2 in.		4 in.		3 in.
	Defects (#)		**Percent (%)***		**Total (%)**
	Sample 1	**Sample 2**	**Sample 1**	**Sample 2**	
Quality	2	0	18%	0	18%
Bruises	1	1	9%	10%	19%
Soft/Overripe	0	0	0	0	

Notes:

Quality defects: **Excessive surface scars** *(detracts from appearance)* and **Insect damage** *(detracts from appearance and possible vector for decay and produce safety issues)*.

For in-depth descriptions of defects and full inspection procedures please reference the inspection instructions available on the USDA Agriculture Marketing Service grades and standards website at: https://www.ams.usda.gov/grades-standards.

You will find direct links on the bottom of each commodity log sheet.

Broccoli Florets

# of Florets	Defects (#)		Percent (%)*		
	Sample 1	Sample 2	Sample 1	Sample 2	Totals (%)
Quality					
Discoloration					
Freshness					
Decay					

*# of Defects ÷ number in sample = %

Helpful hints:

Diameter	Minimum	Maximum
Not less than 1 inch or more than 4 inches	1-1/2 inches Unless otherwise specified	4-1/2 inches Unless otherwise specified

- ✓ Broccoli florets are a fresh-cut product which is covered by a U.S. grade standard. When solely packaged as broccoli florets, refer to the Broccoli Inspection Instructions. When broccoli florets are packaged in a mix with other fresh-cut commodities (such as cauliflower, carrots, etc.), inspect using the Fresh-Cut Produce Inspection Instructions.

- ✓ Total allowable defects: 10% which includes 2% decay.

- ✓ If bud clusters are yellowish, brownish, or reddish in color, this is a sign of age.

- ✓ To determine if free or excessive water is present, tilt the package so that a corner is pointing down, but keep the product from filling the corner of the package. Any amount of free or excessive water is objectionable.

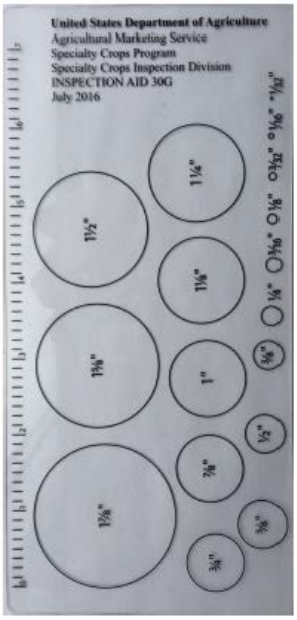
Culinary tips:

- Include desired number of days until expiration in specification; 7 days is typical in retail.
- Typically packed in 3 and 5 lb. bags
- How many pounds of broccoli florets may be steamed in each 2 inch perforated steamtable pan? _____.
- List at least two advantages of blanching broccoli florets:_____and _____.

Notes:

Equipment for Receiving Inspection:

Area Gauge, IA #30G



General Purpose Sizer

Knife

Resources:

Inspection Instructions

Fresh-Cut Produce:
https://www.ams.usda.gov/sites/default/files/media/FreshCutProduceInstructions.pdf

Broccoli:
https://www.ams.usda.gov/sites/default/files/media/Broccoli_Inspection_Instructions%5B1%5D.pdf

Catalogs

Equipment:
https://www.ams.usda.gov/sites/default/files/media/Fresh%20and%20Processed%20FV%20Products%20Inspections.pdf

Official Visual Aids Index:
https://www.ams.usda.gov/sites/default/files/media/Broccoli_Visual_Aid%5B1%5D.pdf

Order Form:
https://www.ams.usda.gov/sites/default/files/media/SC380.pdf

Cantaloupe

Weight	
Sample 1	Sample 2

	Hard	Ripe and Firm	Overripe/Wilted
Firmness			
	Green	Turning	Yellow
Ground Color			

	Count		Percent		*Totals	
	Sample 1	Sample 2	Sample 1	Sample 2		
Quality (D/SD)						
Bruises (D/SD)						
Decay (D)						
Soluble Solids						

D = damage; SD = serious damage *Defects ÷ weight = %

Helpful hints:

- ✓ Frequently, mold growth is seen only in stem scars; these scars being moist. Do not score as decay unless actual breakdown of tissue is present and sloughs out under finger pressure. The presence of mold in stem scars without resulting decay should not be reported as a defect.

- ✓ Total defects: 12% which includes 8% quality, 6% serious damage, 10% serious damage by permanent defects and 2% decay.

- ✓ "Good internal quality" means that the combined juice from the edible portion of a sample of cantaloupes selected at random contains not less than 9 percent soluble solids as determined by an approved hand refractometer.

- ✓ Quality defects include cleanness, netting, maturity and sunburn.

- ✓ Decay is not scored if only affecting the stem.

Culinary tips:

For faster fabrication, cut away the stem and blossom ends, stand on end, peel and then cut in half and remove seeds.

Equipment for Receiving Inspection:

Refractometer

Knife

Garlic Press

Resources

Inspection Instructions:
https://www.ams.usda.gov/sites/default/files/media/Cantaloup_Inspection_Instructions%5B1%5D.pdf

Visual Aid Online:
https://www.ams.usda.gov/sites/default/files/media/Cantaloup_Visual_Aids%5B1%5D.pdf

Catalogs:

Equipment
https://www.ams.usda.gov/sites/default/files/media/Fresh%20and%20Processed%20FV%20Products%20Inspections.pdf

Official Visual Aids Index:
https://www.ams.usda.gov/sites/default/files/media/Official%20Inventory%20of%20FV%20Inspection%20Aids.pdf

Order form:
https://www.ams.usda.gov/sites/default/files/media/SC380.pdf

Cauliflower Florets

# of Florets	Defects (#)		Percent (%)*			
	Sample 1	Sample 2	Sample 1	Sample 2	Totals (%)	
Discoloration						
Mold						
Off-Color						
Off-Odor						
Bruising						
Decay/Soft Rot						

*# of Defects ÷ number in sample = %

Helpful hints:

- ✓ Generally, fresh-cut products have no established U.S. Standards for Grades. Fresh-cut produce can be inspected for quality and condition.
- ✓ To determine if free or excessive water is present, tilt the package so that a corner is pointing down, but keep the product from filling the corner of the package. Any amount of free or excessive water is objectionable.
- ✓ When packing cauliflower curds (florets) may be bruised or broken by rough handling if reasonable care not used. The curd is usually very tender and if pressure is applied discolored, bruised spots will show on the curd.

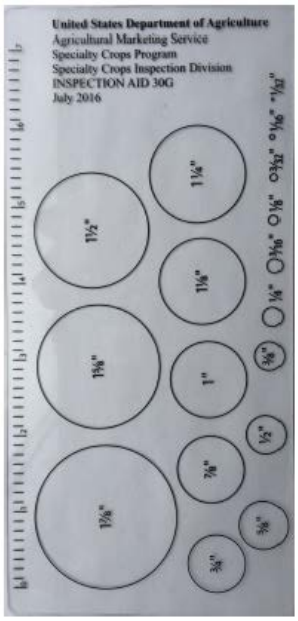
Culinary tips:

- Typically packed in 3 and 5 lb. bags.
- Cauliflower florets may be soaked in lemon juice prior to roasting for added flavor and masking bitterness.
- Floret sizes typically range from 1 to 3 inches.
- List at least two advantages of blanching cauliflower:_____and_____

Notes:

Equipment for Receiving Inspection:

Area Gauge, IA #30G



General Purpose Sizer

Knife

Resources:

Inspection Instructions
https://www.ams.usda.gov/sites/default/files/media/FreshCutProduceInstructions.pdf

Catalogs

Equipment:
https://www.ams.usda.gov/sites/default/files/media/Fresh%20and%20Processed%20FV%20Products%20Inspections.pdf

Official Visual Aids Index:
https://www.ams.usda.gov/sites/default/files/media/Official%20Inventory%20of%20FV%20Inspection%20Aids.pdf

Order Form:
https://www.ams.usda.gov/sites/default/files/media/SC380.pdf

Cucumbers

Sample Size						
Sample 1	**Sample 2**					
		Well Formed		**Fairly Well Formed**		
Shape (✓1)						
		Smallest		**Largest**		**Average**
Diameter/Length (in)						
		Defect (#)		**Percent (%)***		**Total (%)**
		Sample 1	**Sample 2**	**Sample 1**	**Sample 2**	
Quality						
Bruises						
Shriveled Ends						
Decay						

*number of defects ÷ number in sample = %

Helpful hints:

- ✓ Size requirement for U.S. No. 1 is maximum diameter of 2-3/8 inches and minimum length of 6 inches unless otherwise specified.
- ✓ Quality defects include size, shape, color, scars and dirt.
- ✓ Total allowable defects: 10% which includes 1% decay and for off-size 10% including 5% min diameter and 5% max diameter.
- ✓ Measurements for scars based on 6 in. cucumber.

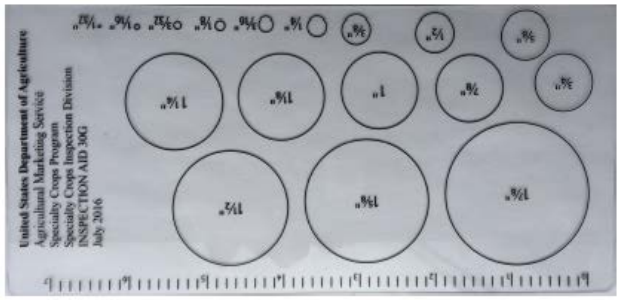
Culinary tips:

- Use a channel knife to garnish cucumbers prior to slicing.
- Local cucumbers may be available unwaxed, but shelf life will be shortened, so use immediately.

Notes:

Equipment for Receiving Inspection:

Area Gauge, IA #30G



Knife

General Purpose Sizer

Resources:

Inspection Instructions
https://www.ams.usda.gov/sites/default/files/media/CucumberInspectionInstructions.pdf

Visual Aid Online
https://www.ams.usda.gov/sites/default/files/media/CucumberVisualAids.pdf

Catalogs

Equipment:
https://www.ams.usda.gov/sites/default/files/media/Fresh%20and%20Processed%20FV%20Products%20Inspections.pdf

Official Visual Aids Index:
https://www.ams.usda.gov/sites/default/files/media/Official%20Inventory%20of%20FV%20Inspection%20Aids.pdf

Order Form:
https://www.ams.usda.gov/sites/default/files/media/SC380.pdf

Oranges

Sample Size	
Sample 1	**Sample 2**

	Smallest		Largest		Average
Size Diameter (in)					
	Defects (#)		**Percent (%)***		**Total (%)**
	Sample 1	**Sample 2**	**Sample 1**	**Sample 2**	
Quality					
Skin Breakdown					
Color (WC/NWC)					
Decay					

*number of defects ÷ number in sample = % WC=Well Colored NWC=Not Well Colored

Helpful hints:

- ✓ Well colored means that the fruit is at least light orange in color, with not more than a trace of green at the stem end, and not more than 15% of the remainder of the surface of the fruit shows green color.
- ✓ Quality defects include maturity, oil spots, size, shape, scale, tree dryness and dirt.
- ✓ Total allowable defects: 12% failing color (separate tolerance), 10% which includes, 7% permanent defects, 5% serious damage 5% serious damage caused by permanent defects and 3% decay. (Based on 25 count individual sample)
- ✓ Juice sacs of granulated fruit remain swollen and do not separate from each other or the segment walls. In such cases, the juice is displaced by yellow to grayish-white solid matter. Affected fruit will generally feel firm, but very light in weight (quality defect).
- ✓ The most common symptom of oil spots is irregularly-shaped yellow, light green or brown spots where the oil glands are conspicuous (quality defect).

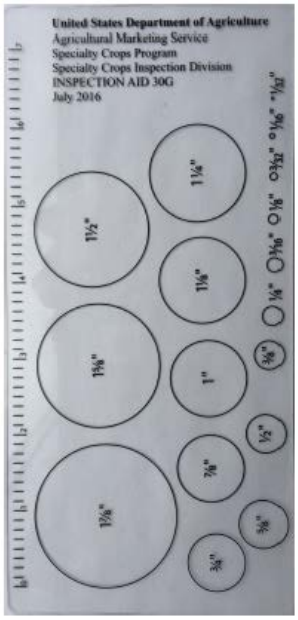
Culinary tips:

- USDA Choice oranges are not ideal for school meal programs due to poor appearance.
- Valencia oranges are difficult for students to peel. Serve cut wedges to improve acceptance.

Notes:

Equipment for Receiving Inspection:

Area Gauge, IA #30G



General Purpose Sizer

Knife

Resources:

Inspection Instructions
https://www.ams.usda.gov/sites/default/files/media/Citrus_CA_and_AZ_Inspection_Instructions%5B1%5D.pdf

Visual Aid Online
https://www.ams.usda.gov/sites/default/files/media/OrangesCAAZVisualAids.pdf

Catalogs

Equipment:
https://www.ams.usda.gov/sites/default/files/media/Fresh%20and%20Processed%20FV%20Products%20Inspections.pdf

Official Visual Aids Index:
https://www.ams.usda.gov/sites/default/files/media/Official%20Inventory%20of%20FV%20Inspection%20Aids.pdf

Order Form:
https://www.ams.usda.gov/sites/default/files/media/SC380.pdf

Pears

Sample Size (#)	
Sample 1	**Sample 2**

	Defects (#)		Percent (%)*		Total (%)
	Sample 1	**Sample 2**	**Sample 1**	**Sample 2**	
Quality					
Bruising					
Firmness (H/F/FR)					
Internal Breakdown					
Decay					

*number of defects ÷ number in sample = % H=Hard F=Firm FR=Firm Ripe

Helpful hints:

- ✓ Quality defects include maturity, cork spot, greening, black end, insect injury, cleanness, hail marks or scars, russeting, and they must be one variety.
- ✓ Internal discoloration is generally caused by low temperatures. The flesh of affected fruit may become translucent.
- ✓ Total allowable defects: 10% which includes 5% serious damage by insects and 1% for decay or internal breakdown.
- ✓ Score any soft bruise over 3/16 inch in depth, any bruise over 7/8 inch in diameter, or any combination of lesser bruises which detracts from the appearance, edible or marketing quality of the pear to an extent greater than any one bruise described above.
- ✓ Blush as used in the description of pears, refers to the red color usually occurring over the sun-exposed cheeks. There are no blush or color requirements in any of the grades.

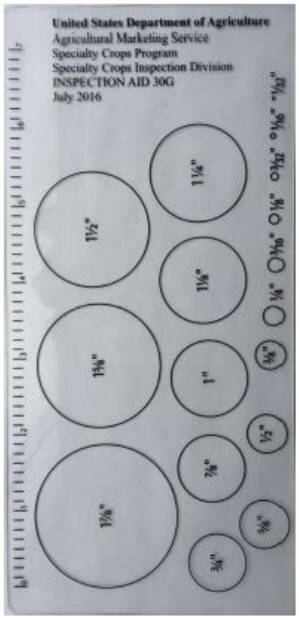
Culinary tips:

- Plan ahead; avoid serving hard, unripe pears. It may take over a week at room temperature to ripen the fruit.
- If PLU stickers are on the fruit, remove prior to ripening to prevent skin damage and bruising during preparation.

Notes:

Equipment for Receiving Inspection:

Area Gauge, IA #30G



Knife

Resources:

Inspection Instructions
https://www.ams.usda.gov/sites/default/files/media/Pear_%28including_Summer%2C_Fall_and_Winter_types%29_Inspection_Instructions%5B1%5D.pdf

Visual Aid Online
https://www.ams.usda.gov/sites/default/files/media/Pear_Visual_Aid%5B1%5D.pdf

Catalogs

Equipment:
https://www.ams.usda.gov/sites/default/files/media/Fresh%20and%20Processed%20FV%20Products%20Inspections.pdf

Official Visual Aids Index:
https://www.ams.usda.gov/sites/default/files/media/Official%20Inventory%20of%20FV%20Inspection%20Aids.pdf

Order Form:
https://www.ams.usda.gov/sites/default/files/media/SC380.pdf

Romaine

Sample Size (#)						
Sample 1	**Sample 2**					
		Defects (#)		**Percent (%)***		
		Sample 1	**Sample 2**	**Sample 1**	**Sample 2**	**Total (%)**
Quality						
Russet Spot						
Discolored						
Downey Mildew						
Peeling/Feathering						
Decay						

*number of defects ÷ number in sample = %

Helpful hints:

Small	Less than 8 inches in length
Medium	8 to 12 inches in length
Large	More than 12 inches in length

- ✓ Quality defects include development (twisted or corkscrew), mechanical damage, seedstems, and dirt.
- ✓ Russet spotting is scored as damage when present in any degree on more than 2 leaves.
- ✓ Total allowable defects: 10% which includes 5% for serious damage and 2% for decay.

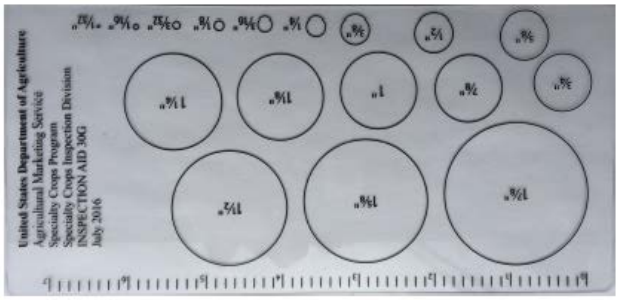
Culinary tips:

- Cut leafy greens are considered a TCS Food and must be stored at 41°F or below.
- If you don't have a salad spinner, what is another way to remove moisture from chopped romaine?_____
- A kitchen hack for dicing romaine is to:_____

Notes:

Equipment for Receiving Inspection:

Area Gauge, IA #30G



Knife

Resources:

Inspection Instructions
https://www.ams.usda.gov/sites/default/files/media/Lettuce_Inspection_Instructions%5B1%5D.pdf

Visual Aid Online
https://www.ams.usda.gov/sites/default/files/media/Lettuce_Inspection_Instructions%5B1%5D.pdf

Catalogs

Equipment:
https://www.ams.usda.gov/sites/default/files/media/Fresh%20and%20Processed%20FV%20Products%20Inspections.pdf

Official Visual Aids Index:
https://www.ams.usda.gov/sites/default/files/media/Official%20Inventory%20of%20FV%20Inspection%20Aids.pdf

Order Form:
https://www.ams.usda.gov/sites/default/files/media/SC380.pdf

Strawberries

Sample Size (# per clam shell)	
Sample 1	**Sample 2**

	Smallest		**Largest**		**Average**
Size Diameter (in)					
	Defects (#)		**Percent (%)***		**Total (%)**
	Sample 1	**Sample 2**	**Sample 1**	**Sample 2**	
Quality					
Bruises					
Soft/Overripe					
Mold					
Decay					

*number of defects ÷ number in sample = %

Helpful hints:

- ✓ Minimum size is 3/4-inch in diameter.
- ✓ Quality defects include size, shape, color, and dirt.
- ✓ Areas are based on a strawberry of 1-1/2 inches in diameter.
- ✓ Total allowable defects: 10% which includes 5% serious damage and 2% decay.
- ✓ Area allowed for flattened discolored bruises (aggregate area) damage 1/2 inch, serious damage 3/4 inch.

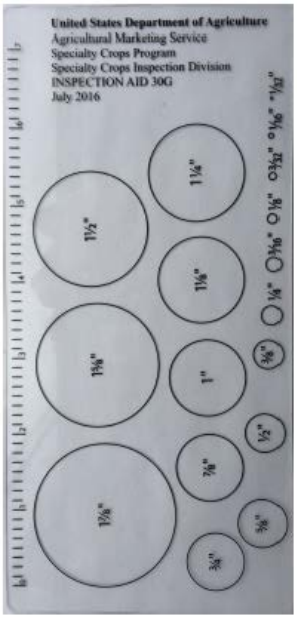
Culinary tips:

- Strawberries are very perishable and should be used within 2 to 3 days of receiving.
- When buying local strawberries, talk to the farmer about providing in bulk containers, such as 10 lb. flats, to save money on packaging.
- Don't soak strawberries in water because: _____
- A tomato shark/scoop may be used to: _____

Notes:

Equipment for Receiving Inspection:

Area Gauge, IA #30G



General Purpose Sizer

Knife

Resources:

Inspection Instructions
https://www.ams.usda.gov/sites/default/files/media/Fresh_Strawberry%2C_Raspberry%2C_Blackberry-Dewberry_Inspection_Instructions%5B1%5D.pdf

Visual Aid Online
https://www.ams.usda.gov/sites/default/files/media/Strawberries_Visual_Aid%5B1%5D.pdf

Catalogs

Equipment:
https://www.ams.usda.gov/sites/default/files/media/Fresh%20and%20Processed%20FV%20Products%20Inspections.pdf

Official Visual Aids Index:
https://www.ams.usda.gov/sites/default/files/media/Official%20Inventory%20of%20FV%20Inspection%20Aids.pdf

Order Form:
https://www.ams.usda.gov/sites/default/files/media/SC380.pdf

Tomato

Sample Size (#)					
	Well Formed		Fairly Well Formed		
Shape (#)					
	Smallest		Largest		Average
Size (in)					
	Defects (#)		Percent (%)*		Total (%)
	Sample 1	Sample 2	Sample 1	Sample 2	
Quality					
Bruises					
SDA					
Decay					

*number of defects ÷ number in sample = % SDA=Sunken Discolored Areas

Helpful hints:

- ✓ Quality defects include puffy, size, shape, color, scars and dirt.
- ✓ Total allowable defects: 15% which includes 10% shoulder bruises/discolored/sunken scars, 10% other defects and 5% decay. 10% for off-size and 10% for off color and 5% for green when any color other than "green" is specified.
- ✓ Containers must be marked to size.

Florida Sizes	Minimum (in)	Maximum (in)	Other Size Designations	Minimum (in)	Maximum (in)
			Small	2-4/32	2-9/32
6 X 7	2-9/32	2-19/32	Medium	2-8/32	2-17/32
6 X 6	2-17/32	2-29/32	Large	2-16/32	2-25/32
5 X 6	2-25/32		Extra Large	2-24/32	

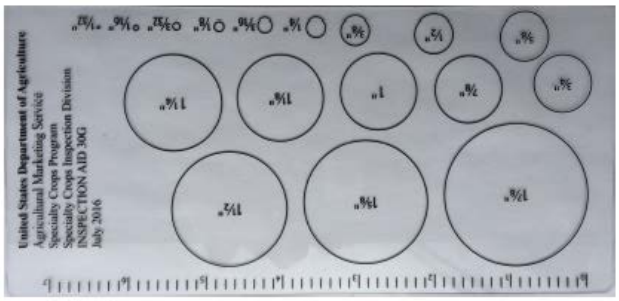
Culinary tips:

- List three ways in which cherry tomatoes may be prepared and served:_____, _____, and _____.
- A 1/2 cup serving of cherry tomatoes weighs:_____.
- A kitchen hack used to cut cherry tomatoes in half is:_____.

Notes:

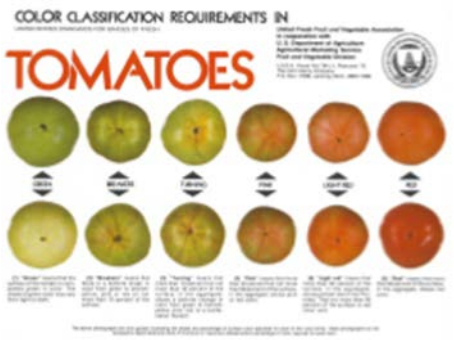
Equipment for Receiving Inspection:

Area Gauge, IA #30G



Knife

Tomato Color Chart



USDA Tomato Sizer

Florida Tomato Sizer

Resources:

Inspection Instructions
https://www.ams.usda.gov/sites/default/files/media/Tomato_Inspection_Instructions%5B1%5D.pdf

Visual Aid Online
https://www.ams.usda.gov/sites/default/files/media/Tomato_Visual_Aids%5B1%5D.pdf

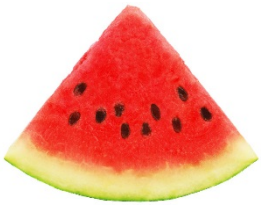
Catalogs

Equipment:
https://www.ams.usda.gov/sites/default/files/media/Fresh%20and%20Processed%20FV%20Products%20Inspections.pdf

Official Visual Aids Index:
https://www.ams.usda.gov/sites/default/files/media/Official%20Inventory%20of%20FV%20Inspection%20Aids.pdf

Order Form:
https://www.ams.usda.gov/sites/default/files/media/SC380.pdf

Watermelon



Sample Size			
	Well Formed	**Fairly Well Formed**	**Not Well Formed**
Shape (✓1)			
	Defects (#)	**Percent (%)***	**Total (%)**
Quality			
Bruises			
Decay			

*number of defects ÷ number in sample = %

Helpful hints:

- ✓ The flesh color of mature "red-flesh" watermelons must be at least pale red.
- ✓ Total allowable defects: 12% which includes 10% quality, with 5% serious damage and 10% condition, with 5% serious damage and 2% decay.
- ✓ External indications of a mature melon include creamy or yellow ground color and a filled out appearance.
- ✓ Bruises:
  - Side bruises are scored as damage when over 3 in. diameter and serious damage when over 5 in.
  - End bruises are scored as damage when over 2 in. diameter and serious damage when over 2 in. of underlying flesh is water soaked.
- ✓ Hollow heart: (score based on 25 lb. melon)
  - Long type: Damage is scored when the aggregate width of the crack exceeds 1-1/4 in, serious damage when exceeding 1-1/2 in.
  - Round type: Damage is scored when the aggregate width of the crack exceeds 2 in, serious damage when exceeding 2-1/2 in.
- ✓ Seedless means there are not more than 10 mature seeds.

Culinary tips:

- To create diced melon: cut in half, remove the peel, then slice and dice the heart of the melon.

Notes:

Equipment for Receiving Inspection:

Refractometer

Knife lll

Garlic Press

Apple Corer

Color Comparator

Resources:

Inspection Instructions
https://www.ams.usda.gov/sites/default/files/media/Watermelon_Inspection_Instructions%5B1%5D.pdf

Visual Aid Online
https://www.ams.usda.gov/sites/default/files/media/Watermelon_Visual_Aid%5B1%5D.pdf

Catalogs

Equipment:
https://www.ams.usda.gov/sites/default/files/media/Fresh%20and%20Processed%20FV%20Products%20Inspections.pdf

Official Visual Aids Index:
https://www.ams.usda.gov/sites/default/files/media/Official%20Inventory%20of%20FV%20Inspection%20Aids.pdf

Order Form:
https://www.ams.usda.gov/sites/default/files/media/SC380.pdf

Whole Apples

Sample Size (#)						
Sample 1	**Sample 2**					
		Defects (#)		**Percent (%)***		
		Sample 1	**Sample 2**	**Sample 1**	**Sample 2**	**Total (%)**
Quality						
Bitter Pit						
Bruises						
Shape (WF/FWF)						
Firmness						
Decay						

*number of defects ÷ number in sample = % WF=Well Formed FWF= Fairly Well Formed

Helpful hints:

Hard: means apples with a tenacious flesh and starchy flavor.
Firm: means apples with a tenacious flesh but which are crisp.
Firm ripe: means apples with crisp flesh.
Ripe: means apples with mealy flesh.

- ✓ Quality defects include cleanness, color, hail marks, insects, shape, stem punctures, and watercore.
- ✓ Total allowable defects: 10% which includes 5% for serious damage and 1% for decay/internal breakdown.
- ✓ Fairly well formed means that the apple may be slightly abnormal in shape but not to an extent which detracts materially from its appearance.
- ✓ Bitter Pit- when the apple is peeled, a small round or oval mass of dry, brown spongy tissue is found below each surface pit.

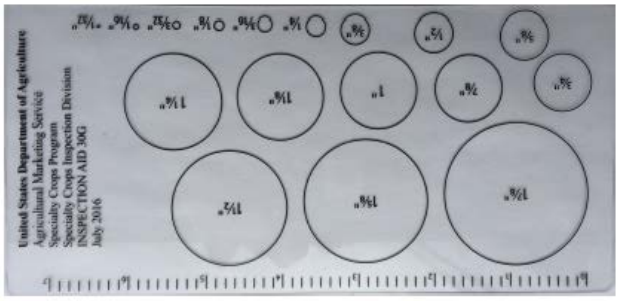
Culinary tips:

- A combination of lemon juice and the juice from canned pineapple tidbits makes for a great antioxidant to prevent apples from browning.

Notes:

Equipment for Receiving Inspection:

Area Gauge, IA #30G



Knife

Pressure Tester II

Resources:

Inspection Instructions
https://www.ams.usda.gov/sites/default/files/media/Apple_Inspection_Instructions%5B1%5D.pdf

Visual Aid Online
https://www.ams.usda.gov/sites/default/files/media/Apple_Visual_Aid%5B1%5D.pdf

Catalogs

Equipment:
https://www.ams.usda.gov/sites/default/files/media/Fresh%20and%20Processed%20FV%20Products%20Inspections.pdf

Official Visual Aids Index:
https://www.ams.usda.gov/sites/default/files/media/Official%20Inventory%20of%20FV%20Inspection%20Aids.pdf

Order Form:
https://www.ams.usda.gov/sites/default/files/media/SC380.pdf

Bananas

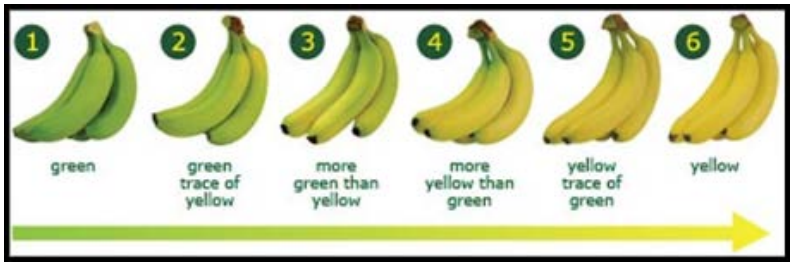
Count			
Firmness relates to color	**Hard**	**Firm**	**Ripe/Soft/Overripe**
Color	**Green**	**Turning**	**Yellow**

Helpful hints: *Bananas *do not* have a corresponding U.S. grade standard.

Why are Bananas sweeter when they are riper?

An unripe banana is full of complex carbohydrates, but as it ripens, these are broken down into simple sugars which is why riper bananas are or become sweeter. The lower starch content and higher sugar content also means that the banana is digested more quickly.

- ✓ Both green and yellow bananas are rich sources of potassium, vitamin B6, fiber, and vitamin C, and particularly low in sugar.
- ✓ An unripe banana is full of complex carbohydrates, but as it ripens, these are broken down into simple sugars which is why riper bananas are sweeter.
- ✓ Quality defects include shape, cuts and/or mechanical damage.
- ✓ Decay can affect the crown or the individual finger.
- ✓ There are no "bunches" only hands (8 or more), cluster (2 to 7), and individual fingers.
- ✓ Size is measured by the *outer* curve of the finger.
- ✓ Ethylene gas is introduced to green bananas to promote *uniform* ripening.
- ✓ Color chart for purchase



Culinary tips:

Notes:

Notes

Notes

INSERT "Additional Resources" TAB

POPULATION CONNECTION
Education and Action for a Better World

Earth: The Apple of Our Eye

Concept: A visual demonstration of the limited sources of food available from land and water.

Materials: An apple, a knife, and a paper towel

Procedure: Slice the apple according to the instructions, narrating as you go. Use the Discussion Questions to encourage critical thinking in discussion of these facts.

Part I: Farmland

Apple	Planet Earth	Narrative
Whole Apple	**Planet Earth**	1. Hold the apple out so the class can see it. *"This apple represents our planet."*
3/4	**Water**	2. Cut the apple into quarters. Hold out 3/4 in one hand. Ask the class: *"What do these 3/4 represent?" (Water.)*
1/4	**Land**	3. Set the three "water" sections aside and hold out the remaining quarter. Ask the class: *"What fraction of the apple remains?" (1/4.) This 1/4 represents the total land surface."*
1/8	**Uninhabitable & Non-Arable Land**	4. Slice the land (the remaining 1/4) in half, lengthwise. Hold out one of the pieces. Ask the class: *"What fraction of the apple is this?" (1/8.) This 1/8 represents the half of the Earth's surface that is inhospitable to people and to crops: the polar regions, deserts, swamps, and high or rocky mountains."*
1/8	**Habitable Land**	5. Set that 1/8 aside and hold out the other. *"This 1/8 represents the other half of the Earth's surface. These are the areas on which people can live, but cannot necessarily grow food."*
3/32	**Habitable Land, but Non-Arable Land**	6. Slice this 1/8 crosswise into four equal pieces. Hold out 3/32 in one hand. *"These 3/32 represent land on which people can live, but cannot grow food. Some of it was never arable because it's too rocky, wet, cold, steep or has soil too poor to produce food. Some of it used to be arable but isn't any longer because it's been developed—turned into cities, suburbs, highways, etc., so it can no longer be farmed. Governments have earmarked other areas, such as parks, nature preserves and other public lands to remain undeveloped forever."*
1/32	**Arable Land**	7. Set 3/32 aside and hold out 1/32. *"So, only 1/32 of the Earth's surface has the potential to grow the food needed to feed all of the people on Earth."*
1/32 Peel	**Topsoil**	8. Carefully peel the 1/32 slice of Earth. 9. Hold up the peel. *"This tiny bit of peel represents the topsoil, the dark, nutrient-rich soil that holds moisture and feeds us by feeding our crops. Currently, 90% of U.S. croplands lose soil above the sustainable rate.[1]"*

Education Program • www.populationconnection.org/education • PopEd@popconnect.org
1400 16th St. NW • Washington, DC 20036 • Phone 202.332.2200/1.800.767.1956 • Fax 202.332.2302

The Periodic Table of Produce

= Fruits
= Vegetables
= Herbs and spices
R = Store in refrigerator
CDV = Store in a cool dry, well ventilated place
RT = Store at room temperature

A **Apples** R, unwrapped, 3 weeks.	**Ch** **Cherries** R, in plastic, 5 days.														**Lk** **Leeks** R, in plastic, 2 weeks.
Av **Avocados** Ripen at RT, unwrapped; then R, 4 days.	**Co** **Coconut** RT or R, unwrapped, 1 month. Cut: R, in coconut juice or water, 1 week.	**L** **Lemons/ Limes** RT, unwrapped, 1 week; or R, 2 weeks.	**Pp** **Papayas** Ripen at RT, unwrapped; then R, 1 week.	**Pl** **Plums** Ripen at RT, unwrapped; then R, 4 days.	**Ar** **Artichokes** R, in plastic, 1 to 2 weeks.						**Mu** **Mushrooms** R, in paper bag or on baking sheet covered with just-damp towel, 3 days.	**Po** **Potatoes** CDV, in open paper bag or basket (not with onions), 1 to 2 months.	**Sqs** **Squash (summer)** R, in plastic, 5 days.	**F** **Fennel** R, in plastic, 5 days.	**O** **Onions** CDV, unwrapped, 2 months (2 weeks for Maui, Vidalia, etc.).
Bn **Bananas** Ripen at RT, unwrapped; if overripe, R, 2 days (skin will blacken).	**Gf** **Grapefruit** RT, unwrapped, 1 week; or R, 2 weeks.	**Ma** **Mangoes** Ripen at RT, unwrapped; then R, 1 week.	**Pc** **Peaches/ Nectarines** Ripen at RT, unwrapped; then R, in vented plastic bag, 4 days.	**Sb** **Strawberries** R, in vented container, 3 days.	**As** **Asparagus** R, in plastic, 4 days.	**Bk** **Bok choy** R, in plastic, 4 days.	**Cb** **Cabbage** R, tightly wrapped in plastic, 2 weeks.	**Ce** **Celery** R (no colder than 40° F), in vented plastic bag, 2 weeks.	**Cu** **Cucumbers** R, in plastic, 1 week.	**Ji** **Jicama** R, in plastic, 3 weeks. Cut: R, tightly wrapped in plastic, 1 week.	**Pa** **Parsnips** R, greens removed, in plastic, 2 weeks.	**Ra** **Radishes** R, greens removed, in plastic, 2 weeks.	**SqW** **Squash (winter)** CDV, unwrapped, 1 month.	**Ga** **Garlic** CDV, unwrapped, 2 months for whole bulbs, 10 days for cloves.	**S** **Scallions** R, in plastic, 5 days.
Be **Berries** (raspberries, blackberries, boysenberries) R, in vented container, 3 days.	**Gr** **Grapes** R, in vented plastic bag, 1 week.	**Me** **Melons** Ripen at RT, unwrapped; then R, 5 days. Cut: R, in plastic, 3 days.	**Pr** **Pears** Ripen at RT, unwrapped; then R, 4 days.	**To** **Tomatoes** RT, unwrapped, 5 days.	**Bt** **Beets** R, greens removed, in plastic, 2 weeks.	**Br** **Broccoli** R, in plastic, 5 days.	**Ct** **Carrots** R, greens removed, in plastic, 3 weeks.	**Chi** **Chilies** R, wrapped in dry paper towel, in plastic, 2 weeks.	**Eg** **Eggplant** R (no colder than 40° F), in vented plastic or paper bag, 5 days.	**LeP** **Lettuce (prewashed)** R, in plastic bag with dry paper towel, 3 days.	**P** **Peas (English, a.k.a. garden)** R, unshelled, in plastic, 2 days.	**Ru** **Rutabagas** R, greens removed, in plastic, 2 weeks.	**Sw** **Sweet potatoes** CDV, unwrapped, 1 to 4 weeks.	**Gi** **Ginger** R, wrapped in dry paper towel, in plastic, 2 to 3 weeks.	**Sh** **Shallots** CDV, unwrapped, 1 month.
Bl **Blueberries** R, in vented container, 6 days.	**K** **Kiwis** Ripen at RT, unwrapped; then R, 4 days.	**Or** **Oranges** RT, unwrapped, 1 week; or R, 2 weeks.	**Pi** **Pineapple** R, unwrapped, 5 days. Cut: R, tightly wrapped in plastic, 3 days.	**W** **Watermelon** RT, unwrapped, 4 days; or R, 2 weeks. Cut: R, in plastic, 3 days.	**Bp** **Bell peppers** R (no colder than 40° F), in plastic, 1 week.	**Bs** **Brussels sprouts** R, in plastic, 5 days. (Flavor gets stronger over time.)	**Cf** **Cauliflower** R, in plastic, 1 week.	**Cr** **Corn (on cob)** R, husks intact, in plastic, 2 days.	**Gb** **Green beans** R, in plastic bag with dry paper towel, 7 days.	**LeH** **Lettuce (whole head)** R, in plastic bag with dry paper towel, 1 week.	**Ps** **Peas (sugar snap or snow)** R, in plastic, 7 days.	**Sp** **Spinach** R, wrapped in dry paper towel, in plastic, 7 days.	**Sc** **Swiss chard/ kale/collard greens** R, in plastic, 5 days.	**H** **Herbs (leafy)** R, wrapped in just-damp paper towel, in plastic, 3 to 7 days.	

A few useful things to know about produce storage and this chart:

- For best results, start by choosing produce that is plump, colorful, and free of blemishes.
- The table shows the average maximum shelf life. Food may be edible after this time, but it's taste, texture, and nutritional value may be compromised. (Note: The chemicals and pesticides used in conventional agriculture can slow the decay of produce; organic produce tends to have a slightly shorter shelf life.)
- Unless otherwise indicated, produce should be stored unwashed and untrimmed. But with root vegetables, leafy tops can steal moisture from the roots, so if the vegetables won't be used within 3 or 4 days, all but 1 to 2 inches of stem should be removed.
- Where "plastic" is indicated, plastic bags (tightly sealed) or airtight containers may be used. "Vented bags" refers to the perforated bag some produce comes in, a bag open at the top, or a plastic bag poked with about 20 holes.
- A paper towel inside a container can help control moisture. Use a dry one to absorb water or a damp one to add it.
- Ideally, refrigerated items should go in the crisper drawers.
- Keep fruits and vegetables in separate drawers. Many fruits emit ethylene, which can accelerate ripening.
- Items stored at room temperature should be kept out of direct sunlight.
- Promptly discard any rotten or moldy produce; it can contaminate the good stuff.

Copied from Real Simple • 2006

COMPATIBILITY, TEMPERATURE GUIDELINES & ETHYLENE SENSITIVITY

COMPATIBILITY, TEMPERATURE GUIDELINES

Source: United States Department of Agriculture (USDA)

Load Compatibility Groups[1]

Group 1

Apples
Apricots
Berries (except cranberries)
Cherries
Figs (not with apples, danger of odor transfer to figs; also see group 6a)
Grapes[2] (see groups 2 and 6a)
Peaches
Pears
Persimmons
Plums and prunes
Pomegranates
Quinces

Recommended Transit Conditions:

- *Temperature:*
  32˚ to 34˚F (0˚ to 1.5˚C)
- *Relative humidity:*
  90 to 95 percent
- *Atmosphere:*
  Normally used on berries and cherries only
  10 to 20 percent CO^2
- *Ice:*
  Never in contact with commodity.

Note: Most members of this group are not compatible with group 6a or 6b because ethylene production by group 1 can be high, and thus harmful to members of group 6a or 6b.

[1] Taken from USDA Marketing Research Report No. 1070, Compatibility of Fruits and Vegetables During Transport in Mixed Loads, by W.J. Lipton and J.M. Harvey, 1977.

[2] Grapes: Compatible with other commodities only if the grapes are not fumigated with sulfur dioxide (SO^2) in vehicle and if no chemicals that release SO^2 are included in packages.

Group 2

Avocados
Bananas
Eggplants (also see group 5)
Grapefruit3
Guava
Limes
Mangoes
Muskmelons, other than cantaloupes
Casaba
Crenshaw
Honey Dew
Persian
Olives, fresh
Papayas
Pineapples (not with avocados, danger of avocados odor absorption)
Tomatoes, green
Tomatoes, pink (also see group 4)
Watermelons (also see groups 4 and 5)

Recommended Transit Conditions:

- *Temperature:*
  55˚ to 65˚F (13˚ to 18˚C)
- *Relative humidity:*
  85 to 95 percent
- *Ice:*
  Never in contact with commodity

[3] Citrus Fruits : Oranges and tangerinesócompatibility depends on source. Florida or Texas grown oranges are shipped at 32˚ to 34˚F (0.0˚ to 1.1˚C), but oranges grown in California and Arizona are shipped at 38˚ to 48˚F (3.3˚ to 8.8˚ C).

Group 3

Cantaloupes
Cranberries
Lemons (adjust temperature to other commodity)
Lychees (also see group 4)
Oranges
Tangerines

Recommended Transit Conditions:

- *Temperature:*
  36˚ to 41˚F (2.5˚ to 5.0˚C)
- *Relative humidity:*
  90 to 95 percent; cantaloupes about 95 percent
- *Ice:*
  In contact only with cantaloupes

Group 4

Beans, snap
Lychees (also see group 3)
Okra
Peppers, green (not with beans)
Peppers, red (if with green peppers, temperature adjusted toward top of range)
Squash, summer
Tomatoes, pink (also see group 2)
Watermelons (also see groups 2 and 5)

Recommended Transit Conditions:

- *Temperature:*
  40˚ to 45˚F (4.5˚ to 7.5˚C)
- *Relative humidity:*
  About 95 percent
- *Ice:*
  Never in contact with commodity

Group 5

Cucumbers
Eggplants (also see group 2)
Ginger (not with eggplants, also see group 7)
Grapefruit, Florida (after January 1), and Texas
Potatoes (late crop)
Pumpkin and squashes, winter
Watermelons (temperature adjusted for other members of groups; also see groups 2 and 4)

Recommended Transit Conditions:

- *Temperature:*
  40˚ to 55˚F (4.4˚ to 13˚C); ginger not below 55˚F
- *Relative humidity:*
  85 to 90 percent
- *Ice:*
  Never in contact with commodity

COMPATIBILITY, TEMPERATURE GUIDELINES

Source: United States Department of Agriculture (USDA)

Group 6a

Artichokes
Asparagus
Beets, red
Carrots
Endive and escarole
Figs (also see group 1)
Grapes (also see group 1)
Greens
Leeks (not with figs or grapes)
Lettuce
Mushrooms
Parsley
Parsnips
Peas
Rhubarb
Salsify
Spinach
Sweet corn
Watercress

This group, except for figs, grapes, and mushrooms, is compatible with group 6b.

Recommended Transit Conditions:

- *Temperature:*
  32˚ to 34˚F (0˚ to 1.1˚C)
- *Relative humidity:*
  95 to 100 percent
- *Ice:*
  Never in contact with asparagus, figs, grapes, or mushrooms

Group 6b

Broccoli
Brussels sprouts
Cabbage
Cauliflower
Celeriac
Horseradish
Kohlrabi
Onions, green (not with rhubarb, figs, grapes, mushrooms, or sweet corn)
Radishes
Rutabagas
Turnips

This group is compatible with group 6a, except for figs, grapes, and mushrooms.

Recommended Transit Conditions:

- *Temperature:*
  32˚ to 34˚F (0˚ to 1.1˚C)
- *Relative humidity:*
  95 to 100 percent
- *Ice:*
  Contact acceptable for all

Group 7

Ginger (also see group 5)
Potatoes, early crop (temperatures adjusted for others)
Sweet potatoes

Recommended Transit Conditions:

- *Temperature:*
  55˚ to 65˚F (13˚ to 18˚C)
- *Relative humidity:*
  85 to 90 percent
- *Ice:*
  Never in contact with commodity

Group 8

Garlic
Onions, dry

Recommended Transit Conditions:

- *Temperature:*
  32˚ to 34˚F (0˚ to 1.5˚C)
- *Relative humidity:*
  65 to 75 percent
- *Ice:*
  Never in contact with commodity

ETHYLENE SENSITIVITY

Compatibility Chart for Fruits & Vegetables

Source: University of California — Davis

Compatible produce for long distance transport. Produce in the same temperature section can be mixed safely. Ethylene-sensitive vegetables should not be mixed with ethylene-producing fruits and vegetables. Dry vegetables can be mixed with other fruits and vegetables on trips lasting less than about one week.

Ethylene-sensitive vegetables

(32-36˚ F)

arugula
asparagus
Belgian/endive
broccoli
Brussels sprouts
cabbage[1]
carrot[1,3]
cauliflower
celery[1,3,9]
collard
escarole
green onion[9]
herbs
leek[8]
lettuce
mustard greens
parsley
snow peas
spinach
sweet peas
turnip greens
watercress

(45-50˚ F)

chayote
eggplant[5]
squash, summer
cucumber
okra

(55-65˚ F)

squash: pumpkin, winter, yam
sweet potato

Not sensitive to ethylene vegetables (55-65˚ F)

dry onion[9]
jicama
potato
ginger[5]
melon: bitter
tomato

Ethylene-producing (very low) fruits and melons (32-36˚ F)

apple[1,3,9]
apricot
avocado (ripe)
berries
cantaloupe
cherry
coconut
currant
date
fig[1,7,8]
grape[6,7,8]
loquat
nectarine
peach
pear[1,9]
plum
plumcot
pomegranate
prune
quince

Ethylene-sensitive fruits (45-50˚ F)

grapefruit[4,9]
lime[4,9]
lemon[4,9]

Not sensitive to ethylene vegetables

(32-36˚ F)

alfalfa sprouts
amaranth
anise
artichoke
beans: fava, lima
bean sprouts
beet
bok choy
garlic
horseradish
kale
mint
mushroom[7]
parsnip
radicchio
radish
rhubarb[7]
rutbaga
shallot
sweet corn[7]
water chestnut

(45-50˚ F)

basil
cowpea
tomatillo
beans: green, snap[10]
pepper: bell, chili[10]

Not sensitive to ethylene fruits

(45-50˚ F)

avocado (unripe)
cactus pear[1,9]
cranberry
guava
kumquat
mandarin[4,9]
olive
orange[4,9]
passion fruit
pineapple[2,10]
tamarillo
tamarind
tangelo[4,9]
watermelon

(55-65˚ F)

banana
jackfruit
melon: casaba, crenshaw, honeydew Persian
plantain
soursop
breadfruit
mango
papaya
rambutan

Notes:

[1] Odors from apples and pears are absorbed by cabbage, carrots, celery, figs, onions, and potatoes.
[2] Avocado odor is absorbed by pineapple.
[3] Celery absorbs odor from onion, apple, and carrot.
[4] Citrus absorbs odor from strongly scented fruits and vegetables.
[5] Ginger odor is absorbed by eggplant.
[6] Sulfur dioxide released from pads used with table grapes will damage other produce.
[7] Green onion odor is absorbed by fig, grape, mushroom, rhubarb, and corn.
[8] Leek odor is absorbed by fig and grape.
[9] Onion odor is absorbed by apple, celery, pear, and citrus.
[10] Pepper odor is absorbed by beans, pineapple, and avocado.

COMMON SHIPPING CONTAINERS BY COMMODITY

APPLES
45-lb. 1 1/8 bushel cartons, loose
40- to 45-lb. cartons, tray-pack
40-lb. bushel cartons, tray- or cell-pack
40-lb. bushel cartons, loose
40-lb. cartons, 10 4-lb.bags
40-lb. cartons, 8 5-lb. bags
40-lb. cartons, 16 8-count trays, over wrapped
38- to 42-lb. cartons, loose
37- to 43-lb. cartons, cell-pack
36-lb. cartons, 12 3-lb. bags
20-lb. half-bushel cartons, loose

ASPARAGUS
30-lb. pyramid cartons/crates, bunched or loose
28-lb. cartons/crates, bunched
25-lb. lugs/cartons, loose
24-lb. cartons, 16 1 1/2 lb. packages
21-lb. lugs/cartons, loose
20-lb. pyramid cartons/crates
20-lb. cartons, bunched
15- to 17-lb. pyramid cartons/crates, bunched or loose
14-lb. cartons, loose
12-lb. cartons, loose
12- to 13-lb. cartons/crates, bunched
11-lb. cartons/crates, loose

BLUEBERRIES
11-lb. flats, 12 1-pint cups
9-lb. flats, 12 250-gram cups
5-lb. flats, 12 8-oz. baskets

BROCCOLI
Bunched
21-lb. cartons/crates, 14s and 18s
Crown-Cut
20-lb. cartons, loose
Florets
10-lb. film bags
5-lb. film bags

BRUSSELS SPROUTS
25-lb. cartons, loose
10-lb. flats/cartons

CABBAGE
Green and Red
2,000-lb. bulk bins
1,000-lb. bulk bins
50- to 60-lb. flat crates
50-lb. 1 3/4 bushel crates/ cartons/bags
45-lb. cartons
40-lb. cartons/bags
Savoy
40-lb. 1 3/4 bushel crates
Chinese
80- to 85-lb. crates
45- to 54-lb. crates
50- to 53-lb. cartons

CARROTS
Topped
50-lb. cartons/bags, loose
50-lb. cartons, 10 5-lb. bags
48-lb. master bags, containing 48 1-lb., 24 2-lb. or 16 3-lb. bags
26-lb. cartons, bunched
25-lb. bags, loose
24-lb. cartons, containing 24 1-lb. bags
15-lb. cartons, containing 20 12-oz. bags
Bunched
26-lb. cartons/crates, 24s
Baby whole
24-lb. cartons, containing 24 1-lb. film bags
20-lb. cartons, containing 20 1-lb. bags
15-lb. cartons, containing 20 12-oz. bags

CANTALOUPE
1,000-lb. pallet bins
800-lb. pallet bins
80-lb. jumbo crates
60-lb. 1 3/4 bushel cartons
54-lb. cartons
45- to 50-lb. wirebound crates
40-lb. cartons/crates
40-lb. 1 1/9 bushel cartons/crates

CAULIFLOWER
60-lb. wirebound crates
50-lb. cartons/crates (Long Island Type)
25- to 30-lb. cartons, 12s and 16s film-wrapped and trimmed

CORN
50-lb. cartons/crates/bags
42-lb. cartons/crates/bags
37-lb. mesh bags

CUCUMBERS
Pickling
55-lb. 1 1/9 bushel cartons/crates
Slicers
50-lb. bushel cartons/crates
30-lb. cartons, 48s
28-lb. 5/9 bushel cartons/crates
24-lb. cartons, 36s and 42s
22-lb. cartons, 24s
Greenhouse
16-lb. cartons, loose, film-wrapped
12-lb. flats/cartons, loose, film-wrapped

EGGPLANT
33-lb. bushels or 1 1/9 bushel cartons/crates/baskets
26- to 28-lb. cartons/crates/lugs
25-lb. cartons
22-lb. lugs/cartons, 18s and 24s
17-lb. 1/2 bushel lugs
Chinese
26-lb. lugs
25-lb. cartons
15-lb. 1/2 bushel cartons/crates
Italian
26-lb. lugs
15-lb. 1/2 bushel cartons/crates
Japanese
15-lb. 1/2 bushel cartons/crates

GRAPES
Bunch 24-lb. crates, 8 2-quart baskets

22- to 23-lb. cartons/lugs
21-lb. lugs
20-lb. 12-quart baskets
16-lb. lugs, 16-lb. bagged/wrapped

Muscadines
12-lb. flats, 12 1-pint cups

LETTUCE

Iceberg
50-lb. cartons, 30s, 24s, 18s
30-lb. cartons
20-lb. cartons

Bibb
10-lb. flat cartons/crates
5-lb. 12-quart baskets/cartons
5-lb. baskets, greenhouse

Looseleaf
25-lb. cartons/crates
20-lb. 4/5-bushel crates
14-lb. 1 1/9-bushel crates
10-lb. baskets/cartons

Romaine
40-lb. 2/3 cartons/crates
28-lb. 1 1/3-bushel cartons
22-lb. 1 1/9-bushel cartons/crates
22-lb. cartons, 24s

ONIONS, BULB

50-lb cartons/bags/crates, loose
50-lb cartons, containing 10 5-lb bags
48-lb cartons, containing 16 3-lb bags or 24 2-lb bags
45-lb cartons, containing 15 3-lb bags
40-lb cartons, containing 20 2-lb bags
40-lb cartons, loose 36-lb cartons, containing 12 3-lb bags
32-lb cartons, 16 2-lb bags
25-lb bags/cartons, loose
24-lb cartons, containing 12 2-lb bags
10-lb bags, loose

ONIONS, GREEN

28-lb cartons, bunched 12s, bulb-type
20-lb cartons/crates, bunched 24s, bulb-type
13-lb cartons, bunched 48s
11-lb cartons, bunched 36s

PEACHES

38-lb. 3/4 bushel cartons/crates
35-lb. cartons
26-lb. cartons
25-lb. 1/2 bushel cartons/crates
22-lb. 2-layer cartons
11-lb. crates/flats, 1 layer tray pack
10-lb. cartons
9-lb. cartons, 1-layer

PEAS

Green
30-lb. bushel baskets/crates/hampers
30-lb. 1 1/9 -bushel crates/cartons

Snow, China, Sugar, Sugar Snap
10-lb. cartons

Southern
25-lb. bushel hampers

PEPPERS

Bells
35-lb. 1 1/4 -bushel cartons
30-lb. cartons/crate
28-lb. bushel and
1 1/9 bushel-cartons/crates
25-lb. cartons
14- to 15-lb. half-bushel cartons
11-lb. flat cartons

Jalapeños and Chilies
16- to 25-lb. half- and
5/9-bushel cartons/crates, loose
20-lb. cartons, loose
10-lb. cartons, retail packs

POTATOES

100-lb. bags
50-lb. cartons/bags
50-lb. cartons, containing 5 10-lb. or 10 5-lb. bags

PUMPKINS

1,000-lb. bins
50-lb. cartons/crates/bags
25-lb. 1/2-bushel cartons/crates

RADISHES

Topped
40-lb. bags, loose
25-lb. bags, loose
14-lb. cartons, containing
14 1-lb. bags
12-lb. baskets/cartons, containing 30 6-oz. bags

Bunched
35-lb. cartons/crates, 48s, 24s
30-lb. 4/5-bushel cartons/lugs
20-lb. cartons/crates,
containing 24 bunches
15-lb. cartons/crates, 24s

SPINACH

32-lb. 1 2/3-bushel cartons/crates
25-lb. bushel carton/crates
20-lb. cartons, 24s
12-lb. bags
10-lb. 24-quart baskets
8-lb. cartons, 12 10-oz. bags

SQUASH

Summer
42-lb. bushel and 1 1/9-bushel
cartons
35-lb. cartons/crates
30-lb. 3/4 bushel cartons/crates
26-lb. cartons/lugs
21-lb. 1/2 or 5/9-bushel baskets/
cartons/crates
10-lb. 8-quart baskets/cartons

Winter
50-lb. 1 1/9-bushel cartons/crates
40-lb. cartons/crates
35-lb. cartons/crates
12-lb. flats, 6 quarts

SWEET POTATOES

800-lb. bulk bins
40-lb. cartons/crates
40-lb. cartons, containing
eight 5-lb. bags
20-lb. boxes
10-lb. boxes
5-lb. cartons/bags

TOMATOES

28-lb 1/2 or 4/7-bushel cartons
25-lb cartons, loose
20-lb cartons/flats, loose or layerd

Cherry
15-lb flats, containing 12 1-pint cups
5-lb cartons, containing 9 250-gram cups

Mature Green
25-lb cartons, loose
20-lb cartons, loose or layered
10-lb cartons, loose

Greenhouse
15-lb flats, 1-layer

Plum or Roma
25-lb cartons, loose

WATERMELON

1,000-lb. pallet bins
100-lb. cartons
85-lb. cartons
40-lb. cartons
35-lb. cartons

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, sex, disability, age, or reprisal or retaliation for prior civil rights activity in any program or activity conducted or funded by USDA.

Persons with disabilities who require alternative means of communication for program information (e.g. Braille, large print, audiotape, American Sign Language, etc.), should contact the Agency (State or local) where they applied for benefits. Individuals who are deaf, hard of hearing or have speech disabilities may contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, (AD-3027) found online at: How to File a Complaint, and at any USDA office, or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights , 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; fax: (202) 690-7442; or email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender. February 2022