



Produce Safety University

2025



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Overall Goals of Produce Safety University (PSU)

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Provide Child Nutrition Professionals with 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.



PSU Objectives

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Look for these icons that connect to PSU objectives addressed in various presentations



Identifying and Mitigating Food Safety Risks

Increasing Shelf Life, Preventing Spoilage, Reducing Waste



Improving Student Acceptance

Controlling Produce Costs



Engaging the Community, Supporting Local Agriculture

Applying Specification Writing Best Practices



INSERT "Where Does Your Produce Come From" TAB



Where Does Your Produce Come From?

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United States Department of Agriculture

Objectives

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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

Key Points

What

- Diverse production systems and broad geographic distributions influence the food safety considerations of our fresh produce supplies.

Why

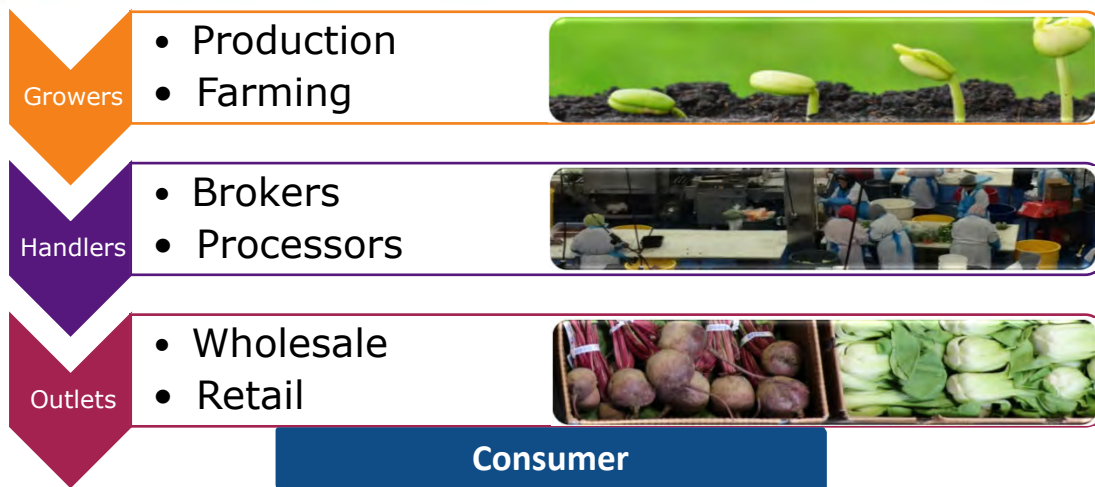
- Knowledge of where and how produce is grown and handled helps SNPs to identify, assess, and address potential food safety concerns across varied production and purchasing options.

How

- Resources for Implementation: [Guidance for Industry: Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables](https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-guide-minimize-microbial-food-safety-hazards-fresh-fruits-and-vegetables) (<https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-guide-minimize-microbial-food-safety-hazards-fresh-fruits-and-vegetables>)



Global Food Supply





What is a Farm?

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Primary Production Farm

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



What is a Farm?



Secondary Farm Activities

- Separate location from the primary production farm but majority owned by the same entity as the primary farm.
- Activities include:
 - shelling,
 - hulling,
 - packing or holding.



Farm Examples



**AUCTION
TODAY**



Greenhouse Grown



Greenhouse – Vertical Growing



Wholesalers/Distributors

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Apple Production



Apple Production

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🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿

Apple Packing

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🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿🌿

Apple Packing

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Storage

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



Safety in the Supply Chain



Farmer's Market

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Retailer

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Summary



Identified different growing areas and types, harvesting, processing and distribution of fresh produce.



Explained the complexities and challenges of food safety in the global food supply.





INSERT "Food Safety Overview" TAB






Food Safety Overview

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Objectives


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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.





Key Points to Consider

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Key Points

What

- Discuss the U.S. food safety system, food safety hazards associated with fresh produce, and foodborne illnesses typically associated with produce.
- Understand the importance of food safety regulations and identify the three different types of food safety hazards.



Key Points to Consider Continued...

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Key Points

Why

- Foodborne illness outbreaks associated with fresh produce continue to be a concern.
- Understanding the food safety risks and how to reduce them can help to prevent foodborne illness among students and ensure the availability of healthy and balanced meals that are safe.

How

- Resource for Implementation:
Foodborne Illness Causing Organisms in the U.S. (<https://www.fda.gov/media/77727/download>)



What is Food Safety?

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- Conditions and practices that **prevent unintentional contamination** of food and foodborne illnesses
- 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**
- **Hazard Analysis and Critical Control Point (HACCP)** plans/systems are intended to identify and control food safety hazards.

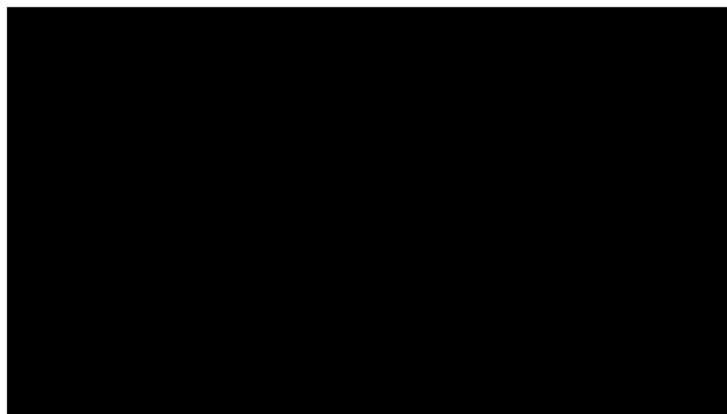


Why Food Safety Matters

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Video from the California Leafy Greens Marketing Agreement (LGMA)

https://www.youtube.com/watch?v=VN56_ZEavaA&t=26s





The Role of Government

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Federal — State — Local

- **Set food safety standards**
- **Check if standards are met** (through inspections and investigations)
- **Conduct enforcement** to address non-compliance
- **Collaborate** and **partner** across organizations to expand awareness, education, improvement, and compliance

A decorative border at the bottom of the slide consisting of a repeating pattern of small food icons.

Federal Agencies in Food Safety

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- **FSIS:** Regulates meat, poultry, egg products, and catfish



- **FDA:** Regulates shell eggs, seafood, and all other foods, including produce



- **CDC:** Investigates and monitors foodborne illnesses and outbreaks



The Food Safety Modernization Act

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The **Food Safety Modernization Act (FSMA)** is a federal law **enacted in 2011**. FSMA:

- Focuses on preventing foodborne illness
- Is implemented by the FDA
- Consists of various rules including the:
 - Produce Safety Rule
 - Preventive Controls for Human Food Rule



Food Safety in FNS Child Nutrition Programs

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- The **Richard B. Russell National School Lunch Act (NSLA)** is a 1946 federal law that created the **National School Lunch Program (NSLP)**.
- **The Child Nutrition and WIC Reauthorization Act of 2004** amended the NSLA and required implementation of a Hazard Analysis and Critical Control Point (HACCP) approach to food safety.



Food Safety in FNS Child Nutrition Programs

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- **The Healthy, Hunger Free Kids Act of 2010** expanded the Hazard Analysis and Critical Control Point (HACCP) approach to any facility, or part of it, where food is stored, prepared, or served for the NSLP.
- The HACCP approach helps to reduce the risk of foodborne hazards.



State and Local Food Safety



- At the State level, departments of agriculture and/or departments of public health are involved in food safety regulation.
- Both State and local regulatory agencies are responsible for enforcing the respective state and local food safety laws.



State and Local Food Safety

- Schools follow the **FDA Food Code** for retail foodservice operations. Recent version published in 2022.
- **The FDA Food Code is usually updated every 4 years.**
- Many regulatory agencies may use different versions of the FDA Food Code.



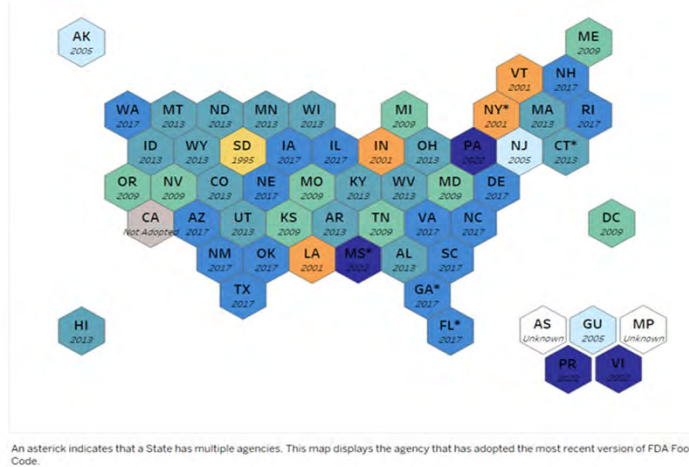
<https://www.fda.gov/food/fda-food-code/state-retail-and-food-service-codes-and-regulations-state>

<https://www.fda.gov/food/fda-food-code/food-code-2022>



State and Local Food Safety

Adoption of the FDA Food Code by State and Territorial Agencies



Food Safety Versus Food Quality



- **Food safety and food quality are different** - Food quality refers to the features of a product that affect its value and shelf life
- **Grading for quality is voluntary** based on standards developed for each product and is paid for by the producer/processor
- **Inspection for safety (wholesomeness) is mandatory** and is paid for with public funds





Food Safety Hazards

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Food safety hazards are **biological, chemical, or physical** properties that may cause a food to be unsafe for human consumption

Biological
Results in illness

Food Safety Hazards

Physical
Results in injury

Chemical
Results in poisoning

Physical Hazards

Naturally occurring

Bones, insects (or parts), pits, seeds, shells, etc.

Added: Foreign materials

Metal, plastic, glass, rubber, bone, stones, wood, personal items, etc.

Risks: Traumatic injury

Choking, laceration, damage to the mouth/throat/digestive tract, etc.



Chemical Hazards

Naturally occurring

- Mycotoxins: aflatoxins, patulin
- Toxic mushroom species
- Food allergens

Added

- Environmental contaminants: improperly used fertilizers and pesticides
- Nonfood grade chemicals

Risks: Acute poisoning or chronic illness



Chemical Hazard Example: Food Allergens



- **9 major food allergens** account for over 90% of food allergic reactions in the U.S.
- An estimated **8% of children (1 in 13) are affected** by food allergies
- Over **15% of school-aged children with food allergies have experienced a reaction** at school
- An estimated 20-25% of severe and potentially life-threatening reactions (**anaphylaxis**) reported at schools involved children with no previous food allergy diagnosis

A background pattern of various food icons including carrots, bananas, and leafy greens, scattered across the slide.

Biological Hazards

Factors that Influence Microbial Growth

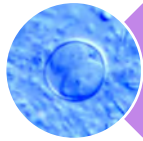
Biological Hazards



Bacteria



Viruses



Parasites



Biological Hazards



Bacteria

- Naturally present in the environment, animals, and plants
- Certain bacteria can cause illness (pathogens)
 - *Salmonella*, Shiga Toxin Producing *E.coli* (STEC), *Campylobacter*, *Listeria*, *Staphylococcus*
- Can contaminate produce during harvest, processing, and preparation
- Are **destroyed at cooking temperatures and growth prevented at refrigeration temperatures**





Viruses

- Require a living cell or host to multiply
- Foodborne viruses spread through humans handling foods who are infected with viruses
 - Norovirus, Hepatitis A, Other gastroenteritis causing viruses
- Can spread rapidly and be highly contagious
- Cooking is not effective at destroying foodborne viruses, must **prevent human contamination through good personal hygiene.**



Parasites

- Require live animal or human hosts as part of their life cycles
- Exist naturally in the environment, but generally introduced to humans when sewage or fecal material contaminates water or food
 - Cyclospora, Giardia, Parasitic Worms (Tape Worms)
- **Controlled through avoidance of contaminated water and proper sewage control**



Factors That Influence Bacterial Growth

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Food



Acidity



Time



Temperature



Oxygen



Moisture

Bacteria need six components to grow in food

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



Factors That Influence Bacterial Growth

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Food

F **A** **T** **T** **O** **M**



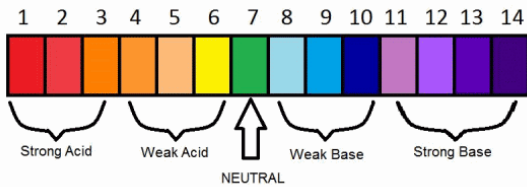
Bacteria require nutrients like carbohydrates, fats, and amino acids to survive and grow



Acidity

F A T T O M

THE PH SCALE



Bacteria can survive in acidic conditions but grow best near neutral pH (7.0)



Time/ Temperature

F A T T O M



Bacterial pathogens need time to multiply and grow best at temperatures between 41-135 F



Oxygen

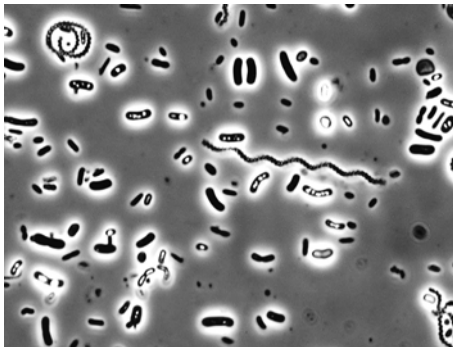


F A T T O M

- **Aerobic** - require oxygen to grow
- **Facultative anaerobic** - require some oxygen (0-21%)
 - *Salmonella, Listeria, STEC*
- **Anaerobic** - grow when oxygen is absent
 - *Clostridium botulinum*



Moisture



F A T T O M

- In food, water activity (aw) is used to measure the available water needed by bacteria to grow.
- Water activity is measured on a scale between 0-1.
- Most bacterial pathogens can only survive above 0.83 aw



Factors That Influence Viral Transmission



Foodborne viruses spread from infected humans

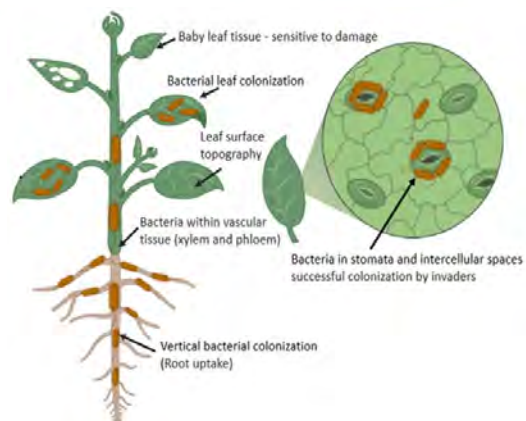
- Infected food handlers
- Bodily fluid transfer
 - Hepatitis A: fecal material
 - Norovirus: vomiting, diarrhea, coughing
- Viral particles can spread through air and surfaces



Field Factors Contributing to Produce Contamination

Pathogen internalization

- **Plant topography factors**
 - Wax layers
 - Surface Roughness
- **Plant tissue damage**
 - Enables entry
 - Releases nutrients



Bacteria are opportunist and will grow wherever there are nutrients!

Produce Contamination Risks During Processing

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

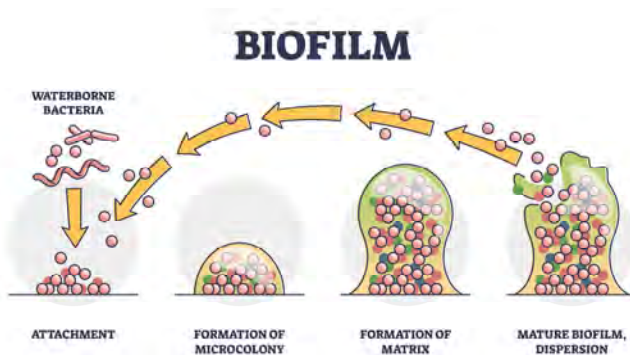


The natural exterior barrier is broken, and provides opportunity for pathogens to be introduced and grow if present



Produce Contamination Risks During Processing and Service

A biofilm is a **colony of bacteria that is attached to a surface** within a thin (slime) layer made up of extracellular polymeric substances (EPSs)



Biofilms **enable bacteria to survive and adapt** in difficult environmental conditions including in:

- produce packing plants
- field equipment
- food service kitchens



Produce Contamination Risks During Processing and Service

Biofilms

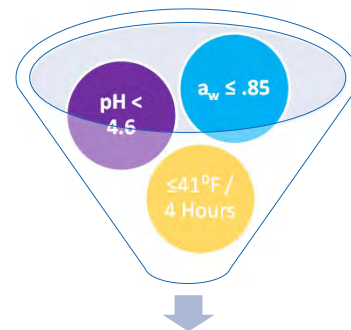
- Some bacteria can form biofilms on **surfaces of food, equipment, and facilities**
- Biofilms are a **public health challenge and risk** since they can:
 - Be difficult to remove
 - Be resistant to agents used to clean
 - Lead to food contamination and spoilage
 - Lead to transmission and poor treatment of disease
 - Lead to corrosion/damage of surfaces in food facilities



*Any surface that combines an abundance of **moisture and nutrients** is susceptible to biofilm formation if **microorganisms** are present.*

The Food Code and Biological Hazards

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



Food Safety

Note: Values shown in image are general.





Poll Question By Show of Hands

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The majority of foodborne illnesses associated with outbreaks in schools are caused by which of these foodborne pathogens?

1. Salmonella
2. Norovirus
3. E. coli
4. Hepatitis A virus
5. Staphylococcus aureus

A decorative footer consisting of a horizontal row of small, light blue icons of hands, each with a different gesture, arranged in a repeating pattern.



Foodborne Illness and Outbreaks

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- **Foodborne illness:**
Results from eating contaminated food
- **Foodborne outbreak:**
Two or more persons experience a similar illness after ingestion of a common food and analysis implicates the food as the source of the illness



Produce Associated Foodborne Outbreaks in the U.S.

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2004 to 2010 Multistate Produce Outbreaks:

163 Outbreaks
4949 Illnesses
895 Hospitalizations
9 Deaths

2010 to 2017 Multistate Produce Outbreaks:

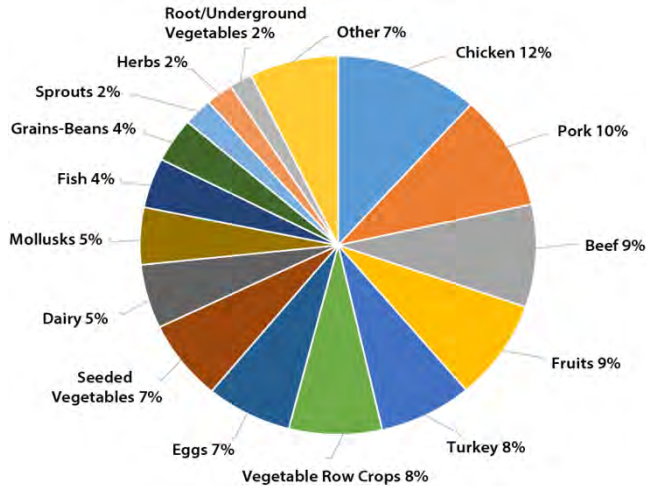
228 Outbreaks
4748 Illnesses
1190 Hospitalizations
55 Deaths

Multistate Outbreaks of Foodborne Illness in the United States
Associated With Fresh Produce From 2010 to 2017 - PMC



Top 15 Foods That Caused Outbreak Associated Illnesses, 2009–2018

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<https://www.cdc.gov/fdoss/index.html>



Recent Multistate Foodborne Outbreak Associated With Produce

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March 2023
Listeria Monocytogenes
 Linked to leafy greens and packaged salads



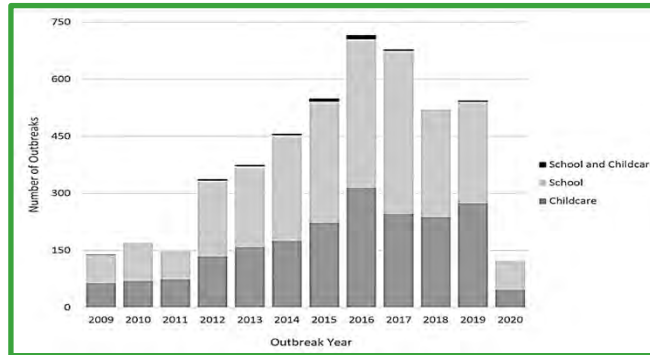
<https://www.cdc.gov/foodsafety/outbreaks/index.html>

<https://www.fda.gov/food/recalls-outbreaks-emergencies/outbreaks-foodborne-illness>



Childcare and School Acute Gastroenteritis Outbreaks, 2009-2020

Most outbreaks were caused by Norovirus and Shigella spp. and spread via person-to-person transmission



https://stacks.cdc.gov/view/cdc/126388/cdc_126388_DS1.pdf



FDA Foodborne Illness Risk Factor Study for Schools

Improper holding/time and temperature (66.2%) and poor personal hygiene (57.5%) were the top 2 foodborne illness risk factors that were out of compliance in schools

Foodborne Illness Risk Factor	Schools (# OUT)	Total Obs. (IN & OUT)	% OUT
Poor Personal Hygiene	231	402	57.5%
Contaminated Equipment	145	402	36.1%
Improper Holding/Time and Temperature	266	402	66.2%
Inadequate Cooking	13	263	4.9%

<https://www.fda.gov/science-research/fda-science-forum/2023-fda-science-forum-06132023>



The Burden of Norovirus in the USA

Norovirus causes 58% of foodborne illnesses in the United States



*Estimates of the annual number of illnesses and associated outcomes of norovirus disease in the U.S., across all age groups.

<https://www.cdc.gov/norovirus/burden.html>



Strategies to Reduce the Risk of Norovirus



- Effective surface cleaning and sanitizing
- Proper hand hygiene
 - **handwashing**
 - **no bare hand contact with ready to eat foods**
 - **glove use**
- Exclusion and restriction of ill food employees

<https://www.fda.gov/food/cfsan-risk-safety-assessments/risk-assessment-norovirus-transmission-food-establishments>



The Bottom Line

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Produce safety is important and food safety hazards can be minimized to ensure that food we serve to students is safe to eat.



Questions

INSERT "Food Safety Activity" TAB

Produce Safety University

Epidemiological Investigation

Activity

Objectives:

- Simulate an epidemiological investigation that would follow a foodborne illness outbreak, including identifying the cause/source of the outbreak.
- Discuss institutional food safety concerns.

Instructions:

Form small groups of 3-4 people. Designate one cook, and two or more investigators.

Only the cook should read the notes on page 6.



Scenario:

- The George Washington Elementary School had a lunchtime Field Day school picnic on September 19th with the menu items shown above.
- Following the picnic, students started reporting similar symptoms: abdominal cramps, diarrhea, fever, and vomiting.
- **If you are the cook:** Proceed to the confidential information on page 6.
- **If you are an investigator:** Continue reading for your instructions. Do not read beyond page 5.

Investigator Instructions

Foodborne illness is suspected, so your team of investigators is called in three days later on September 22nd. Get ready to investigate. Good luck!

- Your fellow investigators already interviewed all the teachers and students who attended the picnic on September 19th. They compiled a chart showing all of the foods eaten by students and teachers at the picnic. This chart also reports who got sick, as well as who did not (page 3).
- You received an organism chart to help identify which organism caused the foodborne illness (page 4).
- Your fellow investigators also plotted the time of incidence for new foodborne illness cases. This epi curve (page 5), combined with the organism chart (page 4), can help you develop a hypothesis (proposed explanation) about the type of pathogen causing the illness.

Step 1

Your goal is to form a hypothesis regarding the food item that contained the pathogen, the pathogen that caused illness, and the likely cause of contamination.

- To determine the food source of the outbreak, look at the chart on page 3.
- To determine the organism causing the outbreak, compare the signs and symptoms given with the chart on page 4.
- To determine the exact organism causing the outbreak, compare the time of onset column on the organism chart listed on page 4 with the epi curve on page 5.

Step 2

- Prepare to interview the cook. Interview questions have been provided to help you get started. Add others if appropriate and necessary.
- While interviewing the cook, record potential food safety violations and/or risks.

Sample Cook Interview Questions

- What foods did you need to cook? What foods were ready to eat?
- At what points in preparing the food did you wash your hands?
- Was there any bare hand contact with any ready to eat foods?
- At what points in preparing the food did you sanitize any knife and cutting board used?
- Did you take any food temperatures? Which food item did you check the temperature of?
- What time did you start and finish serving lunch?

Step 3

- Discuss the hypothesis you developed in Step 1 with the cook.
- Based upon the information learned from the cook, what actions may have led to the outbreak?

The facilitator will call you back together for a large group discussion.

In Epidemiology, an **attack rate** is defined as the proportion of those who became ill after a specified exposure. To identify the potential vehicle in a foodborne disease outbreak, **the food-specific attack rate** is often calculated, which is the attack rate for consumption of a specified food, calculated as:

$$\frac{\text{\# of sick people among those who ate food "X"}}{\text{Total \# of people who ate food "X"}}$$

To discover the source of the illness, a second attack rate must be calculated for those who did not eat food "X". **Relative risk**, or risk ratio, is a method used to determine the likelihood of an event (e.g., disease) occurring in an exposed group versus an unexposed group. The two attack rates can be compared with each other to determine relative risk, which is calculated as:

$$\frac{\text{Attack rate among eaters}}{\text{Attack rate among non-eaters}}$$

For example, you can interpret the relative risk for ranch dressing as "those who ate ranch dressing were about 1 times as likely (or equally likely) as those who did not eat ranch dressing to become ill". Therefore, the ranch dressing is unlikely to be the cause of the contamination. Comparing the attack rate for those who ate the food to those who did not helps to determine the cause of the illness.

Food Item	Number of people who ate specific food item				Number of people who did not eat specific food item				Relative Risk
	Sick	Well	Total	Attack Rate	Sick	Well	Total	Attack Rate	
Chicken	40	94	135	30%	53	112	165	32%	0.94
Whole Wheat Sandwich Buns	37	109	146	25%	42	112	154	27%	0.93
Lettuce for sandwiches	41	70	111	37%	68	121	189	36%	1.03
Tomatoes for sandwiches	38	84	122	31%	51	127	178	29%	1.07
Ranch Dressing	40	110	150	27%	40	110	150	27%	1.00
Mixed Greens Salad	77	26	103	75%	14	183	197	7%	10.71
Carrots	30	160	190	16%	12	98	110	11%	1.45
Fruit Salad	110	22	132	83%	6	162	168	4%	20.75
Milk	78	220	300	26%	0	0	0	-	-



Organism	Illness Onset time	Signs and Symptoms	Food Sources
Norovirus	12-48 hours	Nausea, vomiting, abdominal cramps, diarrhea, fever, headache	Raw produce, contaminated drinking water, uncooked/cooked foods that are not reheated after contact with an infected food handler, shellfish from contaminated waters
Salmonella	6-48 hours	Diarrhea, fever, abdominal cramps, and vomiting	Eggs, poultry, meat, raw milk/juice, cheese, contaminated raw fruits and vegetables
Clostridium perfringens	8-16 hours	Severe abdominal cramps and watery diarrhea	Meats, poultry, gravy, dried/precooked foods, time/temperature-abused foods
Campylobacter jejuni	2-5 days	Diarrhea (possibly bloody), abdominal cramps, fever, and vomiting	Raw/undercooked poultry, raw milk, contaminated water
Staphylococcus aureus	1-6 hours	Sudden and severe nausea and vomiting, abdominal cramps, possible diarrhea and fever	Unrefrigerated/improperly refrigerated meats, potato/egg salads, cream pastries
E. coli O157:H7	1-8 days	Severe diarrhea (often bloody), abdominal pain, vomiting, possible kidney failure	Undercooked beef (e.g., hamburger) raw milk/juice, raw fruits and vegetables, contaminated water/food

*Most organisms can also cross contaminate other foods such as fresh produce

Sources:

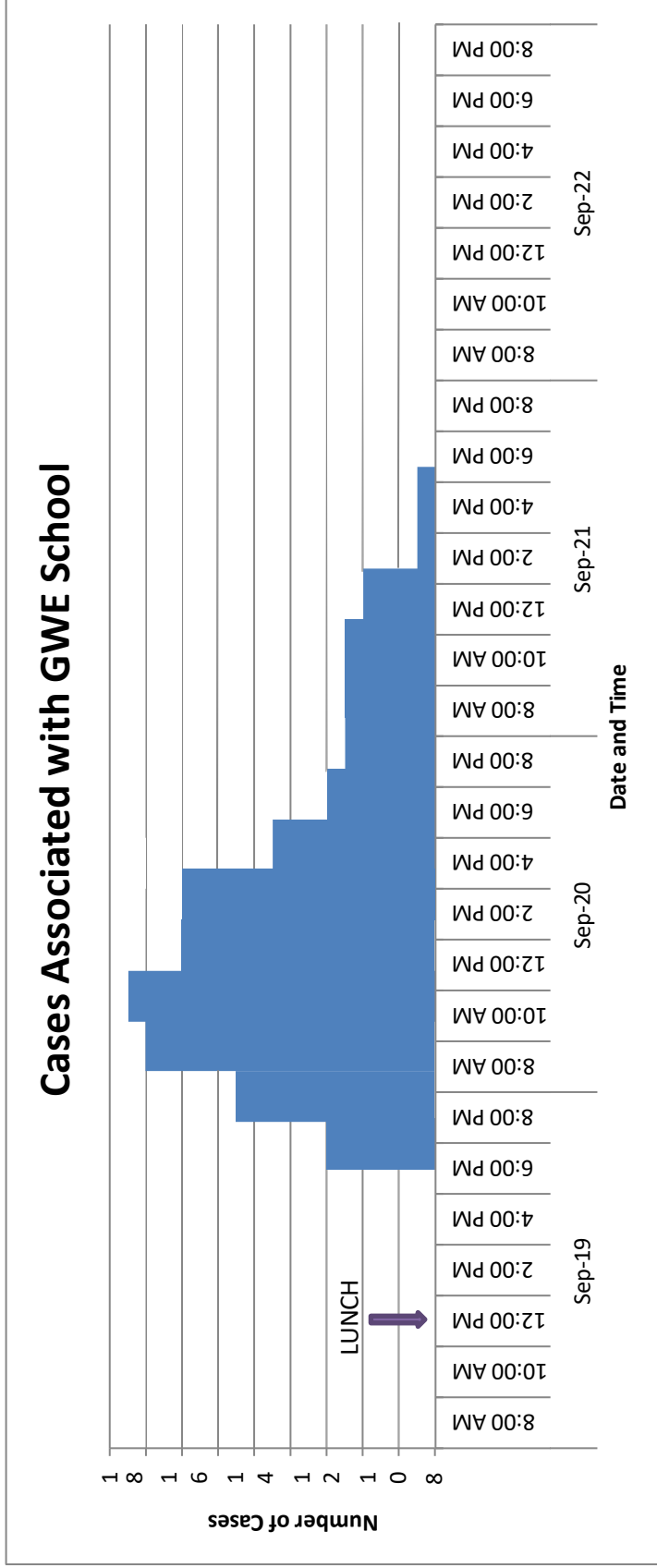
[Foodborne Illness-Causing Organisms in the U.S. What You Need to Know about Foodborne Illnesses](#) | [FDA](#)



Epidemic Curves

An epidemic (epi) curve is a **visual display of the onset of illness among cases** associated with an outbreak. It can show the distribution of cases over time, “outliers” or cases that stand apart from the overall pattern, the magnitude, the pattern of spread, and the most likely time of exposure. An epidemic curve can help determine the pathogen causing the illness. For example, an illness that takes 24 hours to show symptoms is unlikely to have many cases 6 hours after exposure.

In **point source outbreaks**, individuals are exposed to the same source during a brief time, such as a single meal or event, and there’s a rapid rise in cases to a peak and a gradual fall. In **continuous common source outbreaks**, there is exposure to the same source that is prolonged for days, weeks, or longer. The epi curve rises gradually and might plateau. In **propagated outbreaks**, there is no common source because of person-to-person spread. There is a classic epi curve shape of progressively taller peaks, each being one incubation period apart, versus one sharp peak in the number of cases.



Cook Instructions

There is a suspected outbreak of foodborne illness in your school. Investigators will come to interview you shortly. Familiarize yourself with your notes below so you can answer their questions.



- I ordered all of the food for the picnic, including frozen raw chicken cutlets, bags of mixed greens lettuce salad, whole grain buns, pre-packaged bags of baby carrots, heads of lettuce, and whole apples, grapes, and melons for the fruit salad. We already had individual packages of ranch dressing. The day before the picnic I put the chicken cutlets into the fridge to thaw.
- We received the tomatoes from the school garden. We partner with a local farmer to teach the kids how our food is grown and the day before our picnic, the 5th grade science class harvested the tomatoes for our Field Day event.
- On the day of the picnic, I arrived to work around 7:00 AM. I washed my hands before I started to prepare the food. I went to the walk-in refrigerator to get the lettuce, tomatoes, and the salad mix. I gathered a cutting board, my favorite knife, 2 colanders, and some other utensils that were cleaned in the warewashing machine the day before at the end of the shift.
- I washed the heads of lettuce and the tomatoes under cool, running water in the colander in the prep sink. I used the cutting board and my favorite knife to cut the lettuce and tomatoes up to use on sandwiches.
- I went to the fridge to get the chicken. I used the cutting board and knife to cut up the chicken cutlets; one cutlet was big enough to make two sandwiches. I wiped my hand off with a clean paper towel.
- I opened the bagged salad mix and emptied the bag into a large bowl. I added the rest of the cut-up lettuce to the bowl with the bagged salad mix. I tossed the salad in the bowl with my hands to mix it all together.
- I gathered the fruits from the dry storage room and walk in cooler. I washed the fruits under cool, running water using the second colander in the prep sink. I used the cutting board and knife to slice up the fruits. After slicing up the fruits, I sanitized my cutting board and knife.
- I prepared and grilled the chicken. I checked the temperature; when the cutlets reached 165 degrees F I knew they were done. I prepared and roasted the baby carrots in the oven; they reached 135 degrees F so I knew they were ready. After cooking the chicken and roasting the carrots, I washed my hands.
- We had a large turnout for the picnic-about 300 teachers and students attended. We began to set up the food around 11:30 AM. We began to serve lunch at noon and served the final student a few minutes after 1:00 PM.



Cook Instructions

Review the following interview questions that an investigator may ask and note your responses.

- What foods did you need to cook? What foods were ready to eat?
- At what points in preparing the food did you wash your hands?
- Was there any bare hand contact with any ready to eat foods?
- At what points in preparing the food did you sanitize any knife and cutting board used?
- Did you take any food temperatures? Which food item did you check the temperature of?
- What time did you start and finish serving lunch?

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	<i>B. cereus</i> 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	<i>E. coli</i> 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 <i>E. coli</i> 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	24-48 hrs	Abdominal cramps, fever, and diarrhea. Stools may contain blood and mucus	4-7 days	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	<i>V. parahaemolyticus</i> 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	<i>V. vulnificus</i> 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)

INSERT "Growing Food Safely" TAB





Growing Food Safely

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USDA
United States Department of Agriculture

Objectives

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-  Identify best growing practices on the farm to reduce the risk of foodborne illness.
-  Explain the complexities and challenges of food safety in the global food supply.

Decorative icons at the bottom of the slide.

Key Points to Consider

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Key Points

What

Good Agricultural Practices (GAPs) are required by the FSMA Produce Safety rule and are important tools to identify and help reduce the risks of foodborne illness through the assessment of operations, training programs, monitoring and evaluation program, and more.



Key Points to Consider

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Key Points

Why

- Understanding GAPs and their impact on food safety supports safe meals for students. Since produce is often eaten fresh, there is no kill step to protect the consumer from foodborne illness.
- There are various potential sources of contamination in growing areas, this presentation highlights several of those sources and how GAPs can mitigate contamination.

How

- Resource For Implementation: **Good Agricultural Practices (GAP) Audits**
(<https://www.ams.usda.gov/services/auditing/gap-ghp>)




Good Agricultural Practices (GAPs)

Let's Test What You Know!

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Which of the following areas of potential foodborne contamination has had the largest impact on pathogen transfer?

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



Decorative icons at the bottom of the slide.

Let's Test What You Know!

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UNIVERSITY

What are the top reasons a food might be recalled?

1. Defective, adulterated, allergen, and or contaminated
2. Misbranded, under weight, under size
3. Mislabeled, immature, overmature



Let's Test What You Know!

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What is the most common cause of food recalls?

1. Listeria
2. Salmonella
3. Food packaging
4. Presence of undeclared allergens



Let's Test What You Know!

Leading cause of food recalls in the U.S.



A New Era of Produce Safety



FDA FOOD SAFETY
MODERNIZATION ACT

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

- **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
- **All** melons such as cantaloupe, honeydews, variety melons and watermelons
- **Vegetables** such as tomato, summer squash, broccoli, cabbage, onions, etc.



Crops Not Covered Under the Rule



Crops Not Covered Under the Rule

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Rarely Consumed Raw:

- Fruits such as sour “tart” 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

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Current Good Agricultural Practices

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USDA Fresh Audit Types

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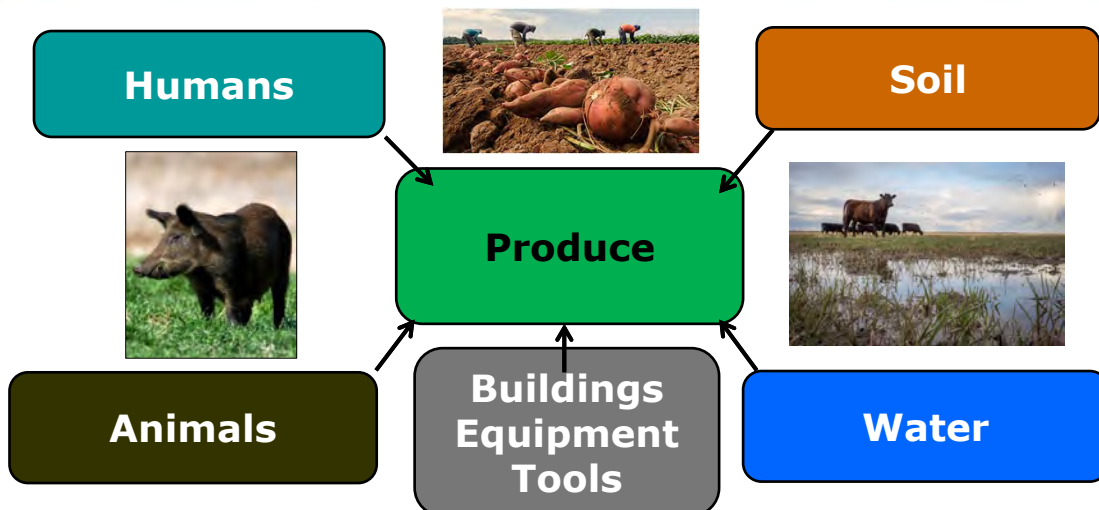
- **USDA GAP&GHP Audit**
- **Harmonized GAP Audit**
- **Group GAP**
- **Mushroom GAP**
- **Arizona (LGMA)**
- **California (LGMA)**



Conducting a Food Safety Audit

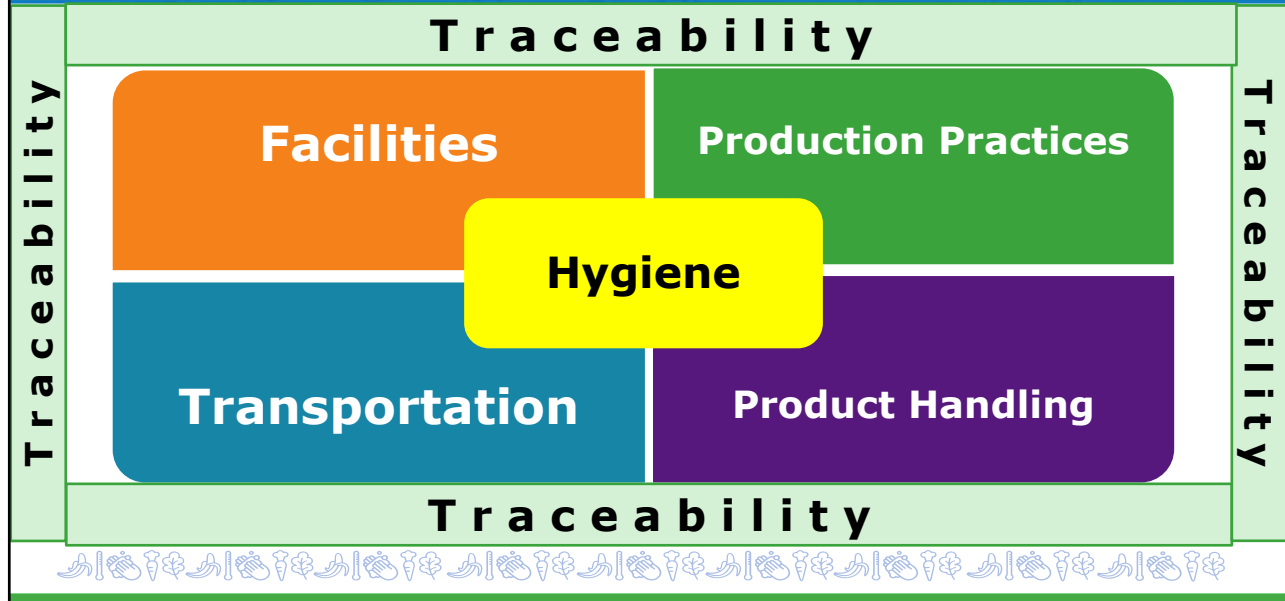


How Contamination is Spread



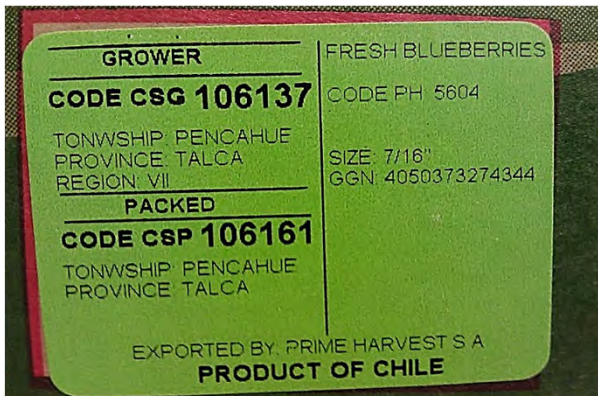
GAP Major Areas

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Traceability

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Traceability

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- One step **forward**, one step **back**
 - Bar Coding
 - Sequential Numbering
 - Positive Lot Id (PLI)
- Product Recall – Successful “mock”



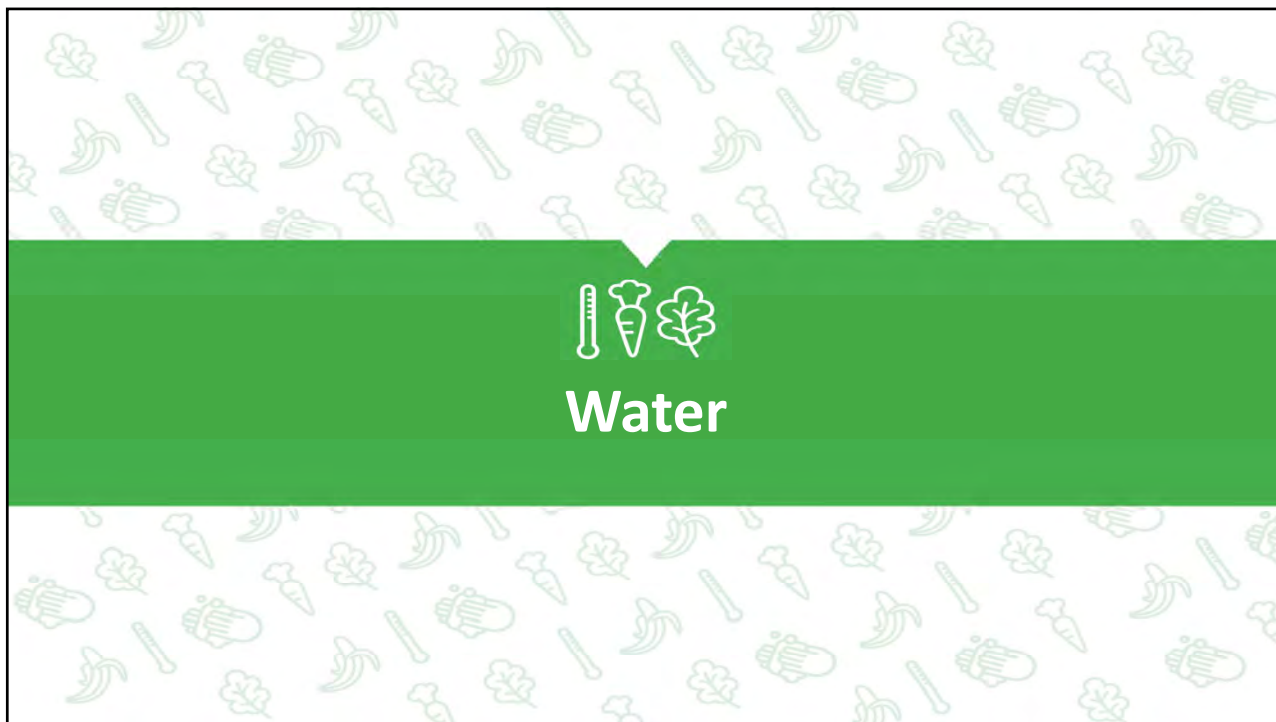
Reducing Risks

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Reduce contamination risks using:

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





Sources of Contamination

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Water

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



Sources of Contamination

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Production Contamination Sources

- Irrigation, crop sprays, frost protection, flood events

Postharvest Contamination Sources

- Fluming, cooling, washing, waxing, cleaning



FSMA - Agricultural Water

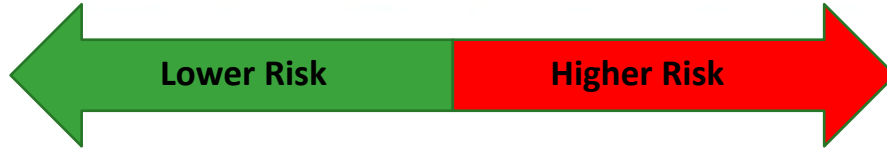
Definition:

“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 FSMA rule



Probability of Contamination



Public Source



Treated

Ground



Protected

Surface



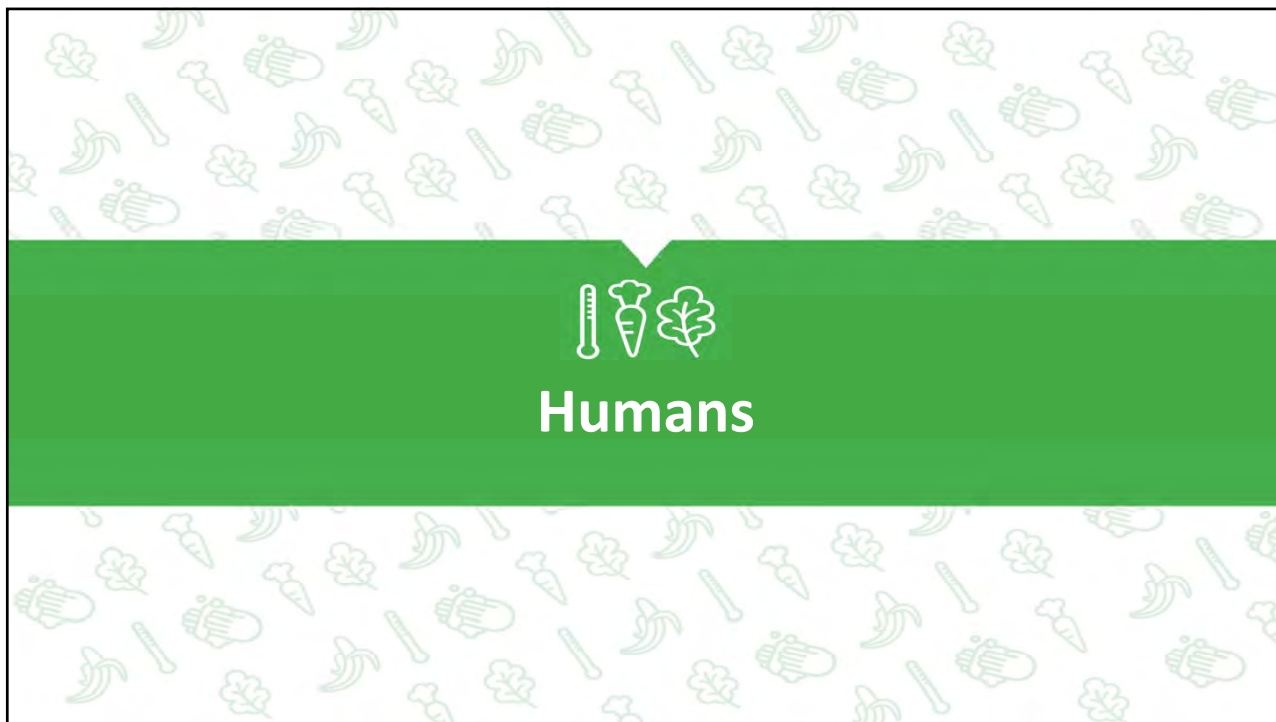
Open to Environment



Postharvest Water

Every food safety risk in the field cannot be eliminated. Postharvest water has the **potential** to spread contamination widely.





Sources of Contamination: Workers

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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



Sources of Contamination: Visitors

Visitors should be trained in food safety practices.



Soil

Sources of Contamination: Soil Amendments

Soil Amendments:

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

Examples:

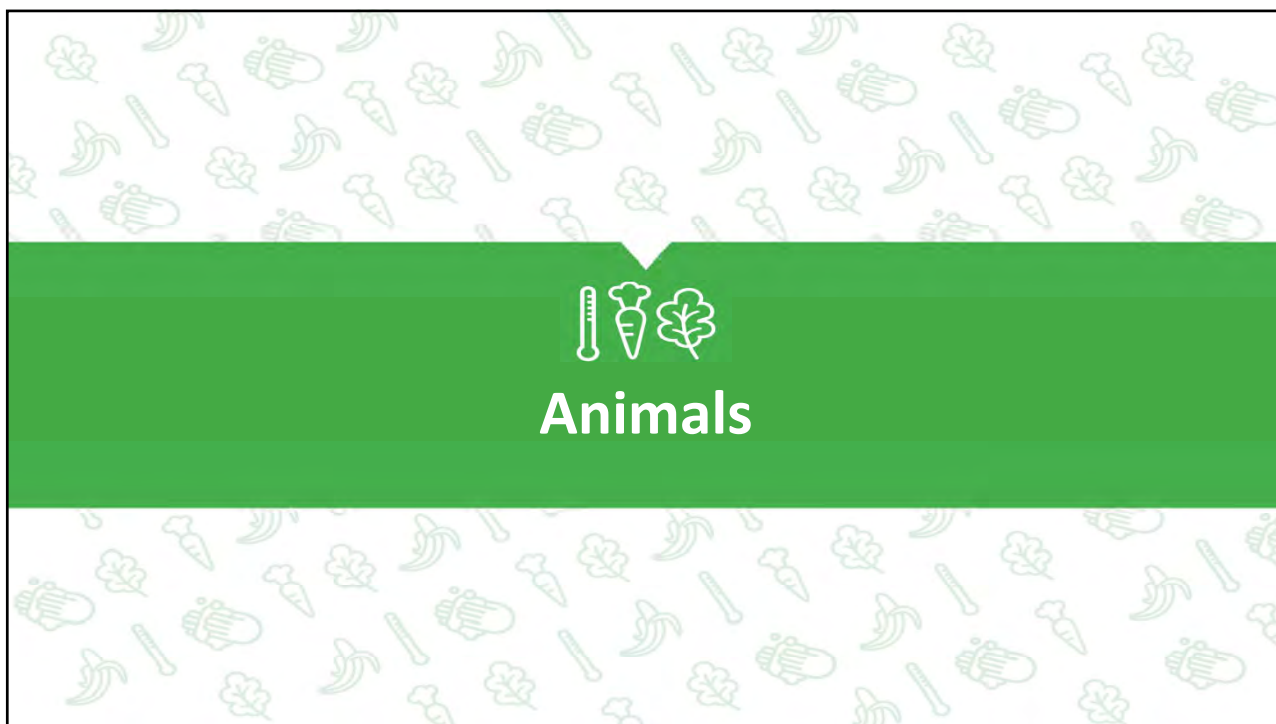
- Fertilizers
- Stabilized compost
- Manure
- Non-fecal animal byproducts
- Peat moss
- Vegetable waste
- Sewage sludge biosolids
- Table waste
- Agricultural tea and yard trimmings



Manure & Compost

- **Risk assessment** – 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)





Sources of Contamination: Animals

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Domestic and wild 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, and Tools

Sources of Contamination: Equipment

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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


All About Distribution

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Produce Distributors must adhere to FSMA rules including:

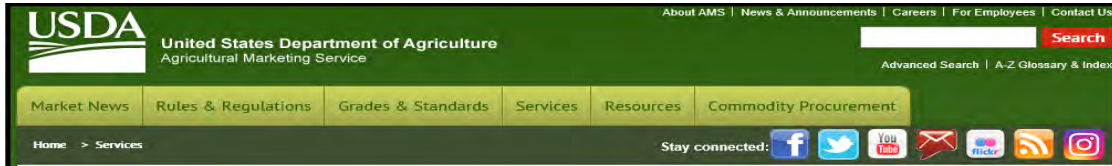
- Current Good Manufacturing Practices (cGMP)
- Food Traceability
- Food Defense (intentional contamination)
- Sanitary Transportation



Locating GAP Audited Growers

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<https://www.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



Locating GAP Audited Growers

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Country: Location:

1 of 2 ? Find | Next

USDA United States Department of Agriculture
AMS Fruit & Vegetable Programs

Companies that Meet USDA GAP&GHP Acceptance Criteria

Location Categories: United States, Canada
Locations: All Locations

The following table shows companies that have been audited by the USDA Agricultural Marketing Service, Fruit and Vegetable Programs for the audit type, audit scopes, and commodities listed below and have successfully demonstrated an acceptable level of adherence to the audit standard being audited. The audit results are valid for one (1) year from the date shown, and are validated through the use of unannounced audit(s) throughout the growing/packing season.

Company :	Address :	City, State :	Audit Type :	Scope(s) of Audit : Conducted	Date Audit : Conducted	Commodities Covered : by Audit
United States						
Alabama						
123	-	-	Produce GAPs Harmonized Audit	Field Operations and Harvesting	September 15, 2022	Bananas, Beets
Big Charlies Produce, LLC	2274 Halls Mill Road	Mobile, AL	USDA Good Agricultural Practices & Good Handling Practices Audit	Preventive Food Defense, Wholesale Distribution Center/Terminal Warehouses	July 13, 2022	Various Fruits and Vegetables
Boahright Farms LLC - (Harmonized GAP Plus+)	1799 County Road 42	Steele, AL	Produce GAPs Harmonized Audit	Field Operations and Harvesting	August 24, 2022	Tomatoes
Danny Dickie Farms	1284 Putman Rd.	Oneonta, AL	USDA Good Agricultural Practices & Good Handling Practices Audit	Farm Review, Field Harvesting and Field Packing Activities, Storage and Transportation	October 13, 2021	Tomatoes



Buying Local Checklist



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



Summary



Identified on the farm best growing practices for fresh produce to reduce the risk of foodborne illness.



Reviewed previously voluntary growing practices and Good Agricultural Practices that are now required by the FSMA.





INSERT "GAPs Activity" TAB



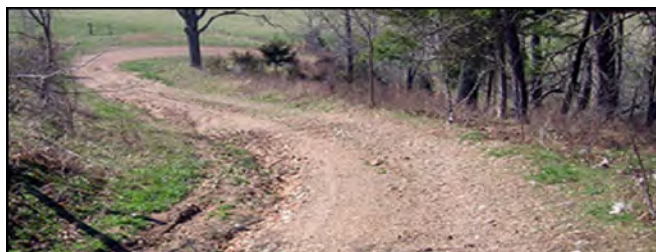
Good Agricultural Practices (GAPs) Activity

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 AM 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.



SCENARIO - Farm Visit Observations

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 restrooms are clean, have adequate supplies, and provide clean 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 that are 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 that 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: Tom Mato Farms								
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			
7/18/2020	Packing Table	Tested, within tolerance		Pressure washed, sanitized with bleach	Shelves Sanitized floor mopped	7/18/2020	Bleach	Molly Mato



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

SCENARIO - Farm Visit Observations

Compost pile, adjacent growing field.



Irrigation water



Group #1 Question

What GAP practices does the farm do well?

Group #2 Question

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

How can they be addressed?

SCENARIO - Farm Visit Observations

Group #3 Question

What are the food safety concerns concerning animals?

How can they be addressed?

Group #4

What are the food safety concerns concerning the packing area?

How can they be addressed?

Group #5

Is the food safety documentation adequate and sufficient?

Are there areas in need of improvement?

Group Conversation

What additional questions should Sally ask?

Would you buy from this farm?

Production Practices	Yes	No	N/A
Are wells protected from contamination?			
What is the source of irrigation water? <input type="checkbox"/> Well <input type="checkbox"/> Stream <input type="checkbox"/> Pond <input type="checkbox"/> Municipal <input type="checkbox"/> Other _____			
What method(s) of irrigation is used on the farm? <input type="checkbox"/> Drip <input type="checkbox"/> Overhead <input type="checkbox"/> Flood Note: <i>Drip is recommended for leafy greens.</i>			
Are generic <i>E. coli</i> tests conducted on agricultural water used in fields?			
What types of manure are used on produce crops? <input type="checkbox"/> Raw manure <input type="checkbox"/> Composted <input type="checkbox"/> Aged <input type="checkbox"/> No manure is used			
Is the manure composted onsite or purchased commercially? <input type="checkbox"/> Onsite composting <input type="checkbox"/> 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? <input type="checkbox"/> Well <input type="checkbox"/> Municipal <input type="checkbox"/> Other			
Is this water source tested for generic <i>E. coli</i> 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.

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Understanding FSMA: The Produce Safety Rule

Discussion of farming activities and produce covered in the Produce Safety Rule under the Food Safety Modernization Act (FSMA), key requirements, possible exemptions, and deadlines for compliance.



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).
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.

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](#). In Pennsylvania, Penn State Extension offers regular produce safety certification courses. Visit the [Penn State Extension FSMA website](#) 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

FDA initially required growers to periodically monitor the quality of pre- and postharvest agricultural water through microbiological testing. However, in 2024, FDA revised its requirements for evaluating the safety of agricultural water.

Testing pre-harvest agricultural water for generic *E. coli* concentration is no longer required, although it is a regulatory option for some situations and can be helpful in identifying trends. FDA's new approach is that water test results are not to be used as the sole factor when making use decisions for pre-harvest agricultural water. Instead, the new ruling places more emphasis on considering factors such as the location and nature of the water source, how it is applied, and surrounding the environment. A pre-harvest agricultural water assessment must now be at least once a year. Compliance dates start April 07, 2025 for farms that sell more than \$500,000 total food per year (three-year rolling average) and are staggered by business size class, as in other parts of the Produce Safety Rule. FDA indicates there may be updates to this revision as they obtain more data.

Sanitizers may continue to be used 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.

[FDA resources on the new ruling](#) include a summary of factors to consider are online and an "[Agricultural Water Assessment Builder](#)" decision making tool.

Visit the [FDA FSMA Final Rule on Pre-Harvest Agricultural Water page](#) for more information.

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	1/26/2024
Small	More than \$250,000 up to \$500,000	1/28/2019	1/26/2023
Other	More than \$500,000	1/26/2018	1/27/2022

*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](#).

Additional Resources

[Produce Safety. Pennsylvania Department of Agriculture](#) State implementation of the FDA Produce Safety Rule, documents and forms, contacts

[The Produce Safety Alliance](#). Cornell University. 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). 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](#). 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.

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Code: ART-5277

INSERT "Farm to School" TAB



Farm to School

Safely Sourcing Local Foods

**PRODUCE SAFETY
UNIVERSITY**



United States Department of Agriculture

Objectives

**PRODUCE SAFETY
UNIVERSITY**



Understand the concept of farm to school.



Understand food safety practices for handling fresh produce and learn how they apply to locally sourced foods.



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.



Key Points

What

- Farm to school promotes a healthy and diverse diet.
- Local produce (including school gardens) help meet meal pattern requirements and assist in creating markets for local farmers.
- Soil and water conditions, harvesting techniques, documentation, and specifications play important roles in ensuring the safety of produce procured locally, or grown in a school garden.

Why

- Buying locally will support your community, producers, and children and help you consistently satisfy the Buy American requirement.
- Greater transparency and predictability of local procurement may alleviate issues caused by supply chain disruptions.

How

- Resources for Implementation: www.fns.usda.gov/f2s/farm-to-school
- Farm to School Regional Specialists



Efforts including:

- Bringing locally or regionally produced foods into child nutrition programs (i.e., school cafeterias)
- Hands-on learning activities
- The integration of food-related education into school curriculum



Poll

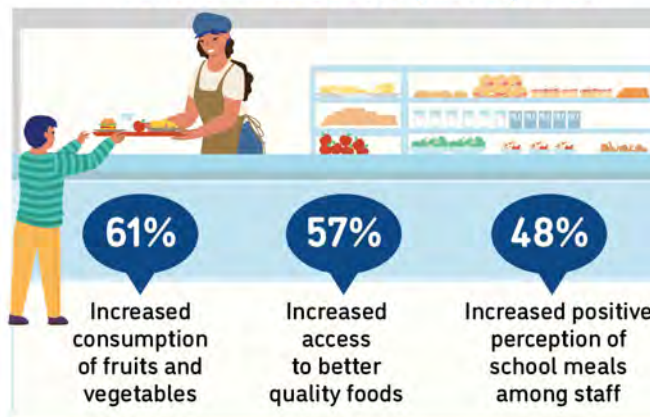
Does your school nutrition program participate in farm to school or buy locally grown produce?

- 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.



Positive outcomes of SFAs from farm to school participation



Defining Local

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



- ✓ Through distributors
- ✓ Through food service management companies
- ✓ From food processors
- ✓ Through USDA DoD Fresh
- ✓ From individual producers
- ✓ From producer co-ops/food hubs
- ✓ From school gardens





USDA Requirements **PRODUCE SAFETY UNIVERSITY**

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

Important Schools determine their own food safety standards for produce, in accordance with state and local regulations.

Decorative footer icons: a row of small, repeating icons of a hand holding a leafy green vegetable.

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!



Potential Food Safety Risks in Farm to School

PRODUCE SAFETY
UNIVERSITY

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



Soil



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



Design



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



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

Harvest protocols include:

- Healthy harvesters
- Hand washing
- Clean harvest tools
- Observation for contaminants
- Harvesting into clean, food grade containers that are kept off ground
- Minimal produce washing
- Proper storage/cooling
- **Detailed Documentation!**



Know Your Produce!



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



Training



- Farm employees
- Volunteers
- Students
- Teachers
- Harvesters
- Cafeteria Staff
- Custodial Staff



Important

Documentation basics:

- 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.)



Writing Specifications for Local Foods

New Expanded Flexibility

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Geographic Preference Option

Allows program operators to target local foods in their specifications for unprocessed agricultural products.



Unprocessed Agricultural Products

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➤ “Unprocessed agricultural products” that retain their inherent character:

- **ALLOWED:**
 - Cooling, refrigerating, or freezing;
 - Peeling, slicing, dicing, cutting, chopping, shucking, and grinding;
 - Drying and dehydrating;
 - Washing, packaging, vacuum packing, and bagging; and
 - Adding preservatives to prevent oxidation
- **NOT ALLOWED:**
 - Heating, cooking, or canning



Writing Specifications for Local Food

Two Strategies

- Use a defined scoring advantage
 - Includes the program operator's definition of local for the specific product(s)
 - Decide how much preference local products will receive
 - Be clear in the solicitation how the preference will be applied

- Use local as a specification
 - Includes the program operator's definition of local for the specific product(s)
 - Requires unprocessed agricultural products to be local
 - Uses language like locally grown, locally caught, or locally raised in the specification



Geographic Preference Solicitation Example: Defined Scoring Advantage

	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



Tiered Approach

- 15 points = Sources over 70% within the state
- 7 points = Sources over 50 - 69% within the state
- 5 points = Sources over 25 - 49% within the state



Example: Local as a Specification

Original Specification:

- Apples, fresh, 125-138 count, whole and free from decay, injury, or disease.

Revised Specification:

- **Local** apples, fresh, 125-138 count, whole and free from decay, injury, or disease.
- Must be grown within 200 miles of Imaginary School District's Nutrition Services.



Important Principles and Considerations

- Define or target local to uphold **full and open competition**
- Ensure that an **adequate supply of a local products** exists in the marketplace based on specifications
- Best practice: **“Three bids and a buy”**



Other Considerations

- 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



Geographic Preference Resources

For more information, see:

- [Procuring Local Foods](#) (web page)
- [Geographic Preference Expansion Related to the Final Rule titled, Child Nutrition Programs: Meal Patterns Consistent With the 2020-2025 Dietary Guidelines for Americans](#) (memorandum)
- [Geographic Preference Option Question & Answer](#) (memorandum)



USDA Farm to School Specialists

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<https://www.fns.usda.gov/cfs/usda-farm-school-staff>

Resources

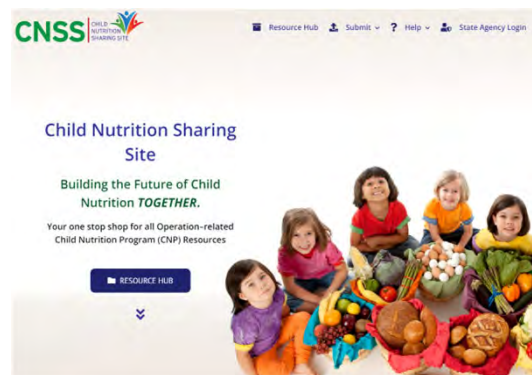
Procuring Local Foods for Child Nutrition Programs Guide

www.fns.usda.gov/f2s/procuring-



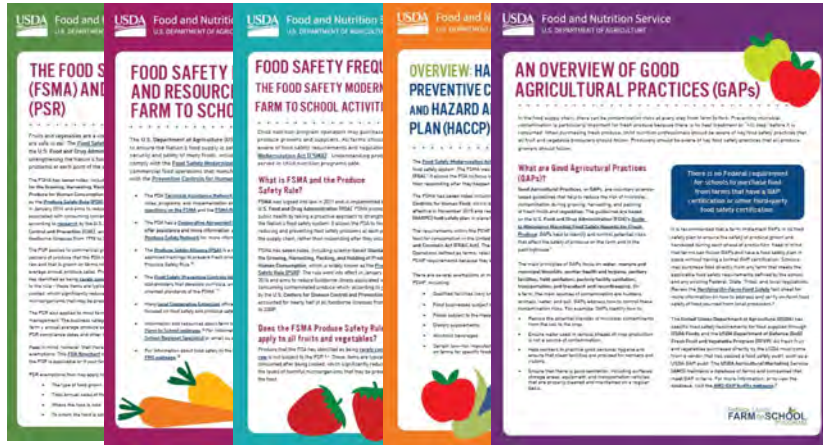
ICN Child Nutrition Sharing Site

[https://theicn.org/cnss/re
sources](https://theicn.org/cnss/resources)



Food Safety Fact Sheets

PRODUCE SAFETY UNIVERSITY

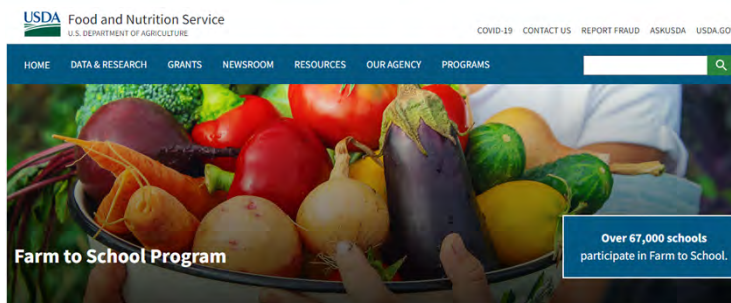


- For schools and producers
- Cover food safety rules and guidance
- Answer commonly asked questions
- www.fns.usda.gov/f2s/fact-sheets



Community Food Systems Division

PRODUCE SAFETY UNIVERSITY



Visit our website!

www.fns.usda.gov/f2s/farm-to-school





Questions?

INSERT "Farm to School Resources" TAB

GARDEN SAFETY CHECKLIST

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



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.		
Water & Irrigation	13	Harvested items are labeled and properly stored prior to use in cafeteria or otherwise consumed.		
	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.		
Health	27	Bees are placed in a low traffic section of the garden that receives excellent sunlight.		
	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.		





FOOD SAFETY INFORMATION AND RESOURCES FOR THE FARM TO SCHOOL COMMUNITY



* * * * *

The **U.S. Department of Agriculture (USDA)** works with the **U.S. Food and Drug Administration (FDA)** to ensure the Nation’s food supply is safe. The FDA is the Federal agency responsible for ensuring the security and safety of many foods, including fresh fruits and vegetables. Many farms are required to comply with the [Food Safety Modernization Act \(FSMA\)](#) and [Produce Safety Rule \(PSR\)](#) and many commercial food operations that manufacture, process, pack, or hold human food are required to comply with the [Preventive Controls for Human Food Rule \(PCHF\)](#).^{1,2,3}

- The FDA [Technical Assistance Network \(TAN\)](#) is a central source of information for questions related to the FSMA rules, programs, and implementation strategies.⁴ Answers have been provided in response to [frequently asked questions on the FSMA](#) and the [FSMA Rules and Guidance for Industry](#) can also be used to find answers to questions.^{5,6}
- The FDA has a [Cooperative Agreement Program](#) with many States to implement the PSR. Your [State agency](#) may offer assistance and more information, and if this does not apply to your State or territory, you can visit the FDA [Produce Safety Network](#) for more information.^{7,8,9}
- The [Produce Safety Alliance \(PSA\)](#) is a collaboration between Cornell University, the FDA, and the USDA which offers approved trainings to prepare fresh produce growers to meet the regulatory requirements included in the FSMA Produce Safety Rule.¹⁰
- The [Food Safety Preventive Controls Alliance \(FSPCA\)](#) is an alliance consisting of industry, academic and government stakeholders that develops curricula, and training and outreach programs to support compliance with the prevention-oriented standards of the FSMA.¹¹
- Many [local Cooperative Extension](#) offices provide information about available resources and training opportunities focused on food safety and produce safety.¹²
- Information and resources about farm to school activities can be found on the [USDA Food and Nutrition Service \(FNS\) Farm to School webpage](#).¹³ For information about local foods or school gardens, contact your [USDA FNS Farm to School Regional Specialist](#) or email us at SM.FN.FarmToSchool@usda.gov.¹⁴
- For information about food safety in the Child Nutrition Programs, visit the [USDA FNS Food Safety: Food Safety at FNS webpage](#).¹⁵





References

- (1) *Full Text of the Food Safety Modernization Act (FSMA)*
www.fda.gov/food/food-safety-modernization-act-fsma/full-text-food-safety-modernization-act-fsma
- (2) *FSMA Final Rule on Produce Safety*
www.fda.gov/food/food-safety-modernization-act-fsma/fsma-final-rule-produce-safety
- (3) *FSMA Final Rule for Preventive Controls for Human Food*
www.fda.gov/food/food-safety-modernization-act-fsma/fsma-final-rule-preventive-controls-human-food
- (4) *FSMA Technical Assistance Network (TAN)*
www.fda.gov/food/food-safety-modernization-act-fsma/fsma-technical-assistance-network-tan
- (5) *FSMA Frequently Asked Questions*
www.fda.gov/food/food-safety-modernization-act-fsma/frequently-asked-questions-fsma
- (6) *FSMA Rules and Guidance for Industry*
www.fda.gov/food/food-safety-modernization-act-fsma/fsma-rules-guidance-industry
- (7) *FDA-State Produce Safety Implementation Cooperative Agreement Program*
www.fda.gov/ForFederalStateandLocalOfficials/FundingOpportunities/GrantsCoopAgrmts/ucm517991.htm
- (8) *FoodSafety.gov State Agency Information*
www.foodsafety.gov/about
- (9) *FDA Produce Safety Network*
www.fda.gov/food/food-safety-modernization-act-fsma/produce-safety-network
- (10) *Produce Safety Alliance (PSA)*
producesafetyalliance.cornell.edu/
- (11) *Food Safety Preventive Controls Alliance (FSPCA)*
www.ifsh.iit.edu/fspca
- (12) *Local Cooperative Extension Offices*
www.nifa.usda.gov/land-grant-colleges-and-universities-partner-website-directory
- (13) *USDA Food and Nutrition Service (FNS) Farm to School Webpage*
www.fns.usda.gov/f2s/farm-to-school
- (14) *USDA FNS Farm to School Regional Specialists*
www.fns.usda.gov/f2s/usda-farm-school-staff
- (15) *USDA FNS Food Safety: Food Safety at FNS webpage*
www.fns.usda.gov/fs/food-safety



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For more information and to sign up for The Dirt, the e-newsletter from the Patrick Leahy Farm to School Program, visit

www.fns.usda.gov/f2s/e-letter-archive.

Questions? Email us at SM.FN.FarmToSchool@usda.gov.



THE FOOD SAFETY MODERNIZATION ACT (FSMA) AND THE PRODUCE SAFETY RULE (PSR)

Fruits and vegetables are a vital component of a healthy diet and it's important that these key sources of nutrition are safe to eat. The [Food Safety Modernization Act \(FSMA\)](#) was signed into law in 2011 and is implemented by the **U.S. Food and Drug Administration (FDA)**.¹ The FSMA protects public health by taking a proactive approach to strengthening the Nation's food safety system. It allows the FDA to focus on reducing and preventing food safety problems at each point of the supply chain, rather than responding after they happen.

The FSMA has **seven rules**, including science-based **Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption**, which is widely known as the [Produce Safety Rule \(PSR\)](#).² The rule went into effect in January 2016 and aims to reduce foodborne illnesses associated with consuming contaminated produce which, according to [research](#) by the **U.S. Centers for Disease Control and Prevention (CDC)**, accounted for nearly half of all foodborne illnesses from 1998 to 2008.³

The PSR applies to commercial growers, harvesters, and packers of produce that the FDA has deemed likely to be eaten raw and that is grown on farms with greater than \$25,000 in average annual produce sales. Produce items that the FDA has identified as being [rarely consumed raw](#) are not subject to the rule - these items are typically consumed after being cooked, which significantly reduces the levels of harmful microorganisms that may be present in the food.⁴

The PSR also applies to most farms that grow, harvest, and pack produce in one general location and under one general management. The business category of covered farms and their PSR compliance dates are based on the farm size and the farm's annual average produce sales of the previous 3-year period. Visit the [FDA webpage](#) for more information about applicable PSR compliance dates and other key requirements.²

Keep in mind, however, that there are some farms and businesses that may be eligible for exemptions. This [FDA flowchart](#) can help you learn more about your farm's status, including if the PSR is applicable or if your farm may be eligible for a full or qualified exemption.⁵

PSR exemptions that may apply to a farm business are generally based on:

- The type of food grown
- Total annual sales of the food (adjusted each year to [account for inflation](#))⁶
- Where the food is sold
- To whom the food is sold

FDA List of Produce Rarely Consumed Raw:

asparagus; black beans, great Northern beans, kidney beans, lima beans, navy beans, and pinto beans; garden beets (roots and tops) and sugar beets; cashews; sour cherries; chickpeas; cocoa beans; coffee beans; collards; sweet corn; cranberries; dates; dill (seeds and weed); eggplant; figs; ginger; hazelnuts; horseradish; lentils; okra; peanuts; pecans; peppermint; potatoes; pumpkins; winter squash; sweet potatoes; and water chestnuts





The following types of produce are typically not covered by the PSR:

- Produce that is rarely consumed raw⁴
- Produce for personal or on-farm consumption
- Produce intended for commercial processing (e.g., cooking), which is covered by a [different FSMA rule](#)⁷
- Produce from farms with full exemptions or qualified exemptions

Full exemption: Farms with annual average produce sales of \$25,000 or less (adjusted for inflation) during the previous 3-year period are not covered by the PSR. These farms should keep records showing their sales information.

Qualified exemption: To be eligible for a qualified exemption, there are two requirements for farms.

- The farm must have food sales averaging less than \$500,000 per year (adjusted for inflation) during the previous 3-year period – these sales include all food for humans and animals, not just fruits and vegetables.

School nutrition programs are considered retail food establishments and are qualified end-users under the PSR.

During the 3-year period, farm sales to **qualified end-users** must be more than the combined sales to all other users ([21 CFR 112.5](#)).⁸ A qualified end-user is either (a) the consumer of the food or (b) a restaurant or retail food establishment that is located in the same State or Indian reservation as the farm, or not more than 275 miles away ([21 CFR 112.3](#)).⁹



- A farm with a qualified exemption must still meet some modified requirements, including disclosing the name and the complete business address of the farm where the produce was grown either on the label of the produce or at the point of purchase. These farms are also required to keep certain records.

As a producer, the PSR should not impact your ability to sell to child nutrition programs. There is no Federal requirement for child nutrition programs to buy from farms that are covered by the PSR. Farms should always follow good food safety practices, whether covered by the PSR or a food safety certification, such as **Good Agricultural Practices (GAP)**.

Federal law does not require schools to purchase from farms with a Good Agricultural Practices (GAP) certification or other third-party food safety certification.

In their solicitations, schools must ensure that vendors comply with all applicable Federal, State, Tribal, and local regulations. Be prepared to provide information about your farm's food safety practices that will help your child nutrition partners ensure that their school receives food that is safe.





References

- (1) *Full Text of the Food Safety Modernization Act (FSMA)*
www.fda.gov/food/food-safety-modernization-act-fsma/full-text-food-safety-modernization-act-fsma
- (2) *FSMA Final Rule on Produce Safety*
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- (3) *CDC Attribution of Foodborne Illness: Findings*
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- (4) *FSMA Produce Safety Rule: "Rarely Consumed Raw" Produce*
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- (5) *Standards for Produce Safety: Coverage and Exemptions Exclusions for 21 Part 112*
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- (6) *FSMA Inflation Adjusted Cut Offs*
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- (7) *FSMA Final Rule on Preventive Controls for Human Food*
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- (8) *FSMA Produce Safety Rule (Final Rule): Which farms are eligible for a qualified exemption and associated modified requirements based on average monetary value of all food sold and direct farm marketing?*
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- (9) *FSMA Produce Safety Rule (Final Rule): What definitions apply to this part?*
www.ecfr.gov/current/title-21/chapter-I/subchapter-B/part-112/subpart-A/section-112.3



FOOD SAFETY FREQUENTLY ASKED QUESTIONS: THE FOOD SAFETY MODERNIZATION ACT AND ITS IMPACT ON FARM TO SCHOOL ACTIVITIES

* * * * *

Child nutrition program operators may purchase fruits and vegetables from a variety of sources, including local produce growers and suppliers. All farms should follow good food safety practices and it is important to be aware of food safety requirements and regulations that help keep fresh produce safe, such as the [Food Safety Modernization Act \(FSMA\)](#)¹. Understanding produce safety best practices and requirements will help keep meals served in child nutrition programs safe.

What is FSMA and the Produce Safety Rule?

FSMA was signed into law in 2011 and is implemented by the **U.S. Food and Drug Administration (FDA)**. FSMA protects public health by taking a proactive approach to strengthening the nation’s food safety system. It allows the FDA to focus on reducing and preventing food safety problems at each point of the supply chain, rather than responding after they occur.

FSMA has **seven rules**, including science-based **Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption**, which is widely known as the [Produce Safety Rule \(PSR\)](#)². The rule went into effect in January 2016 and aims to reduce foodborne illness associated with consuming contaminated produce which, according to research by the **U.S. Centers for Disease Control and Prevention (CDC)**, accounted for nearly half of all foodborne illnesses from 1998 to 2008³.

Does the FSMA Produce Safety Rule apply to all fruits and vegetables?

Produce that the FDA has identified as being [rarely consumed raw](#) is not subject to the PSR^{2,4}. These items are typically consumed after being cooked, which significantly reduces the levels of harmful microorganisms that may be present in the food.

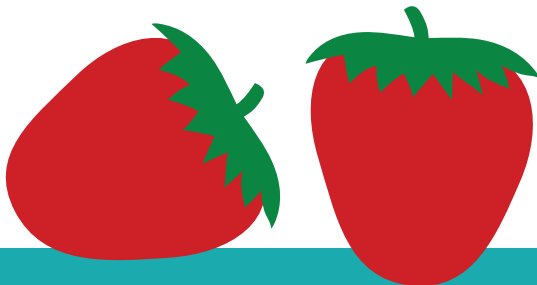
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When does the FSMA Produce Safety Rule apply to a farm business?

The PSR applies to commercial growers, harvesters, and packers of produce that the FDA has deemed likely to be eaten raw, and that is grown on farms with greater than \$25,000 in average annual produce sales. The PSR also applies to most farms that grow, harvest, and pack produce in one general location and under one general management.

The business category of covered farms and their PSR compliance dates are based on the farm size and the farm’s annual average produce sales of the previous 3-year period. Visit the [FDA webpage](#) for more information about applicable PSR compliance dates and other key requirements².





Child nutrition professionals should keep in mind that produce growers and suppliers who sell to schools may fall into different categories and may be eligible for exemptions. The criteria information provided in this section and the [FDA flowchart](#) can help child nutrition professionals understand whether the PSR is applicable to a farm, or if a farm may be partially or fully exempt from the PSR⁵.

PSR exemptions are generally based on:

- The type of food grown
- Total annual sales of the food (adjusted each year to [account for inflation](#))⁶
- Where the food is sold
- To whom the food is sold

The following types of produce are typically not covered by the PSR:

- Produce that is rarely consumed raw^{2,4}
- Produce for personal or on-farm consumption
- Produce intended for commercial processing (e.g., cooking) which is covered by a [different FSMA rule](#)⁷
- Produce from farms with full exemptions or qualified exemptions

Full exemption: Farms with annual average produce sales of \$25,000 or less (adjusted for inflation) during the previous 3-year period are not covered by the PSR. These farms should keep records showing their sales information.

Qualified exemption: To be eligible for a qualified exemption, there are two requirements for farms.

- The farm must have food sales averaging less than \$500,000 per year (adjusted for inflation) during the previous 3-year period – these sales include all food for humans and animals, not just fruits and vegetables.
- During the 3-year period, farm sales to **qualified end-users** must be more than the combined sales to all other users ([21 CFR 112.5](#))⁸. A qualified end-user is either (a) the consumer of the food or (b) a restaurant or retail food establishment that is located in the same State or Indian reservation as the farm, or not more than 275 miles away ([21 CFR 112.3](#))⁹.

School nutrition programs are considered retail food establishments and are qualified end-users under the PSR.

A farm with a qualified exemption must still meet some modified requirements, including disclosing the name and the complete business address of the farm where the produce was grown either on the label of the produce, or at the point of purchase. These farms are also required to keep certain records.





Does the FSMA Produce Safety Rule impact procurement practices and farm to school activities in child nutrition programs?

The PSR should not impact a child nutrition program's ability to buy local food or a farmer's ability to sell to child nutrition programs. It is not a Federal requirement to buy from farms that are covered by the PSR. All Federal child nutrition procurement rules remain the same.

When buying directly from farms, you should ask your farm partners if they are covered under the PSR; don't assume that they may be exempt. There is no certificate of compliance from the FDA and there is no list of farms that are compliant with the PSR.

If your program or state law requires a food safety certification, there are several private options, as well as the **Good Agricultural Practices (GAP)** certification from the **United States Department of Agriculture (USDA) Agricultural Marketing Service (AMS)**, which is aligned with the FDA's FSMA rules.

Federal law does not require schools to purchase from farms with a Good Agricultural Practices (GAP) certification or other third-party food safety certification.

Farms should always follow good food safety practices, whether covered by the PSR or a food safety certification such as GAP. It is your responsibility to ask questions about the farm's food safety practices to ensure that your school receives food that is safe.

In solicitations, schools must ensure that vendors comply with all applicable Federal, state, tribal, and local regulations. Review the [Verifying On-Farm Food Safety](#) fact sheet for more information on how to address and verify on-farm food safety of food sourced from local producers¹⁰.

Does the FSMA Produce Safety Rule impact school gardens?

Many school gardens fall below the \$25,000 threshold of annual average produce sales – the PSR does not apply to these gardens. Donated garden produce does not count toward the total sales revenue.

Many school nutrition programs use most of the produce grown in their school gardens; since school nutrition programs fall into the **qualified end-user** category, the PSR would not apply to these school gardens. Even if the PSR does not apply to your school garden, schools should implement good food safety practices for all gardens. Review the [School Gardens Fact Sheet](#) for more information¹¹.





References

- (1) *Full Text of the Food Safety Modernization Act (FSMA)*
www.fda.gov/food/food-safety-modernization-act-fsma/full-text-food-safety-modernization-act-fsma
- (2) *FSMA Final Rule on Produce Safety*
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- (3) *CDC Attribution of Foodborne Illness: Findings*
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- (8) *FSMA Produce Safety Rule (Final Rule): Which farms are eligible for a qualified exemption and associated modified requirements based on average monetary value of all food sold and direct farm marketing?*
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- (9) *FSMA Produce Safety Rule (Final Rule): What definitions apply to this part?*
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- (10) *USDA FNS Food Safety: Verifying On-Farm Food Safety Fact Sheet*
www.fns.usda.gov/fs/verifying-farm-food-safety
- (11) *USDA FNS Farm to School Program: School Gardens Fact Sheet*
www.fns.usda.gov/f2s/school-gardens



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For more information and to sign up for The Dirt, the e-newsletter from the Patrick Leahy Farm to School Program, visit

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Questions? Email us at SM.FN.FarmToSchool@usda.gov.





AN OVERVIEW OF GOOD AGRICULTURAL PRACTICES (GAPs)



In the food supply chain, there can be contamination risks at every step from farm to fork. Preventing microbial contamination is particularly important for fresh produce because there is no heat treatment or “kill step” before it is consumed. When purchasing fresh produce, child nutrition professionals should be aware of key food safety practices that all fruit and vegetable producers should follow. Producers should be aware of key food safety practices that all produce growers should follow.

What are Good Agricultural Practices (GAPs)?

Good Agricultural Practices, or **GAPs**, are voluntary science-based guidelines that help to reduce the risk of microbial contamination during growing, harvesting, and packing of fresh fruits and vegetables. The guidelines are based on the **U.S. Food and Drug Administration (FDA)**'s [Guide to Minimizing Microbial Food Safety Hazards for Fresh Produce](#). GAPs help to identify and control potential risks that affect the safety of produce on the farm and in the packinghouse.¹

The main principles of GAPs focus on **water, manure and municipal biosolids, worker health and hygiene, sanitary facilities, field sanitation, packing facility sanitation, transportation, and traceback and recordkeeping**. On a farm, the main sources of contamination are humans, animals, water, and soil. GAPs address how to control these contamination risks. For example, GAPs identify how to:

- Reduce the potential transfer of microbial contaminants from the soil to the crop.
- Ensure water used in various phases of crop production is not a source of contamination.
- Help workers to practice good personal hygiene and ensure that clean facilities are provided for workers and visitors.
- Ensure that there is good sanitation, including surfaces, storage areas, equipment, and transportation vehicles that are properly cleaned and maintained on a regular basis.

There is no Federal requirement for schools to purchase food from farms that have a GAP certification or other third-party food safety certification.

It is recommended that a farm implement GAPs in its food safety plan to ensure the safety of produce grown and harvested during each phase of production. Keep in mind that farms can follow GAPs and have a food safety plan in place without having a formal GAP certification. Schools may purchase food directly from any farm that meets the applicable food safety requirements defined by the school and any existing Federal, State, Tribal, and local regulations. Review the [Verifying On-Farm Food Safety](#) fact sheet for more information on how to address and verify on-farm food safety of food sourced from local producers.²

The **United States Department of Agriculture (USDA)** has specific food safety requirements for food supplied through **USDA Foods** and the **USDA Department of Defense (DoD) Fresh Fruit and Vegetable Program (FFVP)**. All fresh fruit and vegetables purchased directly by the USDA must come from a vendor that has passed a food safety audit, such as a USDA GAP audit. The **USDA Agricultural Marketing Service (AMS)** maintains a database of farms and companies that meet GAP criteria. For more information, or to view the database, visit the [AMS GAP Audits webpage](#).³





You can find more information about GAPs and your produce supply chain partners by visiting the [National Good Agricultural Practices \(GAPs\) Program webpage](#) and contacting your [local and State Cooperative Extension](#) office.^{4,5} Information and resources about farm to school activities can be found on the [USDA Food and Nutrition Service’s \(FNS\) Farm to School Program webpage](#).⁶ For information about local foods or school gardens, contact your [USDA FNS Farm to School Regional Specialist](#) or email us at SM.FN.FarmToSchool@usda.gov.⁷ Visit the [USDA Farm to School e-letter webpage](#) and sign up to receive The Dirt, which provides information about a variety of farm to school activities including webinars, relevant news, success stories, resource highlights, and [Farm to School Census](#) facts.⁸ For information about food safety in the Child Nutrition Programs, visit the [USDA FNS Food Safety webpage](#).⁹



References

- (1) *Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables*
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- (2) *USDA FNS Food Safety: Verifying On-Farm Food Safety*
www.fns.usda.gov/ofs/produce-safety-fact-sheets
- (3) *USDA AMS: Good Agricultural Practices (GAP) Audits*
www.ams.usda.gov/services/auditing/gap-qhp
- (4) *National Good Agricultural Practices Program*
cals.cornell.edu/national-good-agricultural-practices-program
- (5) *USDA National Institute of Food and Agriculture: College Partners Directory*
nifa.usda.gov/land-grant-colleges-and-universities-partner-website-directory
- (6) *USDA Food and Nutrition Service (FNS) Farm to School Webpage*
www.fns.usda.gov/f2s/farm-to-school
- (7) *USDA FNS Farm to School Program Staff*
www.fns.usda.gov/f2s/usda-farm-school-staff
- (8) *Farm to School Census*
farmtoschoolcensus.fns.usda.gov/
- (9) *USDA FNS Food Safety: Food Safety at FNS*
www.fns.usda.gov/fs/food-safety

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OVERVIEW: HAZARD ANALYSIS RISK-BASED PREVENTIVE CONTROL FOOD SAFETY PLAN (HARPC) AND HAZARD ANALYSIS CRITICAL CONTROL POINT PLAN (HACCP)

* * * * *

The [Food Safety Modernization Act \(FSMA\)](#) protects public health by taking a proactive approach to strengthening the nation's food safety system. The FSMA was signed into law in 2011 and is implemented by the **U.S. Food and Drug Administration (FDA)**.¹ It allows the FDA to focus on reducing and preventing food safety problems at each point of the supply chain, rather than responding after they happen.

The FSMA has **seven rules** including **Current Good Manufacturing Practice, Hazard Analysis, and Risk-Based Preventive Controls for Human Food**, which is widely known as the [Preventive Controls for Human Food Rule \(PCHF\)](#).² This rule became effective in November 2015 and requires food facilities to have a written **Hazard Analysis Risk-Based Preventive Control (HARPC) food safety plan** in place that includes preventive controls to minimize or prevent identified hazards from occurring.

The requirements within the PCHF apply to commercial food operations that manufacture, process, pack, or hold human food for consumption in the United States that are already required to register with FDA under section 415 of the **Food, Drug, and Cosmetic Act (FD&C Act)**. The rule also applies to businesses in other countries that export food to the United States. Operations defined as farms, retail food establishments, and restaurants are some of the businesses that are not subject to the PCHF requirements because they are not required to register with the FDA under this Act.

There are several exemptions or modified requirements that may apply even if some food products are covered under the PCHF, including:

- Qualified facilities (very small businesses)
- Food businesses subject to low-acid canned food regulations
- Foods subject to the Hazard Analysis Critical Control Point (HACCP) regulation (such as seafood and juice)
- Dietary supplements
- Alcoholic beverages
- Certain low-risk manufacturing/processing, packing, and holding activities conducted by small/very small businesses on farms for specific foods (e.g., making jams, jellies, and preserves from acidic fruit and extracting oils from grains)





Visit the [FDA webpage](#) for more information about key requirements, including applicable PCHF compliance dates.²

HACCP is an internationally recognized and universally accepted risk-based system, which addresses food safety through the analysis and control of biological, chemical, and physical hazards. HACCP is used in many segments of the food industry and encompasses **seven principles** to identify and assess the risk of hazards, and control the identified hazards. HACCP systems have been mandated by U.S. Federal regulations issued by the FDA for seafood and juice, and by the **USDA Food Safety and Inspection Service (FSIS)** for meat and poultry.

The Seven HACCP Principles

- 1: Conduct a Hazard Analysis
- 2: Determine Critical Control Points (CCPs)
- 3: Establish Critical Limits
- 4: Establish Monitoring Procedures
- 5: Establish Corrective Actions
- 6: Establish Verification Procedures
- 7: Establish Record-Keeping and Documentation Procedures

A **HARPC food safety plan** is developed using HACCP principles, but all components are not identical. Based on scientific data, both plans use a proactive approach to identify and assess process-specific food safety hazards and to utilize appropriate, effective, and verifiable control measures. In HACCP plans, **critical control points (CCPs)** are steps where a control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level. CCPs are measurable and include critical limits, which specify a maximum and/or minimum value, or combination of values.

In HACCP plans, controls are applied at critical control points (CCPs), whereas the HARPC food safety plans may include preventive controls at CCPs, along with controls at other steps, to ensure food safety. In HARPC food safety plans, there are **five main preventive controls**, which include **Process Controls, Food Allergen Controls, Sanitation Controls, Supply Chain Controls, Other Controls, and Recall Plan**. The majority of CCPs in a HACCP plan fall under the Process Controls section in a HARPC food safety plan.

A **preventive controls qualified individual (PCQI)** must develop or oversee the development of the written HARPC food safety plan [\[21 CFR 117.126\(a\)\]](#).³ A PCQI is a person with the education, training, or experience (or a combination of these) to develop and apply a food safety system. A PCQI can be qualified through job experience or by completing training equivalent to the standardized curriculum recognized as adequate by the FDA and does not need to be an employee of the facility [\[21 CFR 117.3\]](#).⁴

Components of HARPC

- 1: Hazard Analysis (Risk Assessment)
- 2: Risk-based Preventive Controls
- 3: Effectiveness Monitoring
- 4: Corrective Actions
- 5: Compliance Verification
- 6: Recordkeeping and Documentation
- 7: Reanalysis

For Receiving Facilities: Supply-Chain Program

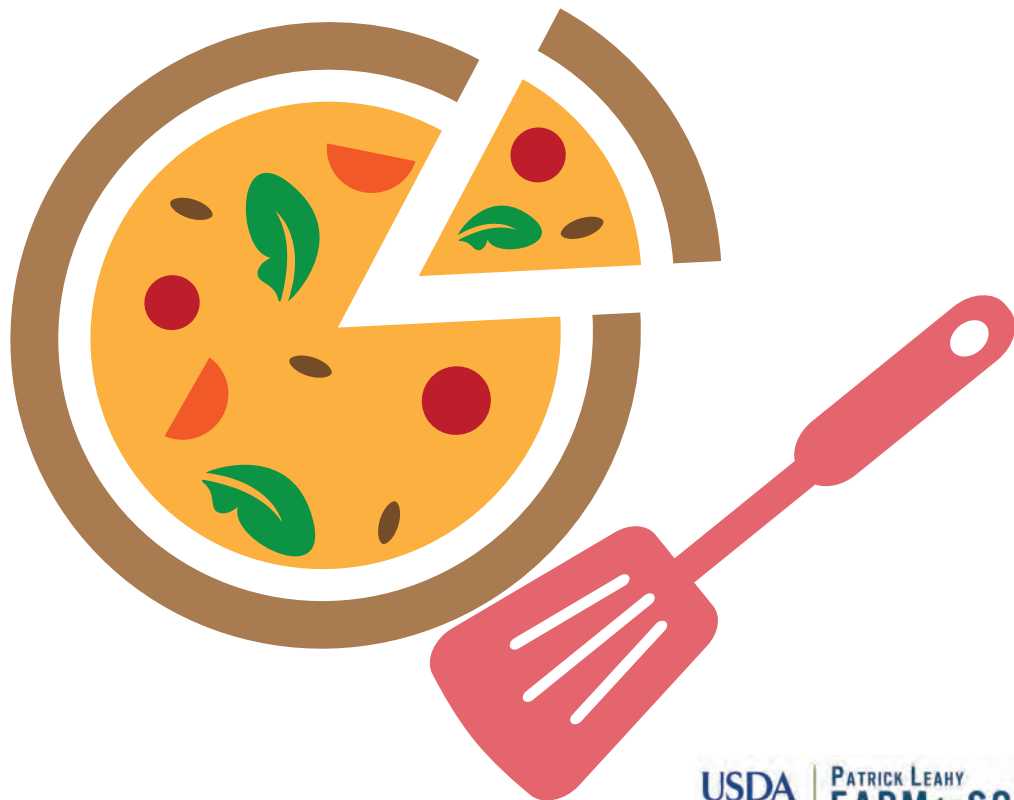
For All Facilities: Recall Plan



A HARPC food safety plan must be reanalyzed at least every three years. The reanalysis may focus on an applicable portion of the plan when there are changes to a system or equipment, when there is new information available about potential hazards associated with the food or facility, when there is an unanticipated food safety problem, or when a preventive control, a combination of preventive controls, or the food safety plan is ineffective. The following records must be kept to comply with the PCHF:⁵

- The hazard analysis
- Preventive controls for each identified hazard and verification that they effectively control the hazards
- Monitoring records to ensure preventive controls are consistently performed
- Documentation of any corrective actions taken
- The supplier approval and verification program
- The recall plan
- All testing and auditing results
- The results of the food safety plan reanalysis

As a producer, understanding differences and similarities between HARPC food safety plans and HACCP plans can help you to determine which elements of each plan may apply to your business and what requirements you need to follow. The FDA has a free [Food Safety Plan Builder \(FSPB\)](#) software program to assist owners/operators of food facilities with the development of food safety plans that are specific to their facilities and meet the requirements of the PCHF.⁶



References

- (1) *Full Text of the Food Safety Modernization Act (FSMA)*
www.fda.gov/food/food-safety-modernization-act-fsma/full-text-food-safety-modernization-act-fsma
- (2) *FSMA Final Rule on Preventive Controls for Human Food*
www.fda.gov/food/food-safety-modernization-act-fsma/fsma-final-rule-preventive-controls-human-food
- (3) *Code of Federal Regulations 21 CFR 117.126: Hazard Analysis and Risk-Based Preventive Controls, Food Safety Plan*
www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfCFR/CFRSearch.cfm?fr=117.126
- (4) *Code of Federal Regulations 21 CFR 117.3: Definitions*
www.ecfr.gov/current/title-21/chapter-I/subchapter-B/part-117/subpart-A/section-117.3
- (5) *Penn State University (PSU): Understanding FSMA: HACCP, HARPC and the Preventive Controls for Human Food Rule*
extension.psu.edu/understanding-fsma-haccp-harpc-and-the-preventive-controls-for-human-food-rule
- (6) *FDA Food Safety Plan Builder (FSPB)*
www.fda.gov/food/food-safety-modernization-act-fsma/food-safety-plan-builder



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INSERT "Quality & Condition" TAB




Quality and Condition


PRODUCE SAFETY UNIVERSITY




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.

Key Points to Consider

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Key Points

What

- Quality describes the degree of excellence of produce based on its attributes or characteristics, including defects, shape, scars, coloration, and size.
- Condition describes the soundness or preservation of produce, and includes bruising, discoloration, shriveling, discoloration, decay, and firmness.



Key Points to Consider Continued...

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Key Points

Why

- Knowledge of appropriate quality and condition of produce, per U.S. grade standards, and their accurate communication to vendors, can help maximize cost savings and shelf life, minimize food safety concerns, and reduce food waste.

How

- Resource for Implementation: **U.S. Grade Standards**
(<https://www.ams.usda.gov/grades-standards>)



Why Defects and Grades?

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Communication

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.

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



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.



Define

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

- 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

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

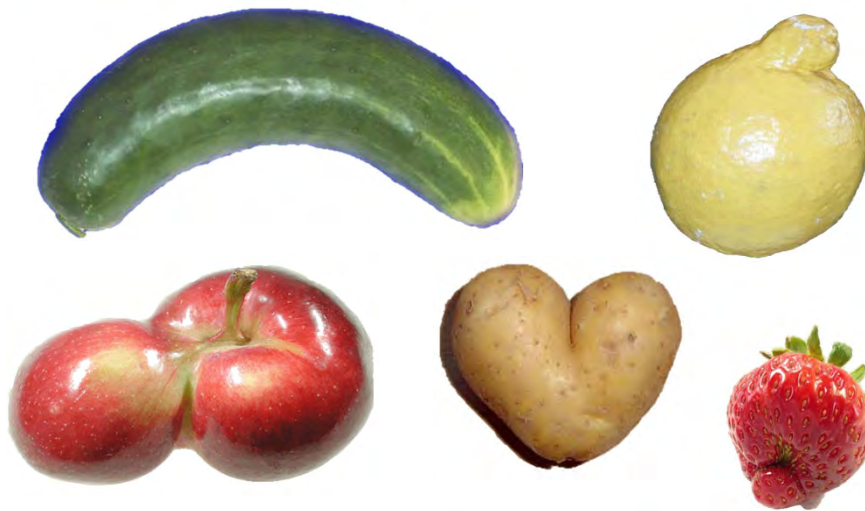


Commonly referred to as **"Grade"** defects. Directly determine the "U.S. grade designated".

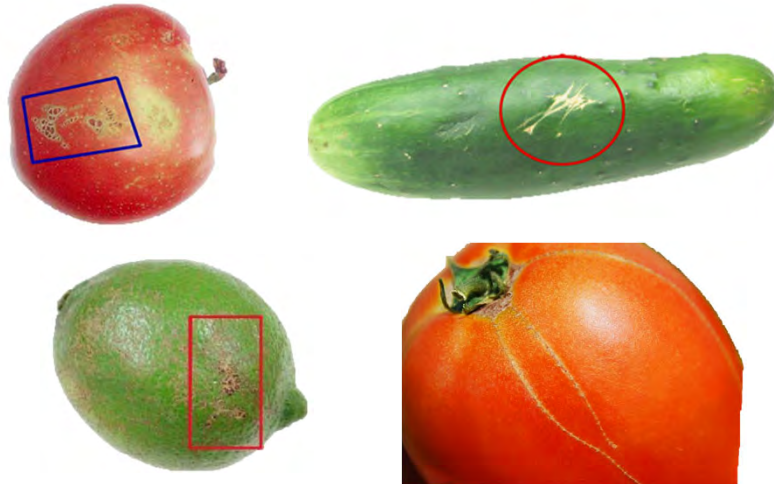
Examples:
Scars, misshapen, undersize.



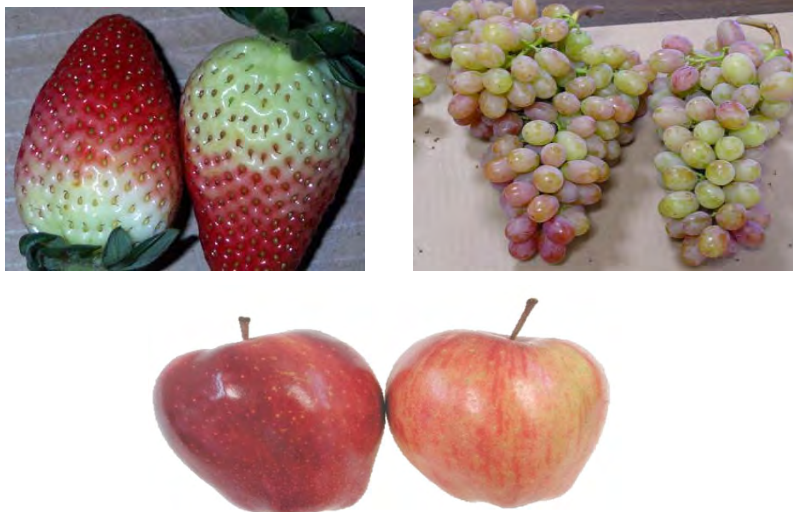
Misshapen



Scars



Poorly Colored



Size

Many products have a minimum/maximum size

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



Plant Diseases Affecting “Quality”



Citrus Greening - 2005

- Asian citrus psyllid - feeds on the leaves and stems
- It is a **bacterial** disease that has wiped out much of Florida’s citrus industry in the past decade.
- Fruit is green, misshapen, has a bitter taste and is not suitable for human consumption.



Plant Diseases Affecting “Quality”

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Fusarium Wilt Bananas

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



Insects Affecting “Quality”

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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 Defects

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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:

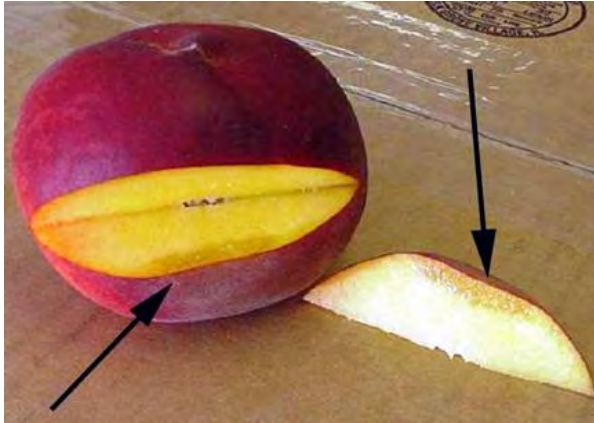
- ripeness,
- decay,
- shriveling,
- or any other progressive factor which affects its marketability.



Bruising

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DEPTH



AREA



Discoloration

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Discoloration will usually progress and is caused by a multitude of factors.

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

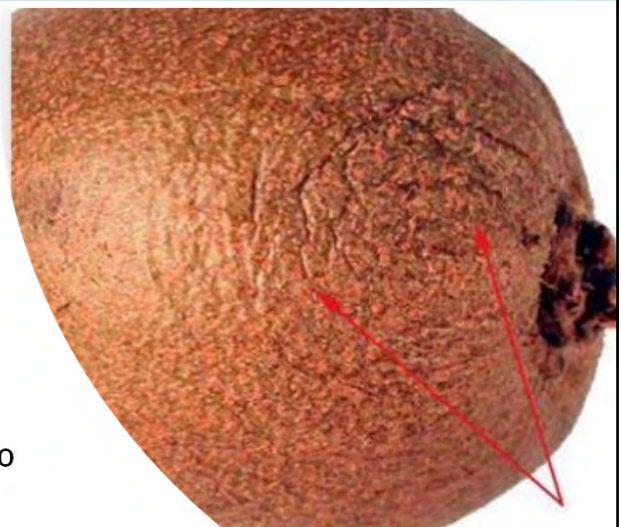


Discoloration



Shriveling

- 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.



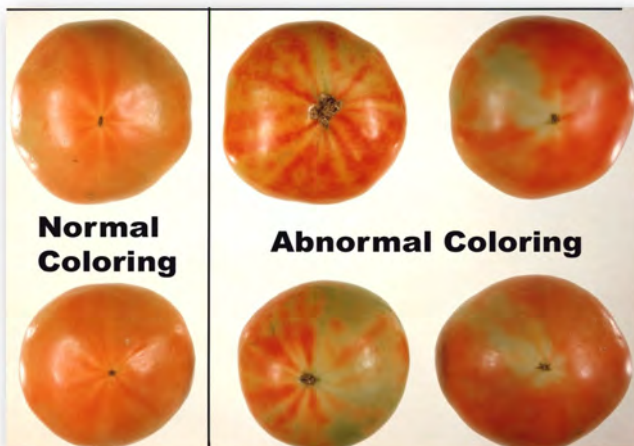
Russet Spotting



- 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.



Abnormal Color



- 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.



Decay

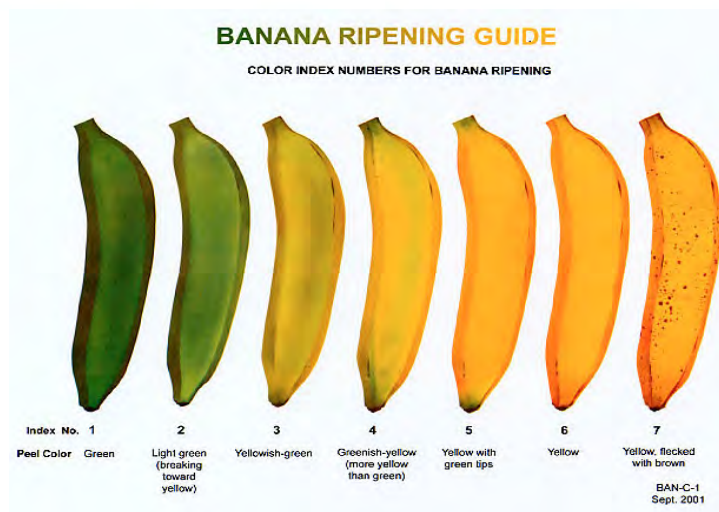
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- **Early** – approximately 10% or less of the surface or specimens affected.
- **Moderate** – approximately 11 to 25% of the surface or specimen affected.
- **Advanced** – approximately 26% or more of the surface or specimen affected.



Color

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Firmness

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Apples

- Firm
- Firm ripe
- Ripe
- Over-ripe

Determine firmness:

- Chewing Test
- Cutting
- Pressure Test



Internal Quality

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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.



Ripeness

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Cantaloupes

- Hard
- Firm
- Ripe & Firm
- Overripe

Ground Color

- Dark Green
- Light Green
- Turning Yellow



Making the Grade

Grades



- 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 website.



Grade and Price



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



312

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

Let's 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 "Fresh-Cut Produce" TAB




Fresh-Cut Produce


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USDA
United States Department of Agriculture

Objectives


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- 

Learn about regulations and best practices of the commercial fresh-cut industry and what to look for at your processor.
- 

Identify food safety practices and the importance of mitigating microbial hazards in fresh-cut produce operations.
- 

Learn about information to consider for fresh-cut produce specifications.





Key Points to Consider

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Key Points

What

- Food safety risks associated with fresh-cut produce can be mitigated using Hazard Analysis and Critical Control Point principles and Current Good Manufacturing Practices (cGMPs).

Why

- Purchasing fresh cut produce adds value and reduces labor costs but bears inherent food safety risks. With no kill step to eliminate microbiological hazards, industry guidance and regulations are crucial.
- Understanding what to look for at your fresh cut processor can help mitigate food safety risks that are unique to these processors.

How

- Resource for Implementation: [Food Safety Practices to Expect from Your Fresh-Cut Produce Processor](https://www.fns.usda.gov/psu/graduates)
(<https://www.fns.usda.gov/psu/graduates>)



What is Fresh-Cut Produce and Why is it Different

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- Any fresh fruit or vegetable or combination that has been **physically altered from its whole state after being harvested** from the field without additional processing
- Does not include produce that has been processed via blanching, cooking, freezing, canning, packing in juice/syrup, or dressing
- May also be referred to as “ready to use”, “pre-cut”, or “value-added” produce



Benefits of Fresh-Cut Produce

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- Can add value and convenience by saving time and labor to process in-house
- Easier to handle for younger children and therefore more likely to be eaten
- More appealing and marketable to customers
- Enhance nutritional content of meals



Let's Test What You Know!

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How is your fresh produce received?

- A. Mostly whole produce that is processed in-house
- B. Mostly fresh-cut produce
- C. About half of each
- D. It often varies based on different factors
- E. Not applicable – I'm not involved in receiving produce



Pre-Washed Fresh-Cut Produce

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



Fresh-Cut Produce Concerns

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- The FDA Food Code identifies certain fresh-cut products as time/temperature control for safety (TCS) foods including **cut melons, cut leafy greens, cut tomatoes, and certain mixtures of cut tomatoes.**
- There is an **increased risk of contamination** due to the natural exterior barrier of the fresh fruits and vegetables being broken to create fresh-cut products.



Outbreaks Linked to Fresh-Cut Produce



Based on data reported by the FDA:

- **Between 1996 and 2010**, fresh-cut fruits and vegetables accounted for **16.8%** of the total produce-related outbreaks.
- From **2002 to 2017**, there were **39 outbreaks linked to the consumption of fresh-cut produce.**

<https://www.fda.gov/media/117526/download>



Examples of Fresh Cut Produce Operations

Fresh-Cut Produce Distributor/Supplier



Examples of Fresh Cut Produce Operations

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Fresh-Cut Produce Distributor/Supplier



Examples of Fresh Cut Produce Operations

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Fresh-Cut Produce Distributor/Supplier



Fresh Cut Produce Operation

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Fresh-Cut Produce Processor



Fresh Cut Produce Processor Equipment

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Employees of Fresh Cut Produce Operations

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From Past to Present - Regulations and Guidance of the Produce Industry

Federal Regulation vs Guidance

Regulations

- are rules based on laws passed by Congress
- change less frequently

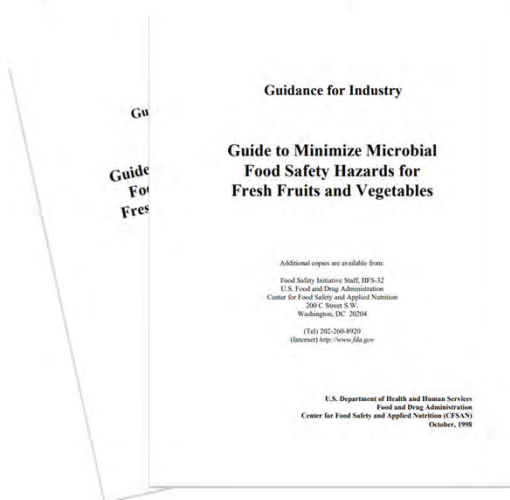
Guidance

- is an agency's policy, thinking, or method to enforce a regulation
- can change frequently

The **FDA** is responsible for produce safety regulations



From Past to Present – Produce Regulations & Guidance



- In 1997, President Clinton announced the "Fresh Produce Safety Initiative"
- In response to numerous high profile produce outbreaks
- Led to development of the **"Guide to Minimize Microbial Food Safety Hazards of Fresh-Cut Fruits and Vegetables"** which was released 1998



Global Food Safety Initiative (GFSI)

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- In 2000, the **Global Food Safety Initiative (GFSI)** was formed
- Hundreds of major global retailers and producers sought to address major food safety incidents and drop in consumer confidence in the food supply



Outbreaks That Influenced Food Safety Regulation

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Between 1998 and 2010, **several major outbreaks occurred:**

- 2004 – *Salmonella* in tomatoes
- 2006 – *E. coli* O157:H7 in spinach
- 2008 – *Salmonella* in tomatoes and peppers
- 2008 – *Salmonella* in peanut butter
- 2011 – *Listeria monocytogenes* in cantaloupe

Food safety laws were highly influenced by the impacts of these outbreaks



Food Safety Modernization Act

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In response to major foodborne outbreaks, congress passed the Food Safety Modernization Act (FSMA) in 2011



- New regulations affecting the entire food industry, including produce
- The **Produce Safety rule** established, science-based standards for safe growing, harvesting, packing, & holding of fruits and vegetables grown for human consumption (effective 2016)



FSMA Highlights and Basics for Produce

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It's important to note that **many exemptions to FSMA rules exist:**

- Farms producing <\$25k/yr
- Food grains
- Personal consumption produce
- Produce that is not a raw agricultural commodity (RAC) (e.g., corn, potatoes, asparagus, sour cherries)
- Other "qualified exemptions"



FSMA Highlights and Basics for Produce

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FSMA requires certain entities (farm operations, processors, etc.) to follow and develop:

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



FSMA Highlights and Basics for Produce

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CGMP regulations broadly address:

- Personal hygiene
- Design/construction of facility
- Maintenance of facility
- Equipment
- Sanitary operations
- Facility sanitations
- Production and process controls



HACCP vs Preventative Control Plan (HARPC)

HACCP:

Eliminate, Prevent & Reduce Food Safety Hazards



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



Produce Safety Rule



The **Produce Safety Rule** focuses on:

- Agricultural water
- Biological soil amendments
- Sprouts
- Animal control
- Worker training and hygiene
- Equipment, tools, and buildings
- Required records



Minimizing Microbial Food Safety Hazards

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- In 2008 and 2018, the FDA updated the **Guide to Minimize Microbial Food Safety Hazards of Fresh-Cut Fruits and Vegetables**
- The 2018 guidance was provided by FDA to help farmers comply with obligations under FSMA



What do I need to know as a School Lunch Professional?

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Verify your supplier's food safety compliance:

- FSMA
 - CGMPs
 - Preventative Controls
 - Produce Safety Rule
- GAPs
- Other industry standards (GFSI)



Verification By Schools

PRODUCE SAFETY
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Document, Document, Document!

Don't be afraid to **request documentation as further verification of compliance** with regulations and guidance:

- Employee training
- Equipment calibration
- Water quality
- Sanitation records
- Corrective action records
- Pest control reports
- Inspection reports



Fresh-Cut Produce in Schools: Requirements and Best Practices

Requirements for FNS School Meal Programs

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FNS school meal programs have been required to have a food safety program based on HACCP since 2004



The Healthy, Hunger-Free Kids Act of 2010 (the Act) strengthened the existing food safety requirements for FNS programs in schools

Amendments of the National School Lunch Act required the school food safety program based on HACCP principles be applied to any facility or to any facility, or part of it, where food is stored, prepared, or served for FNS programs in schools



A School Food Safety Program Based on HACCP Principles

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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



Using HACCP Principles for Produce

Use **HACCP principles** to minimize microbial food safety hazards associated with fresh cut produce

**Personnel Health and Hygiene
Training
Building and Equipment
Sanitation**



A School Food Safety Program Based on HACCP Principles

Commercial 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		

School Practice





Verification By Schools **PRODUCE SAFETY UNIVERSITY**

Verify your supplier's food safety practices
Many facilities are required to register with the FDA (under section 415 of the Federal Food, Drug, and Cosmetic Act).



A photograph of a person wearing a white lab coat, holding a magnifying glass over a digital interface. The interface displays a bar chart with a blue line graph overlaid on it. The person's hand is visible on the left, holding the handle of the magnifying glass. The background is blurred, showing what appears to be a computer screen with various data points and icons.

Alamy Stock | 1567241302

Decorative footer with a repeating pattern of small vegetable icons.

Specifications



Specifications include **quality** and **food safety** requirements



Produce Specification Example

Minimally Processed Fruits & Vegetables Overview of Standard Product Specifications		
Item	Specifications	Pack Size
Shredded Lettuce	Shredded: 1/8", 1/4", or 3/8" width Chopped: 1/2", 1" or 2" width	<ul style="list-style-type: none"> • 5 lb bag, 4 or 6/case • 20 lb case
Broccoli Florets	Fresh: <ul style="list-style-type: none"> • 1" to 2 1/4" diameter • 1" or 3" in length Frozen IQF: <ul style="list-style-type: none"> • 1/2" to 2" in diameter • 1" or 2 1/2" in length "Cuts" (includes florets and some stalk pieces) <ul style="list-style-type: none"> • 3/4" or 1" in length • Average 35% head material 	<ul style="list-style-type: none"> • 3 lb bag • 3 lb bag, 4 or 6/case • 12 lb case • 20 lb case • 30 lb case
Carrots	Sticks or baby: <ul style="list-style-type: none"> • 1/4", 3/8", 5/8", 3/4" diameter • 1-1/2", 2", 3" or 4" in length Coins: <ul style="list-style-type: none"> • 5/8", 7/8", 1-1/8" or 1-1/4" diameter • 3/8", 3/16", or 1/4" thick Diced: <ul style="list-style-type: none"> • 1/4", 1/2", 3/4", 3/8" cubes Shreds ("matchstick" or "shoestring"): <ul style="list-style-type: none"> • 1/8", 1/16", 3/16" in diameter • 2", 3", or variable in length 	<ul style="list-style-type: none"> • 1.5 oz bags, 200/case • 2 oz bags, 100/case • 3 lb bag, 10/case • 5 lb bag, 4/case • 20 lb case • 30 lb case



Commercial Item Descriptions (CIDs)

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- **CIDs** are **government specification** documents mainly used for contracting purposes that describe important characteristics of commercial products
- **CIDs may include:** types and styles available, analytical tests, requirements for quality and for food safety etc.
- **Non-government entities** often use various formats and types of specifications to suit the needs of the customer



Commercial Item Descriptions (CIDs)

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The screenshot shows the USDA Agricultural Marketing Service website. The header includes the USDA logo and navigation links: HOME, MARKET NEWS, RULES & REGULATIONS, GRADES & STANDARDS, SERVICES, RESOURCES, and COMMODITY PROCUREMENT. The main content area features a large image of a green landscape with a red barn. Below the image, the text reads: "Commercial Item Descriptions". A sidebar on the left lists categories: Beef, Cotton, Dairy Products, Eggs, Fish & Seafood, Flowers & Plants, and Fruits. The main text explains that Commercial Item Descriptions (CIDs) are product descriptions that concisely describe the most important characteristics of a commercial product. It lists two key features: "Uniquely numbered in a Federal series" and "Prominently dated for easy reference". It also mentions that CIDs are official U.S. Government procurement documents and provides a link to a "CIDs Fact Sheet (pdf)".

<https://www.ams.usda.gov/grades-standards/cids>



Considerations When Purchasing Fresh Cut

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Shelf Life

Best practice for fresh-cut is 14-21 days from date of packaging

Packaging Dates

- "Sell-By" (how long to display product for sale)
- "Best if Used By" (date recommended for best flavor or quality)
- "Use-By" (last date recommended for the use of the product while at peak quality)





Questions

INSERT "Market News" TAB



AMS Market News

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Market News Video

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David Goodman
Produce Wholesaler



Objectives



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

Key Points

What

- The AMS Market News portal serves as a tool to assess the market value of produce and cost factors. It can also be used to check produce availability.
- A live demonstration will show how to use Market News reports to improve produce procurement decisions

Why

- Comparing prices using Market News allows SNPs to minimize cost, determine the most appropriate specifications for their needs, and plan menus based on seasonality, price, and more.

How

- Resource for Implementation: [USDA Market News](https://www.ams.usda.gov/market-news) (<https://www.ams.usda.gov/market-news>)
- Resource for Training: [My Market News](https://mymarketnews.ams.usda.gov/) (<https://mymarketnews.ams.usda.gov/>)



How many of you have used AMS Market News Fresh Fruit and Vegetable information to make purchasing decisions?

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



You can use Market News to:

Identify and compare current market to verify:

- Bid price
- Vendor adherence to bid terms and conditions
- Justify exceptions to Buy American Provision



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

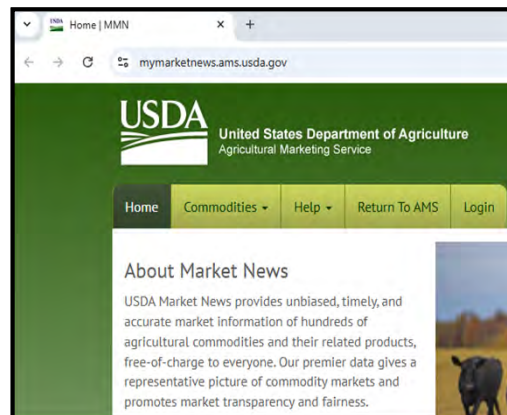
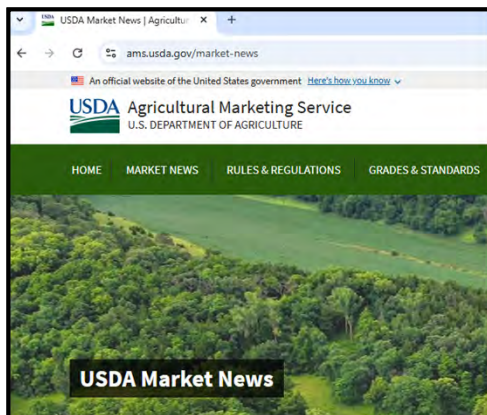
Structure of F&V Market News

Levels of Market Coverage

- Shipping Point
- Wholesale or Terminal Markets
- Retail



Market News and My Market News



What's new?

2024-2025 Updates

- Specialty Crops contact list
- Specialty Crops Announcements
- Grade Standards
- Standard Reports (no customized searches)
 - Terminal Markets
 - Shipping Point



What's new?

2025 Updates

- Search Market News Database
- Search Previous Reports
 - Terminal Market
 - Shipping Point
 - National FOB Review
- API Technology



My Market News (MARS)

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My Market News (MARS)

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Search Market News Database – Reports/Types

Search By Reports | Search By Market Types

▼ Reports --- [Commodity: Oranges -Report: Chicago Terminal Market Fruit Prices (HX_FV010)]

Filters for getting to specific reports!

Commodities: Oranges | Offices: Select office | Market Types: Select market type

Report *: Chicago Terminal Market Fruit Prices (HX_FV010) | Report Section *: Select report section

Chicago Terminal Market Fruit Prices (HX_FV010); Link

▼ Time --- [Year: 2024 -Report Begin Date:2024-10-17 -Report End Date:2024-10-30]

Report Year *: 2024 | Report Begin Date *: 2024-10-17 | Report End Date *: 2024-10-30

CLEAR | GET DATA



Search Market News Database - Reports

Report Begin Date	Report End Date	Published Date	Market Type	Slug Id	Slug Name	Report Title	Final Ind	Report Date	State	City
10/17/2024	10/17/2024	10/17/2024 11:58:45	Terminal	2290	HX_FV010	Chicago Terminal Market Fruit Prices (HX_FV010)	Final	10/17/2024	IL	Chicago
10/18/2024	10/18/2024	10/18/2024 11:48:20	Terminal	2290	HX_FV010	Chicago Terminal Market Fruit Prices (HX_FV010)	Final	10/18/2024	IL	Chicago
10/21/2024	10/21/2024	10/21/2024 11:54:15	Terminal	2290	HX_FV010	Chicago Terminal Market Fruit Prices (HX_FV010)	Final	10/21/2024	IL	Chicago



Search Market News Database - Market Types

> Section 1: Report Type and Time period --- [MT: Terminal Market; Drill by: Commodity; Aggregate: Daily; Date: 10/07/2024-12/13/2024;]

Market Types* Terminal Market	Drill By Commodity	Filter By Select Some Options
Aggregate* Daily	From Date 10/07/2024	To Date 12/13/2024

> Section 2: Details --- [Commodity: Cucumbers; Location: Detroit, Michigan;]

Commodities Cucumbers	Locations Detroit, Michigan
--------------------------	--------------------------------

> Section 3: Refinement

Organic Select organic	Variety Select variety	Item size Select itemsize
Package Select package	Grade Select grade	Origin Select origin
Environment Select environment		

My Market News (MARS)

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Search Previous Reports



Iowa Farm to School Local Purchase Report

Livestock, Poultry and Grain Market News

Iowa Department of Agriculture and Land Stewardship

Report Date:

December 31, 2024

All product published on this report is procured from growers and producers considered local to the state of Iowa and within 30 miles of the border. The data is cumulative for an August through July traditional school year.

	2024-2025	Prior Year 23-24
YTD Local Totals	\$318,552	\$581,401
YTD Local Fruit	\$38,716	\$43,218
YTD Local Vegetables	\$41,446	\$68,643
YTD Local Meat	\$44,313	\$171,381
YTD Local Dairy	\$75,637	\$189,592
YTD Local Miscellaneous	\$118,441	\$108,567

Fruit						
Product	Unit	Volume	Price Range		Wtd Avg	Prior Year Wtd Avg
Apples	Bushel	403	30.00	- 58.00	42.06	46.94
	Each	13,677	0.26	- 0.45	0.32	
	Pound	1,988	0.75	- 2.50	1.51	1.40



My Market News (MARS)

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API

Home Commodities Help Return To AMS Login

Home / MyMarketNews API

Stay connected:

Getting Started

Authentication

Reports

Sorting

Filtering

Errors

Examples

FAQs

Webinars and Other

Materials

Change History

MyMarketNews API

MyMarketNews (MMN) provides an Application Programming Interface (API). With some simple coding and a bit of programming know-how, users are able to tell their software to automatically pull raw Market News data from MMN through the API. While MMN provides a quick method to download data on the Home page, the API allows users to download large amounts of data that is published in our reports.

Helpful Materials:

- MMN API to Excel User Guide ([Instructions](#))
- MMN API to Excel Sample Spreadsheet ([Spreadsheet](#))
- LMPRS API User Guide (which has a lot similarities with the MyMarketNews API)

The links below provide a step-by-step guide on how to use the API. Please be aware that some sections are separated by technical and basic users. We also provide example code of popular queries. For any questions you may have that are not included in the FAQs section or in the webinars, you may contact Market News directly at mymarketnews@usda.gov.



National Shipping Point Trends Report

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Unless otherwise stated, shipments, crossings or imports are for the weeks ending November 16, 23, and 30, 2024, in that order in thousand hundredweight (cwt) or 100,000-pound units. The expected movement is for the period December 01-14, 2024. Prices are for Monday December 02, 2024, compared to Monday November 25, 2024. Unless otherwise stated, sales are F.O.B. Shipping Point Basis (including Delivered Sales, F.O.B. Shipping Point Basis) or port of entry, and extra services are included. Prices represent open (spot) market sales by first handlers on products of generally good quality and condition unless otherwise stated and may include promotional allowances or other incentives. No consideration is given to after-sale adjustments unless otherwise stated. Brokerage fees paid by the shipper are included in the price reported.

---STRAWBERRIES

OXNARD DISTRICT CALIFORNIA 2024 CROP Shipments 99-85*-84 --- Movement expected to decrease. Supplies light. Trading Moderate. Prices Generally Unchanged. Flats 8 -pound containers with lids medium mostly 24.00-26.00. Quality generally good. Most present shipments from prior bookings and/or previous commitments. (* revised)

MEXICO CROSSINGS THROUGH TEXAS 2024 CROP Crossings 49-86*-69 --- Movement expected to increase. Supplies light. Trading Moderate. Prices Slightly Higher. Flats 8-1pound containers with lids medium mostly 26.00-28.00. Quality variable. (* revised)

SANTA MARIA CALIFORNIA 2024 CROP Shipments 74-65*-33 --- Movement expected to decrease seasonally. Supplies light. Trading Moderate. Prices Slightly Higher. Flats 8 1-pound containers with lids medium mostly 22.00-24.00; ORGANIC medium mostly 30.00. Most present shipments from prior bookings and/or previous commitments. (* revised)

CENTRAL FLORIDA 2024 CROP Shipments 3-7-12 --- Movement expected to increase. Trading Fairly Active. Prices Generally Unchanged. Flats 8 1-lb containers with lids medium mostly 28.00. Quality variable.

Multiply Number by **100,000 thousand pounds** = Volume shipments
California Strawberries = 9,900,000; 8,500,000; 8,400,000



Questions



Market News Activity

Work alone or with a partner to answer the questions.

INSERT "Market News Activity" TAB



Market News Activity

Directions: Answer the following questions based on the *AMS Market News* handouts, PPT slide, and/or reports:

1. Per the Sept. 24th, 2024, *Philadelphia Terminal Market Report* for California strawberries in eight 1 lb. containers with lids, what is the reported appearance of the large-extra large berries? (Handout 1)

2. What is the reported appearance definition of the fine berries. (Handout 2)

3. Using the May 13th, 2024, *Chicago Terminal Market Report* for strawberries in 8 1 lb. containers with lids, calculate the high price per pound for the California grown, large-extra-large, fine appearance strawberries. (Handout 3)

4. A school nutrition program in Illinois uses a market price plus fixed fee for delivery type annual bid for fresh produce. It is your responsibility to periodically check bi-monthly bid quotes against prices stated in the *Chicago Terminal Market Report*. Pretend it is May 13th, 2024; this week your vendor quoted 8 1 pound container strawberries at \$24.00 per case plus delivery fee. (Handout 3)
 - a. Is the produce quote acceptable for your district based on current market prices for domestic strawberries? YES/NO Explain why?

5. On the *Los Angeles Terminal Market Fruit Prices* report for cantaloupes week of August 20, 2024 (Handout 4), what does item size 6s, 9s, and 12s refer to?

6. This week, your vendor quotes a 15-count case of cantaloupe at \$10.00 per case or \$0.67 each (rounded up). You want to determine if processing in-house is the best buy, as compared to buying it precut.
- a. Using the following formula, calculate the ½ cup Edible Portion (EP) cost of the melon and write the answer to in the shaded block of the table below.

As Purchased (AP) Cost $\$0.67 \div 8.33 \frac{1}{2} \text{ c servings per melon} = \$\underline{\hspace{1cm}} \frac{1}{2} \text{ c EP Portion}$
 (\$10.00 ÷ 15 = \$0.6666 rounded to \$0.67)

Cantaloupe Processor	Product Pack	Cost per Case	Cost per ½ c Portion
School (in-house)	15 ct. case	\$10.00	
Vendor A	2/5 lb tubs/case – splits allowed	\$41.60	\$0.70
Vendor B	2/5 lb tubs/case – no splits	\$26.50	\$0.45

Note: Labor and packaging, if applicable, should be added to in-house processed fruit or vegetable portion costs, because labor and packaging are included in the price of precut products.

- b. Considering the cost of in-house processing above to purchasing precut from Vendor A or B, what would be the best buy for your operation? Why?
7. According to the December 3, 2024, *National Shipping Point Trends* report, how many pounds of **2024 CROP** apples were shipped from New York for the week ending November 23? (Handout 5 & slide)
8. Your school nutrition program offers a popular cucumber and tomato salad each week on the high school salad bar. The produce vendor cannot offer domestic cucumbers for the week of March 15, 2024, so the program decides to justify using non-domestic product to maintain customer satisfaction. State the process for documenting non-domestic product use. (Handout 6)

Handout 1



Philadelphia Terminal Market Fruit Prices (NA_FV010)

Agricultural Marketing Service

Specialty Crops Market News

September 24, 2024

[Email us with accessibility issues with this report.](#)

Page 1

NA_FV010

Weather at 7:00 a.m. Mostly Cloudy 63

Yesterday's High 70

WHOLESALE MARKET PRICES: Prices quoted cover sales by primary receivers of overall supplies on wholesale lots and are on stock of generally good merchantable quality and condition unless otherwise stated

BERRIES

---**BLACKBERRIES:** MARKET ABOUT STEADY. flats 12 6-oz cups with lids CALIFORNIA large 40.00 GUATEMALA medium 26.00

---**BLUEBERRIES:** MARKET PERU LOWER, OTHERS ABOUT STEADY. flats 12 1-pint cups with lids CANADA BRITISH COLUMBIA CD ONE medium-large 40.00 occasional 45.00 MICHIGAN medium-large 40.00 occasional 45.00 PERU large 68.00-70.00

---**RASPBERRIES:** OFFERINGS LIGHT. flats 12 6-oz cups with lids MEXICO RED large 30.00

---**STRAWBERRIES:** MARKET STEADY. flats 8 1-lb containers with lids CALIFORNIA large-extra large 18.00 fine appearance 20.00 flats 6 1-quart baskets CANADA QUEBEC medium-large 34.00

CITRUS

---**GRAPEFRUIT:** MARKET STEADY. 15 kg containers PERU STAR RUBY CAT I 45s 36.00 60s 36.00 SOUTH AFRICA CLASS I STAR RUBY 24s 36.00 28s 36.00 32s 36.00 35s 36.00 40s 36.00 45s 36.00 50s 36.00

---**LEMONS:** MARKET STEADY. 17 kg containers ARGENTINA NO GRADE MARKED 95s 18.00-20.00 115s 18.00-23.00 mostly 20.00-23.00 140s 18.00-23.00 mostly 20.00-23.00 165s 18.00-23.00 mostly 20.00-23.00 200s 18.00-23.00 mostly 20.00-23.00 fair condition 12.00-15.00 CHILE NO GRADE MARKED 200s 23.00 7/10 bushel cartons CALIFORNIA SHIPPERS FIRST GRADE 165s 48.00-48.50 SHIPPERS CHOICE 95s 28.00-32.50 mostly 32.00-32.50 115s 30.00-34.00 mostly 34.00 140s 35.00-36.50 165s 40.00-43.00 mostly 40.00-40.50 200s 40.00-40.50 MEXICO NO GRADE MARKED 95s 25.00-26.00 115s 25.00-26.00 200s 25.00-26.00

---**LIMES:** MARKET MEXICO 175S & 200S LOWER, OTHERS ABOUT STEADY. 38 lb cartons HONDURAS SEEDLESS TYPE 150s 62.00 175s 62.00 200s 62.00 40 lb cartons MEXICO SEEDLESS TYPE 150s 75.00-76.00 fine appearance 85.00 175s 71.00 one lot 75.00 fine appearance 85.00 200s 66.00 fine appearance 80.00 10 lb cartons MEXICO SEEDLESS TYPE 36s 23.00 fine appearance 25.00 42s 23.00 fine appearance 25.00 48s 18.00-18.50 fine appearance 22.00 54s 17.00-17.50 fine appearance 22.00 35-36 lb cartons COLOMBIA SEEDLESS TYPE 200s 65.00

---**ORANGES:** MARKET ABOUT STEADY. 15 kg cartons CHILE NAVEL 48s 40.00 56s 40.00 72s 40.00 Cara Cara 56s 34.00-36.00 72s 34.00-36.00 88s 34.00-36.00 113s 34.00-36.00 SOUTH AFRICA CLASS I NAVEL 56s 40.00 7/10 bushel cartons CALIFORNIA SHIPPERS FIRST GRADE VALENCIA 40s 39.00 48s fine appearance 44.00-44.50 56s 42.00 fine appearance 44.00-44.50 72s 43.00 fine appearance 46.00-48.50 88s 48.00 fine appearance 50.00-50.50

---**TANGELOS:** MARKET ABOUT STEADY. 10 kg containers PERU MINNEOLA 30s 18.00 36s 18.00 40s 18.00 45s 18.00 SOUTH AFRICA NOVA 50s 27.00 60s 25.00

---**TANGERINES:** MARKET STEADY. 10 kg cartons PERU W. MURCOTT AFOURER 40s 28.00 fine appearance 32.00 60s 24.00-25.00 fine appearance 28.00-30.00 70s 23.00-24.00 cartons 10 3-lb mesh bags AUSTRALIA W. MURCOTT AFOURER 24 size 38.00 CHILE W. MURCOTT AFOURER 32 size 38.00 PERU W. MURCOTT AFOURER 18 size 38.00 28 size 38.00

MELONS

---**CANTALOUPE:** MARKET HIGHER. 1/2 cartons CALIFORNIA 9s 24.00-27.00 mostly 26.00-27.00 12s 26.00-27.00 oversized 1/2 cartons CALIFORNIA 9s (6 size) 24.00-26.00 mostly 24.00-25.00

---**HONEYDEWS:** MARKET ABOUT STEADY. 2/3 cartons CALIFORNIA 5s 18.00-19.00 6s 18.00-21.00 mostly 18.00-20.00 8s 16.00 Golden 5s 15.00 6s 15.00 oversized 2/3 cartons CALIFORNIA 5s (4 size) 18.00-19.00

---**WATERMELONS:** MARKET ABOUT STEADY. cartons INDIANA RED FLESH SEEDLESS TYPE Round Types 4s 28.00 5s 28.00 MARYLAND RED FLESH SEEDLESS TYPE Round Types 4s 30.00 5s 30.00 24 inch bins INDIANA RED FLESH SEEDLESS TYPE Round Types 45s 210.00 60s 190.00 MARYLAND RED FLESH SEEDLESS TYPE Round Types 45s 200.00 60s 200.00

OTHER FRUIT

Source: USDA, AMS, Specialty Crops Market News

6700 Essington Avenue Suite H-208

Philadelphia, PA 19153

Phone (215) 551-6791 | <https://mymarketnews.ams.usda.gov/>

Handout 2

My Market News DEFINITIONS

Common Types of Sales

F.O.B. (Free on Board): This means that the product quoted or sold is to be placed free on board the boat, car, or other type of land transportation at shipping point, in “suitable shipping condition”, and that the buyer assumes all risk of damage and delay in transit not caused by the seller, irrespective of how the shipment is billed. The buyer shall have the right of inspection at destination before goods are paid for to determine if the product shipped complied with the terms of the contract or order at time of shipment, subject to the provisions covering suitable shipping conditions.

Delivered Sales, Shipping Point Basis: This means that the product is to be delivered by the seller on board the car, truck, or on the dock if delivered by boat, at the market in which the buyer is located, or at such other market as is agreed upon, free of any and all charges for transportation or protective service. The seller assumes all risks of loss or damage in transit not caused by the buyer.

F.O.B. Point or Port of Entry: Sales of imported produce on an F.O.B. shipping point basis, with the shipping point as the crossing point or port of import, with any duties, crossing charges, or import fees paid prior to the reported sale.

Prices Paid to Growers: Prices paid to growers by packers or shippers, indicating the unit of sale and point of sale, or basis of delivery most common in the territory. Examples: “Bulk per cwt: U.S. No. 1 at warehouse,” “per ton sacked and loaded,” or “per package, in field, buyer furnishing packages.”

Price Trend

Indicates comparisons of conditions and prices which prevailed on the *previous* day, and in certain situations, conditions expected on the day *following* or *both*. The term is prefaced with the term “MARKET,” as in “MARKET STEADY” or “MARKET HIGHER.”

The following terms are used to describe the price trend:

Strong: Prices are measurably higher than the previous trading session, and it is the reporter’s opinion that the trend toward higher prices has not yet reached its highest level.

Much higher: Prices are substantially higher than the previous trading day.

Higher: The majority of sales have prices which are measurably higher than the previous trading session.

Slightly higher: A condition in which advances are less definite and less general than when “higher” is used.

Unsettled: Used rarely to indicate a condition of market uncertainty with lack of agreement by the trade as to whether prices tend to be lower or higher. May also represent an attitude pending the development or outcome of extraneous factors which might affect the market.

Steady: Prices are unchanged from the previous trading session.

About steady: Probably the most used term since a market situation seldom remains exactly the same two or more consecutive days without some change, even though not significant.

Dull: Prices are relatively unchanged from the previous session, trading is inactive, and prices represent few sales.

Slightly lower: A condition in which price declines are less definite and less general than when “lower” is used.

Lower: Prices for most sales are measurably lower than the previous trading session.

Much lower: Prices are substantially lower than the previous trading session.

Weak: Indicates a downward trend. Prices are measurably lower than the previous trading session and may be lower the following day.

Demoralized: A condition in which the terminal market or shipping point is oversupplied with perishable commodities that cannot be sold except at extremely low prices.

Demand

Represents the immediate or current desire for a product coupled with the ability and willingness of the buyer to buy it. The following terms, when used in conjunction with “demand,” are interpreted as meaning:

Demand Exceeds Supply/Offerings: When demand is substantially greater than available supplies/offering.

Very good: Demand is well above average for seasonally normal supplies/offering.

Good: Demand is better than average and trading is more active than normal.

Moderate: Average buyer interest and trading.

Fairly light: Buyer interest and trading are slightly below average.

Light: Demand is below average.

Very light: Few buyers are interested in trading.

Practically no demand: Indicates a stagnant condition on the market, with very little interest and very few or no sales.

Quality

Quality includes size, color, shape, texture, cleanness, freedom from defects, and other more permanent physical properties of a product which can affect its market value.

The following terms, when used in connection with “quality,” are interpreted as meaning:

Fine: Better than good. Superior in appearance, color, and other quality factors.

Good: In general, stock which has a high degree of merchantability with a small percentage of defects. This term includes U.S. No. 1 stock, generally 85 percent U.S. No. 1 or better quality on some commodities, such as tomatoes.

Fair: Having a higher percentage of defects than “good.” From a quality standpoint, having roughly 75 percent U.S. No. 1 quality with some leeway in either direction.

Ordinary: Having a heavy percentage of defects as compared to “good.” Roughly 50 to 65 percent U.S. No. 1 quality.

Poor: Having a heavy percentage of defects, with a low degree of salability, except to “low priced” trade. More than 50 percent grade defects.

Condition

Condition includes stage of maturity, decay, freezing injury, shriveling, or any other deterioration which may have occurred, or progressed since the product was harvested and which may continue to progress.

The following terms, when used in connection with “condition,” are interpreted as meaning:

Good: Such condition does not justify price reduction because of condition factors.

Fair: Having a slight degree of off-condition factors which may warrant a small price reduction as compared to “good.”

Ordinary: Having a heavier degree of off-condition factors which may warrant a substantial price reduction as compared to “good.”

Poor: So badly off-condition as may warrant heavy price reduction.

Hold Overs: Refers to merchandise that has been on the terminal market or at shipping point longer than normal, but remains near its original condition. Prices are discounted in order to clear supplies because shelf-life is reduced.

Appearance

Appearance refers to color, texture of the skins, uniformity of the pack and other external conditions.

The following terms, when used in connection with “condition,” are interpreted as meaning:

Fine: Appearance that is higher than average, often justifying a price increase.

Fair: Having a slight degree of off-appearance factors which may warrant a small price reduction as compared to normal appearance.

Ordinary: Having a heavier degree of off-appearance factors which may warrant a substantial price reduction as compared to normal.

Poor: So badly off-appearance as may warrant heavy price reduction.

Qualifying Terms

The following terms, when used in Market News, Perishable Agricultural Commodities Act (PACA), or Federal-State inspection documents, are interpreted as meaning:

Occasional: 1 to 5%

Few: 6 to 10%

Some: 11 to 25%

Many: 26 to 50%

Mostly: 51 to 90%

Generally: 91 to 100%

Other Helpful Terminal Report Details

Low-High Price: Primary price range showing low price and high price.

Mostly Low-High Price: Price range where most of the sales were made, showing both the mostly low and the mostly high price within the overall range.

Origin: The State or Country from which the product originated (example: Washington for a state, Mexico for a country).

Origin District: The district within the state or country from which the product originated. Sometimes the district spans several states, as in “New England” or “Klamath Basin”.

Environment: These values signify the environment conditions under which a commodity is grown. Environment types are generally Greenhouse or Open Field (or Field Grown). For Mexico the terms for environment for various tomato types include Controlled Environment, Adapted Environment and Open Field, based on terms used in the Suspension Agreement. Older data in Market News also used Greenhouse Hydroponic and Greenhouse Including Hydroponic.

Storage: Storage or other external factors affecting the product. Examples are “Controlled Atmosphere Storage,” “Regular Storage,” and “Unwashed.”

Crop: This field is generally only used when there are changes in the season or when there is a price difference between crops of two seasons. Values used in this column are “Old” crop and “New” crop.

Trans Mode: The transportation mode at which the product arrived on the market. Examples are “Truck,” “Air,” “Boat,” “Rail,” “Piggyback”, and “Import.”

Repacked: Signifies that the product was repacked, either local repacked, repacked en-route, or a combination of both. If the column is blank, the item has not been repacked.

Price Comment: Additional factors specifically affecting the price, description, or sale of a commodity in a record.

Report Abbreviations

appearance - appear	container(s) - cntr(s)	inch - in	pound - lb
approximately - approx	Controlled Atmosphere Storage - CA	include(s) - incl(s)	pyramid - pyr
average - avg	crate - crt	jumbo - jbo	quality - qual
bagged - bgd	dispenser(s) - dspncr(s)	large - lge	quart - qt
baled - bld	dozen - dz	larger - lgr	repack(ed)(er) - rpk(d)(r)
basket - bkt/bskt	Eastern Boston Crate - Ebert	layer - lyr	sacks - sks
bushel - bu	extra - ex	loose - lse	shippers - shprs
bunch(ed)(s) - bch(d)(s)	extra large - xlge	master container - mctr	size - sz

bundle - bdl	fair(ly) - fr(ly)	medium - med	small(er) - sml(r)
bushel basket - bubkt/bubskt	fancy - fcy	miniature - mini	standard - std
Canada Number One - CDOne	film - flm	minimum - min	topped - tpd
carton - ctn	flat(s) - flt(s)	miscellaneous - misc	traypack - trpk
celery crate - cel crt	flat cartons - fltctn(s)	number - No. or #	unclassified - uncl
cellpack - celpk	green - grn	occasional - occas	U.S. Number One - USOne
Chef's Special - Chef'sSpec	greenhouse - grnhse	ordinary - ord	waxed - wxd
colossal - col	half - hlf or 1/2	ounce - oz	Western Growers Association Crate - WGAct
combination - comb	hamper - hmpr	package(s) - pkg(s)	wirebound crates - wbcrt
commercial - com	holdovers - hldovrs	percent - pct or %	wrap(ped) - wrp(d)
condition - cond	hundredweight - cwt	pint - pt	

Container Net Weights

The following list shows commodities and their most commonly used containers. The net weight signifies the conversion factor used to convert packages to weight.

Apples - Cartons, tray or cell pack - 40 pounds

Apricots - Cartons – 24 pounds; 2-layer carton tray pack - 18 pounds

Asparagus - Cartons or crate – 11 pounds; pyramid carton or crate - 28 pounds

Avocados - 2-lyr Cartons – 23 and 25 pounds

Bananas - Cartons - 40 pounds

Beans, Green - Bushel basket, carton or crate - 30 pounds

Beets - Carton or crate, 12's – 20 pounds

Blueberries– Flats 12-1 pint cups- 11 pounds; Flats 12 6 ounce cups – 5 pounds; Flats 4.4 ounces/ 125 grams with lids - 4 pounds

Broccoli - Carton or crate, 14-18's - 23 pounds

Cabbage – Carton, crate or sack - 50 pounds

Cantaloupe - 1/2 carton or crate - 40 pounds

Carrots (Topped) - 48 1-lb film bags – 48 pounds; Sacks, as marked - 25 and 50 pounds

Cauliflower - Carton, film wrapped - 25 pounds

Celery - Carton or crate – 60 pounds; Hearts - carton film bag - 28 pounds

Cherries - Carton or lug (California and Washington) - 18 and 20 pounds; carton (Chile) -11 pounds.
Chinese Cabbage - Celery crate – 50 pounds; WGA type crate – 80 pounds
Clementines - Carton or crate - 5 pounds
Corn, Sweet - Carton or crate - 42 pounds
Cucumbers – Bushel and 1-1/9 bushel carton or crate – 55 pounds; Greenhouse film wrapped - 12 pounds
Grapefruit - Carton (Florida and Texas) – 40 pounds; Carton (Arizona and California) - 34 pounds
Grapes, Table - Lug carton or lug (California) - 18 and 19 pounds; Carton or lug (Chile) - 18 pounds
Greens - Bushel basket, carton or crate - 25 pounds
Honeydew Melons - Carton - 30 pounds
Kiwifruit - 1-layer flat - 7 pounds
Lemons - Carton (Arizona and California) - 38 pounds
Lettuce, Iceberg - Carton, 24's - 50 pounds
Lettuce, Romaine - 1-1/9 bushel carton or crate – 22 pounds; Carton or crate, 24's (Western States) - 40 pounds
Lettuce, Other, leaf – Carton, 24's – 20 pounds
Limes - Carton (Mexico) - 40 pounds
Mangoes - 1-layer flat -10 pounds
Nectarines - 1/2 bushel carton loose – 25 pounds; 2-lyr Carton or lug (Chile) – 18 pounds; 2-layer carton or lug (California) -22 pounds
Okra - 1/2 bushel basket or carton -15 pounds
Onions, Dry - Sacks as marked - 25 and 50 pounds
Onions, Green – Carton 48 bunched, 13 pounds
Oranges - Carton (Florida and Texas) - 43 & 42 pounds; Carton (Arizona and California) - 38 pounds
Papaya - Carton (Hawaii) - 10 pounds
Peaches - 1/2 bushel carton or crate – 25 pounds; 2-layer carton – 22 pounds; 2-layer Carton or lug (Chile) - 18 pounds
Pears - 4/5 bushel box – 45 pounds; carton -40 pounds
Peas, Green - bushel carton or crate - 30 pounds
Peppers, Bell - Bushel & 1-1/9 bushel carton or crate – 28 pounds; Carton (California, Texas and Mexico) - 30 pounds
Peppers, Other – ½ bushel carton – 15 pounds; Carton – 10 pounds
Pineapple - 2-layer carton – 40 pounds; 1-layer carton - 20 pounds
Plums - 1/2 bushel basket or carton (California) – 28 pounds; 2-layer carton or lug (Chile) - 18 pounds
Potatoes- carton – 50 pounds; sacks or Cwt - 100 pounds
Radishes (topped) - Carton 30-6 ounce bags – 12 pounds; Carton or crate, 48 bunched - 35 pounds
Raspberries – Flats 12 6-ounce cups – 5 pounds

Spinach - Carton or crate loose – 25 pounds; carton 24s bunched - 20 pounds; Carton 12 10-ounce bags - 8 pounds

Squash (Soft Shell) - 1/2 bushel basket or carton – 21 pounds; Carton or lug - 26 pounds

Squash (Hard Shell) - 1-1/9 bushel crate – 40 pounds

Strawberries – flats 12-1 pint baskets – 12 pounds; Flats 8 16 ounce containers with lids - 8 pounds

Sweet Potatoes - Carton or crate – 40 pounds

Tangelos – 4/5 bushel carton or crate – 43 pounds; ½ bushel carton – 25 pounds

Tangerines - 4/5 bushel carton or crate – 43 pounds; ½ bushel carton – 25 pounds

Tomatoes - Carton – 25 pounds; 2-layer flat – 20 pounds; 1-layer flat -15 pounds

Tomatoes – Greenhouse – 1 layer flats 15 pounds; On-the-Vine 5 kg cartons – 11 pounds

Tomatoes, Cherry – Flat 12-1 pint baskets – 15 pounds

Tomatoes, Grape - Flat 12 1-pint container - 9 pounds

Tomatoes, Plum - Carton - 25 pounds

Watermelon - Cwt – 100 pounds; cartons 75 pounds

Handout 3

Report_date	Location	Commodity	Package	Origin	Item_size	Appearance	Organic	Low_price	High_price	Comment
5/13/2024	Chicago, Illin	Strawberries	flats 8 1-lb containers with lids	California	large-extra	Fine appearance	N	18.5	18.5	few best 27.00
							Market_tone_comme			
							MARKET STEADY			



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WEATHER AT 7:00 AM: CLEAR: 70

YESTERDAYS HIGH: 79

WHOLESALE MARKET PRICES: Prices quoted cover sales by primary receivers of overall supplies on wholesale lots and are on stock of generally good merchantable quality and condition unless otherwise stated

BERRIES

---**BLACKBERRIES:** MARKET ABOUT STEADY. OFFERINGS VERY LIGHT. flats 12 6-oz cups with lids CALIFORNIA SALINAS-WATSONVILLE CALIFORNIA large 24.00-26.00 mostly 24.00-25.00 occasional higher fair quality 18.00-20.00 poorer quality and condition lower fine appearance 28.00-30.00 (one label) occasional higher SANTA MARIA DISTRICT CALIFORNIA large fair quality 18.00-19.00 poorer quality and condition lower fine appearance 28.00-30.00 (one label) occasional lower

---**BLUEBERRIES:** MARKET ABOUT STEADY. OFFERINGS BRITISH COLUMBIA AND 1-PINT CUPS WITH LIDS VERY LIGHT. flats 12 6-oz cups with lids CANADA BRITISH COLUMBIA medium-large 16.00 occasional higher/lower OREGON medium-large 16.00 occasional higher/lower fair quality 10.00-11.00 poorer quality and condition lower fine appearance 18.00-19.00 occasional higher/lower WASHINGTON medium-large 16.00 occasional higher/lower fair quality 10.00-12.00 poorer quality and condition lower fine appearance 18.00-19.00 occasional higher/lower flats 12 1-pint cups with lids CANADA BRITISH COLUMBIA medium-large fair quality 14.00-16.00 poorer quality and condition lower OREGON medium-large 20.00-22.00 mostly 20.00-21.00 occasional higher/lower WASHINGTON medium-large fair quality 12.00-14.00 poorer quality condition lower

---**CURRENTS:** MARKET STEADY. OFFERINGS VERY LIGHT. flats 12 6-oz cups with lids OREGON RED medium 32.00-34.00 occasional higher/lower

---**RASPBERRIES:** MARKET ABOUT STEADY. OFFERINGS VERY LIGHT. flats 12 6-oz cups with lids CALIFORNIA SALINAS-WATSONVILLE CALIFORNIA RED large 18.00-21.00 mostly 19.00-20.00 occasional lower fair quality 14.00-16.00 mostly 14.00-15.00 poorer quality and condition lower fine appearance 30.00-32.00 occasional higher/lower SANTA MARIA DISTRICT CALIFORNIA RED large 19.00-22.00 mostly 20.00-21.00 occasional lower MEXICO RED large 19.00-22.00 mostly 20.00-21.00 occasional higher/lower fair quality 11.00-12.00 poorer quality and condition lower

---**STRAWBERRIES:** MARKET FIRM. OFFERINGS 1-PINT BASKETS LIGHT. wide range in quality and condition. flats 8 1-lb containers with lids CALIFORNIA SALINAS-WATSONVILLE CALIFORNIA medium 18.00-20.00 mostly 19.00-20.00 fair quality 13.00-14.00 poorer quality and condition lower fine appearance 22.00-24.00 mostly 23.00-24.00 occasional higher/lower (one label) SANTA MARIA DISTRICT CALIFORNIA medium 18.00-20.00 mostly 19.00-20.00 occasional higher/lower fair quality 12.00-13.00 poorer quality and condition lower flats 12 1-pint baskets CALIFORNIA SALINAS-WATSONVILLE CALIFORNIA medium 22.00-24.00 flats 4 1-lb containers with lids CALIFORNIA SALINAS-WATSONVILLE CALIFORNIA WITH STEMS medium-large insufficient to quote

CITRUS

---**BLOOD ORANGE:** OFFERINGS INSUFFICIENT TO QUOTE. 10 lb cartons CALIFORNIA SHIPPERS FIRST GRADE SANGUINE insufficient to quote

---**CLEMENTINES:** MARKET STEADY. OFFERINGS VERY LIGHT. flat cartons 10 3-lb mesh bags PERU boat 36 size 45.00-48.00 mostly 46.00-47.00 occasional higher/lower

---**GRAPEFRUIT:** OFFERINGS SHIPPERS CHOICE LIGHT. 7/10 bushel cartons CALIFORNIA SHIPPERS FIRST GRADE STAR RUBY 23s 24.00-26.00 mostly 25.00-26.00 one label 30.00 occasional higher 27s 25.00-28.00 mostly 26.00-27.00 one label 30.00 occasional higher 32s 25.00-28.00 mostly 26.00-27.00 occasional higher 36s 26.00-29.00 mostly 27.00-28.00 occasional higher 40s 23.00-26.00 mostly 24.00-25.00 occasional higher 48s 23.00-26.00 mostly 24.00-25.00 occasional higher 56s 23.00-25.00 mostly 24.00-25.00 occasional higher 64s 21.00-24.00 mostly 22.00-23.00 occasional higher SHIPPERS CHOICE STAR RUBY 23s 19.00-22.00 mostly 20.00-21.00 occasional higher 27s 20.00-22.00 mostly 21.00-22.00 occasional higher 36s 22.00-25.00 mostly 23.00-24.00 occasional higher 40s 20.00-23.00 mostly 21.00-22.00 occasional higher 48s 21.00-23.00 mostly 22.00-23.00 occasional higher 56s 19.00-22.00 mostly 20.00-21.00 occasional higher 64s 19.00-22.00 mostly 20.00-21.00 occasional higher

---**KUMQUATS:** OFFERINGS VERY LIGHT. 10 lb cartons CHILE air CLASS I 51.00-54.00 mostly 52.00-53.00 occasional lower

Source: USDA, AMS, Specialty Crops Market News

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---LEMONS: MARKET ABOUT STEADY. OFFERINGS ARGENTINA AND CHILE VERY LIGHT. 7/10 bushel cartons CALIFORNIA CENTRAL DISTRICT CALIFORNIA SHIPPERS FIRST GRADE 95s 36.00-39.00 mostly 37.00-38.00 occasional higher 115s 40.00-42.00 mostly 40.50-41.50 occasional higher 140s 44.00-47.00 mostly 45.00-46.00 occasional higher 165s 48.50-50.50 mostly 49.00-50.00 occasional higher 200s 47.00-50.00 mostly 48.00-49.00 occasional higher SHIPPERS CHOICE 75s 34.00-37.00 mostly 35.00-36.00 occasional higher 95s 29.00-32.00 mostly 30.00-31.00 occasional higher 115s 32.00-34.00 mostly 33.00-34.00 occasional higher 140s 31.00-34.00 mostly 32.00-33.00 occasional higher 165s 39.00-42.00 mostly 40.00-41.00 occasional higher 200s 38.00-41.00 mostly 39.00-40.00 occasional higher 235s 33.00-36.00 mostly 34.00-35.00 few 40.00 occasional higher cartons CALIFORNIA CENTRAL DISTRICT CALIFORNIA SHIPPERS CHOICE medium (10-lbs) insufficient to quote 17 kg cartons ARGENTINA CLASS I 95s 36.00-38.00 mostly 37.00-38.00 occasional higher 115s 36.00-38.00 mostly 37.00-38.00 occasional higher CHILE CLASS I 95s 36.00-39.00 mostly 37.00-38.00 occasional higher 115s 36.00-38.00 mostly 37.00-38.00 occasional higher

---LIMES: MARKET ABOUT STEADY. OFFERINGS VERY LIGHT. wide range in quality and condition. 40 lb cartons MEXICO NO GRADE MARKS SEEDLESS TYPE 110s 43.00-46.00 mostly 44.00-45.00 occasional higher/lower fine appearance 48.00 occasional higher 150s 43.00-46.00 mostly 44.00-45.00 occasional higher fair appearance 34.00-36.00 fine appearance 48.00 occasional higher 175s 43.00-46.00 mostly 44.00-45.00 occasional higher fair appearance 36.00-38.00 poorer quality and condition lower fine appearance 48.00-50.00 occasional higher 200s 43.00-46.00 mostly 44.00-45.00 occasional higher fair appearance 36.00-38.00 poorer quality and condition lower fine appearance 49.00-50.00 occasional higher 230s 38.00-40.00 mostly 39.00-40.00 occasional higher fair appearance 32.00-34.00 fine appearance 42.00-44.00 occasional higher 250s 39.00-42.00 mostly 40.00-41.00 occasional higher fair appearance 32.00-34.00 35-36 lb cartons MEXICO NO GRADE MARKS SEEDED TYPES 300s 47.00-50.00 mostly 48.00-49.00 occasional higher/lower 500s 37.00-40.00 mostly 38.00-39.00 occasional higher

---MELOGOLD: OFFERINGS INSUFFICIENT TO QUOTE. 7/10 bushel cartons CALIFORNIA 18s insufficient to quote

---MEYER LEMON: OFFERINGS VERY LIGHT. 18 lb cartons NEW ZEALAND CLASS I medium 53.00-56.00 mostly 54.00-55.00 occasional higher/lower 17 kg cartons NEW ZEALAND CLASS I 115s 83.00-84.00 occasional higher/lower 10 lb cartons NEW ZEALAND repacked local CLASS I medium size 27.00-30.00 mostly 28.00-29.00 few high as 38.00 occasional higher/lower

---ORANGES: MARKET STEADY. OFFERINGS AUSTRALIA NAVEL CARA CARA TYPE VERY LIGHT. 15 kg cartons CHILE boat CLASS I NAVEL 88s 32.00-35.00 mostly 33.00-34.00 138s 34.00-37.00 mostly 35.00-36.00 7/10 bushel cartons CALIFORNIA SHIPPERS FIRST GRADE VALENCIA 48s 31.00-34.00 mostly 32.00-33.00 occasional higher/lower 56s 30.00-33.00 mostly 31.00-32.00 occasional higher/lower 72s 34.00-37.00 mostly 35.00-36.00 occasional higher/lower 88s 34.00-37.00 mostly 35.00-36.00 occasional higher/lower 113s 37.00-40.00 mostly 38.00-39.00 occasional higher/lower 138s 37.00-40.00 mostly 38.00-39.00 occasional higher/lower SHIPPERS CHOICE NAVEL 56s insufficient to quote 88s insufficient to quote VALENCIA 40s 29.00-32.00 mostly 30.00-31.00 occasional higher/lower 48s 29.00-32.00 mostly 30.00-31.00 occasional higher/lower 72s 29.00-32.00 mostly 30.00-31.00 occasional higher/lower 88s 29.00-32.00 mostly 30.00-31.00 occasional higher/lower 113s 33.00-36.00 mostly 34.00-35.00 occasional higher/lower 138s 33.00-36.00 mostly 34.00-35.00 occasional higher/lower 17 kg containers AUSTRALIA boat CLASS I NAVEL 36s 47.00-50.00 mostly 48.00-49.00 occasional higher/lower 48s 47.00-50.00 mostly 48.00-49.00 occasional higher/lower 72s 47.00-50.00 mostly 48.00-49.00 occasional higher/lower Cara Cara 72s 51.50-52.50 occasional higher/lower

---TANGERINES: OFFERINGS SOUTH AFRICA AND AUSTRALIA DAISY TYPE VERY LIGHT. 10 kg cartons AUSTRALIA boat CLASS I DAISY 54s 28.00-30.00 mostly 29.00-30.00 occasional higher 56s 28.00-30.00 mostly 29.00-30.00 occasional higher PERU CLASS I W. MURCOTT AFOURER 50s 30.00-33.00 mostly 31.00-32.00 occasional higher 60s 30.00-33.00 mostly 31.00-32.00 occasional higher SOUTH AFRICA boat CLASS I W. MURCOTT AFOURER 56s 28.00-30.00 mostly 29.00-30.00 occasional higher cartons 10 3-lb mesh bags AUSTRALIA repacked local boat CLASS I DAISY medium 40.00-43.00 mostly 41.00-42.00 occasional higher CHILE small 44.00-47.00 mostly 45.00-46.00 occasional higher

MELONS



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---**CANTALOUPE**S: MARKET TUSCAN TYPE SLIGHTLY LOWER, OTHERS ABOUT STEADY. OFFERINGS TUSCAN TYPE VERY LIGHT. flat cartons CALIFORNIA SAN JOAQUIN VALLEY CALIFORNIA TUSCAN TYPE 9s 20.00-23.00 mostly 21.00-22.00 occasional higher/lower 1/2 cartons CALIFORNIA SAN JOAQUIN VALLEY CALIFORNIA 9s 9.00-11.00 mostly 10.00-11.00 occasional higher/lower fair quality 6.00-7.00 poorer quality and condition lower 12s 10.00-11.00 mostly 11.00 occasional higher/lower fair quality 6.00-7.00 poorer quality and condition lower oversized 1/2 cartons CALIFORNIA SAN JOAQUIN VALLEY CALIFORNIA 9s (6 size) 10.00-12.00 mostly 10.00-11.00 occasional higher/lower

---**HONEYDEW**S: MARKET SLIGHTLY HIGHER. OFFERINGS LIGHT. 2/3 cartons CALIFORNIA SAN JOAQUIN VALLEY CALIFORNIA 5s 12.00-14.00 mostly 12.00-13.00 fair condition 7.00-8.00 poorer quality and condition lower 6s 11.00-14.00 mostly 12.00-13.00 oversized 2/3 cartons CALIFORNIA SAN JOAQUIN VALLEY CALIFORNIA 5s (4 size) 12.00-14.00 mostly 13.00-14.00 occasional higher

---**MELON, GALIA**: OFFERINGS VERY LIGHT. 2/3 cartons/crates CALIFORNIA IMPERIAL AND PALO VERDE VALLEYS CALIFORNIA 6s insufficient to quote SAN JOAQUIN VALLEY CALIFORNIA 5s 23.00-26.00 mostly 24.00-25.00 occasional higher/lower fair condition 10.00-12.00 mostly 10.00-11.00 6s 23.00-26.00 mostly 24.00-25.00 occasional higher/lower

---**MELON, GAYA**: OFFERINGS VERY LIGHT. 2/3 cartons CALIFORNIA IMPERIAL AND PALO VERDE VALLEYS CALIFORNIA 8s insufficient to quote

---**MELON, HAMI** : OFFERINGS VERY LIGHT. 2/3 cartons CALIFORNIA SAN JOAQUIN VALLEY CALIFORNIA 4s fair condition 11.00-14.00 mostly 12.00-13.00 occasional higher/lower fine appearance 25.00-28.00 mostly 26.00-27.00 occasional higher/lower 5s fair condition 11.00-14.00 mostly 12.00-13.00 occasional higher/lower fine appearance 25.00-28.00 mostly 26.00-27.00 occasional higher/lower 8s fine appearance 22.00-25.00 mostly 23.00-24.00 occasional higher/lower

---**MELON, JUAN CANARY**: OFFERINGS VERY LIGHT. 2/3 cartons/crates CALIFORNIA IMPERIAL AND PALO VERDE VALLEYS CALIFORNIA 6s insufficient to quote SAN JOAQUIN VALLEY CALIFORNIA 5s 10.00-13.00 mostly 11.00-12.00 occasional higher/lower 6s 10.00-13.00 mostly 11.00-12.00 occasional higher/lower

---**MELON, KOREAN**: OFFERINGS INSUFFICIENT TO QUOTE. flat cartons MEXICO 12s insufficient to quote 15s insufficient to quote

---**WATERMELONS**: MARKET ABOUT STEADY. OFFERINGS RED FLESH SEEDLESS MINIATURE TYPE VERY LIGHT. cartons CALIFORNIA SAN JOAQUIN VALLEY CALIFORNIA ORANGE FLESH SEEDLESS TYPE 5s 50.00-53.00 mostly 51.00-52.00 occasional higher RED FLESH SEEDLESS TYPE 3s fair quality 16.00-18.00 4s 26.00-28.00 mostly 26.00-27.00 fair quality 18.00-20.00 5s 26.00-28.00 mostly 27.00-28.00 6s 26.00-28.00 mostly 27.00-28.00 24 inch bins CALIFORNIA SAN JOAQUIN VALLEY CALIFORNIA RED FLESH SEEDLESS TYPE 36s 185.00-190.00 45s 225.00-230.00 occasional lower 60s 225.00-230.00 flat cartons ARIZONA RED FLESH SEEDLESS MINIATURE 6s (one label) insufficient to quote CALIFORNIA SAN JOAQUIN VALLEY CALIFORNIA RED FLESH SEEDLESS MINIATURE 6s 12.00-15.00 mostly 13.00-14.00 occasional higher 8s 12.00-14.00 mostly 12.00-13.00 occasional higher

OTHER FRUIT

---**APPLE PEARS**: MARKET ABOUT STEADY. OFFERINGS VERY LIGHT. cartons 1 layer CHILE SHINKO 18s 28.00-30.00 occasional higher VARIETY NOT MARKED 12s 22.00-25.00 mostly 23.00-24.00 occasional higher/lower 16s 22.00-25.00 mostly 23.00-24.00 occasional higher/lower 18s 22.00-25.00 mostly 23.00-24.00 occasional higher/lower cartons 2 layer CHILE SHINKO 32s 43.00-46.00 mostly 44.00-45.00 occasional higher/lower CHINA boat VARIETY NOT MARKED 28s 24.00-26.00 mostly 25.00-26.00 YALI 56s insufficient to quote cartons 3 layer CHINA boat YALI 72s insufficient to quote 18 kg cartons tray pack wrapped CHINA boat YALI 64s insufficient to quote 8.5 kg cartons wrapped CHINA FRAGRANT 32s 30.00-33.00 mostly 31.00-32.00



NATIONAL SHIPPING POINT TRENDS

Agricultural Marketing Service
Specialty Crops Market News

December 03, 2024

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Page 1

FVWTRDS

Unless otherwise stated, shipments, crossings or imports are for the weeks ending November 16, 23, and 30, 2024, in that order in thousand hundredweight (cwt) or 100,000-pound units. The expected movement is for the period December 01-14, 2024. Prices are for Monday December 02, 2024, compared to Monday November 25, 2024. Unless otherwise stated, sales are F.O.B. Shipping Point Basis (including Delivered Sales, F.O.B. Shipping Point Basis) or port of entry, and extra services are included. Prices represent open (spot) market sales by first handlers on products of generally good quality and condition unless otherwise stated and may include promotional allowances or other incentives. No consideration is given to after-sale adjustments unless otherwise stated. Brokerage fees paid by the shipper are included in the price reported.

BERRIES

---BLACKBERRIES

MEXICO CROSSINGS THROUGH ARIZONA, CALIFORNIA AND TEXAS 2024 CROP Crossings 27-40-29 --- Movement expected to increase. Trading Slow. Prices Generally Unchanged. Prices flats 12 6-ounce cups with lids mostly 10.00-12.00. Quality generally good.

GUATEMALA IMPORTS - PORTS OF ENTRY SOUTH FLORIDA 2024 CROP Imports 1-1-1 --- Movement expected to remain about the same. Trading Moderate. Prices Higher. From Guatemala. Flats 12 6-oz cups with lids medium mostly 13.75-16.00. Supplies light. Many present shipments from prior bookings and/or previous commitments. Quality and condition variable but generally good.

---BLUEBERRIES

PERU IMPORTS - PORTS OF ENTRY MIAMI, PHILADELPHIA AND NEW YORK AREAS 2024 CROP Shipments 184-243-252 --- Movement mostly via boat. Shipments expected to remain the same. Trading Moderate. Prices Pints slightly lower, 6-oz unchanged. Flats 12 1-pint cups with lids large mostly 16.00-18.00; Flats 12 6-oz cups with lids large mostly 12.00-14.00; Organic Flats 12 1-pint cups with lids large 18.00-18.00. Quality good.

MEXICO CROSSINGS THROUGH ARIZONA, CALIFORNIA AND TEXAS 2024 CROP Crossings 7-10-8 --- Movement expected to increase. Trading Slow. Prices Generally Unchanged. Flats 12 6-ounce cups mostly 8.00-10.00. Quality variable.

---RASPBERRIES

MEXICO CROSSINGS THROUGH ARIZONA, CALIFORNIA AND TEXAS 2024 CROP Crossings 52-67-51 --- Movement expected about the same. Trading Slow. Prices Lower. Flats 12 6-ounce cups with lids mostly 14.00-16.00. Quality generally good.

---STRAWBERRIES

OXNARD DISTRICT CALIFORNIA 2024 CROP Shipments 99-85*-84 --- Movement expected to decrease. Supplies light. Trading Moderate. Prices Generally Unchanged. flats 8 -pound containers with lids medium mostly 24.00-26.00. Quality generally good. Most present shipments from prior bookings and/or previous commitments. (* revised)

MEXICO CROSSINGS THROUGH TEXAS 2024 CROP Crossings 49-86*-69 --- Movement expected to increase. Supplies light. Trading Moderate. Prices Slightly Higher. Flats 8-1pound containers with lids medium mostly 26.00-28.00. Quality variable. (* revised)

SANTA MARIA CALIFORNIA 2024 CROP Shipments 74-65*-33 --- Movement expected to decrease seasonally. Supplies light. Trading Moderate. Prices Slightly Higher. Flats 8 1-pound containers with lids medium mostly 22.00-24.00; ORGANIC medium mostly 30.00. Most present shipments from prior bookings and/or previous commitments. (* revised)

CENTRAL FLORIDA 2024 CROP Shipments 3-7-12 --- Movement expected to increase. Trading Fairly Active. Prices Generally Unchanged. Flats 8 1-lb containers with lids medium mostly 28.00. Quality variable.

CITRUS

---CLEMENTINES

MOROCCO IMPORTS - PORTS OF ENTRY PHILADELPHIA AREA AND NEW YORK CITY AREA Imports U-27-66 --- Movement is expected to increase seasonally. Trading Moderate. Prices Generally Unchanged. Flat cartons 10 3-lb mesh bags 20, 24, 28, 32, and 36 size mostly 28.00-30.00. (U = unavailable)



NATIONAL SHIPPING POINT TRENDS

Agricultural Marketing Service
Specialty Crops Market News

December 03, 2024

Email us with accessibility issues with this report.

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FVWTRDS

---APPLES

YAKIMA VALLEY AND WENATCHEE DISTRICT WASHINGTON 2024 CROP Shipments 1,162-1,193-905 (Includes exports 435-457-242)--- Movement expected about the same. Supplies Honeycrisp very light. Trading Honeycrisp active, others moderate. Prices Honeycrisp 113-125s higher, Pink Lady/Cripps Pink 64-80s lower; others generally unchanged. Honeycrisp wide range of prices. Cartons tray pack Washington Extra Fancy Fuji 64-72s mostly 25.95-28.95, 80-88s mostly 24.95-26.95, 100s mostly 22.95-24.95, 113s mostly 21.95-23.95, 125s mostly 20.95-22.95; Gala 64-80s mostly 28.95-31.95, 88s mostly 24.95-26.95, 100s mostly 22.95-24.95, 113s mostly 20.95-22.95, 125s mostly 18.95-20.95; Golden Delicious 64-88s mostly 29.95-32.95, 100s mostly 25.95-28.95, 113s mostly 22.95-24.95, 125s mostly 18.95-20.95; Granny Smith 64-80s mostly 24.40-26.95, 88-100s mostly 23.95-25.95, 113s mostly 22.95-24.95, 125s mostly 21.95-23.95; Honeycrisp 64-80s mostly 40.95-44.95, 88s mostly 38.95-42.95, 100s mostly 26.95-29.95, 113s mostly 24.95-26.95, 125s mostly 22.95-24.95; Pink Lady/Cripps Pink 64-80s mostly 26.40-28.95, 88s mostly 25.95-27.95, 100s mostly 21.95-23.95, 113s mostly 19.95-21.95, 125s mostly 18.95-20.95; Red Delicious 64-88s mostly 18.95-20.95, 100-125s mostly 17.95-19.95. Cartons 12 3-pound film bags Fuji 2 ½" minimum mostly 22.95-24.95, 2 ¼" minimum mostly 16.95-18.95; Gala 2 ½" minimum mostly 22.95-24.95, 2 ¼" minimum mostly 16.95-18.95; Granny Smith 2 ½" minimum mostly 22.95-24.95, 2 ¼" minimum mostly 18.95-20.95; Golden Delicious 2 ½" minimum mostly 21.95-23.95, 2 ¼" minimum mostly 14.95-16.95; Pink Lady/Cripps Pink 2 ½" minimum mostly 22.95-24.95; Red Delicious 2 ½" minimum 18.95-20.95, 2 ¼" minimum 14.95-16.95. ORGANIC Cartons 12 3-pound film bags 2 ½" minimum Fuji 34.95-36.95, Gala mostly 31.95-34.95, Granny Smith mostly 35.95-38.95. Exports to (listed by volume in descending order) Mexico, Canada, Guatemala, Vietnam, Taiwan, Thailand, China, India, Chile, Colombia, Hong Kong, Indonesia, U.A.E., El Salvador, Honduras, Peru, Costa Rica, Dominican Republic, New Zealand, Panama, Venezuela, Israel, Nicaragua, Saudi Arabia, Philippines, Fiji, Trinidad/Tobago, U.S. Possessions, Guyana, Curacao, and Qatar.

NEW YORK 2024 CROP Shipments 94-104-82 --- Movement expected to remain the same. Trading Moderate. Prices Generally Unchanged. Cortland U.S. Extra Fancy cartons 12-3 pound film bags 2 1/2 minimum 20.00-26.00, Cartons Tray Pack 80s-88s 30.00-31.00; Empire U.S. Extra Fancy cartons 12-3 pound film bags 2 1/2 inch minimum 20.00-26.00, cartons tray pack 80s-88s 30.00-32.00; Fuji U.S. Extra Fancy cartons 12-3 pound film bags 2 1/2 inch minimum 22.00-26.00, Cartons tray pack 80s-88s 30.00-32.00; Gala U.S. Extra Fancy cartons 12 3-pound film bags 2 1/2 inch minimum mostly 26.00-27.00, Cartons Tray pack 80s-88s mostly 33.00-34.00; Ginger Gold U.S. Extra Fancy Cartons 12 3-pound film bags 2 1/2 minimum 22.00-27.50, Cartons Tray Pack 80s-88s 30.00-32.50; Honeycrisp U.S. Extra Fancy Cartons 12 3-pound film bags 2 1/2 inch minimum mostly 35.00-43.00, Cartons Tray Pack 80s-88s mostly 48.00-50.00; Macoun U.S. Extra Fancy cartons 12-3 pound film bags 2 1/2 inch minimum 22.00-26.00, Cartons tray pack 30.00-33.00; McIntosh U.S. Extra Fancy cartons 12 3-pound film bags 2 1/2 inch minimum 22.00-25.00, Cartons Tray Pack 80s-88s mostly 30.00-32.00; Red Delicious U.S. Extra Fancy cartons 12-3 pound film bags 2 1/2 inch minimum 20.00-26.00, Cartons Tray Pack 80s-88s 28.00-30.00.

MICHIGAN 2024 CROP Shipments 92-86-66 --- Movement expected to remain the same. Trading Moderate. Prices Unchanged. Cartons Tray Pack U.S. ExFcy Red Delicious 88s 23.90-27.95, Gala 88s 29.95-33.95; Golden Delicious 88s 22.00-30.95; Fuji 88s 23.00-29.95; McIntosh 88s 20.90-25.95, Honeycrisp 88s 44.95-54.95; Cartons 12 3-lb film bags U.S. ExFcy 2 1/2" min Red Delicious 17.90-23.95, Gala 18.00-26.95; Golden Delicious 17.00-22.95; Fuji 18.00-25.95; McIntosh 17.00-25.95, Honeycrisp 39.95-48.95. Quality generally good.

APPALACHIAN DISTRICT (MD, PA, VA, WV) 2024 CROP Shipments 47-41-40 --- Movement expected to remain about steady. Trading Moderate. Prices Generally Unchanged. Fuji U.S. Extra Fancy cartons 12 3-lb film bags 2 1/2" minimum mostly 25.00-27.00. Gala U.S. Extra Fancy cartons 12 3-lb film bags 2 1/2" minimum mostly 25.00-27.00, cartons tray pack 72s mostly 36.00-37.00, 80s mostly 36.00-37.00, 88s mostly 36.00-37.00, U.S. Fancy cartons tray pack 100s mostly 19.00-20.00, 113s mostly 19.00-20.00, 125s mostly 19.00-20.00. Golden Delicious U.S. Extra Fancy cartons 12 3-lb film bags mostly 21.00-23.00, cartons tray pack 72s mostly 33.00-34.00, 80s mostly 33.00-34.00, 88s mostly 33.00-34.00, U.S. Fancy cartons tray pack 100s mostly 19.00-21.00, 113s mostly 19.00-21.00, 125s mostly 19.00-21.00. Honeycrisp U.S. Extra Fancy cartons 12 3-lb film bags 38.00-45.00, cartons tray pack 72s mostly 43.00-46.00, 80s mostly 43.00-46.00, 88s mostly 43.00-46.00. McIntosh U.S. Extra Fancy cartons 12 3-lb film bags mostly 23.00-24.00. Red Delicious U.S. Extra Fancy cartons 12 3-lb film bags 2 1/2" minimum mostly 23.00-25.00, cartons tray pack 72s 26.00-27.00, 80s mostly 26.00-27.00. 88s mostly 26.00-27.00, U.S. Fancy cartons tray pack 100s mostly 18.00-20.00, 113s mostly 18.00-20.00, 125s mostly 18.00-20.00.

NEW ENGLAND 2024 CROP Shipments 4-6-6 --- Movement expected to remain the same. Too few open market sales to establish a market.

Source: USDA Specialty Crops Market News
1400 Independence Avenue Room 1406-S
Washington, DC 20250
Phone (202) 720-2175

<https://mymarketnews.ams.usda.gov/viewReport/1662>

Handout 6

Report_date	Location	Commodity	Package	Origin	Item_size	Quality	Low_price	High_price	Mostly_low_price	Mostly_high_price
3/15/2024	Atlanta, Georgia	Cucumbers	1 1/9 bushel c	Honduras	medium	Fair Quality	42.5	48	45	45
3/15/2024	Atlanta, Georgia	Cucumbers	1 1/9 bushel c	Florida	medium	Fair Quality	45	49	47	49
3/15/2024	Atlanta, Georgia	Cucumbers	1 1/9 bushel c	Mexico	medium	N/A	48.5	53	51.5	52.5
3/15/2024	Atlanta, Georgia	Cucumbers	1 1/9 bushel c	Florida	medium	N/A	46	48.5		
3/15/2024	Boston, Massach	Cucumbers	1 1/9 bushel c	Mexico	medium	Fair Quality	48	50		
3/15/2024	Chicago, Illinois	Cucumbers	1 1/9 bushel c	Mexico	medium	N/A	56	58		
3/15/2024	Detroit, Michigar	Cucumbers	1 1/9 bushel c	Mexico	medium-large	Fair Quality	52	56		
3/15/2024	Detroit, Michigar	Cucumbers	1 1/9 bushel c	Mexico	medium-large	N/A	61	61		
3/15/2024	Los Angeles, Cal	Cucumbers	1 1/9 bushel c	Mexico	medium	N/A	34	36		
3/15/2024	Los Angeles, Cal	Cucumbers	1 1/9 bushel c	Mexico	medium	Fair Quality	28	30		
3/15/2024	Los Angeles, Cal	Cucumbers	1 1/9 bushel c	Mexico	medium	Ordinary Q	24	26		
3/15/2024	Miami, Florida	Cucumbers	1 1/9 bushel c	Mexico	medium	N/A	50	55		
3/15/2024	New York, New Y	Cucumbers	1 1/9 bushel c	Mexico	medium	N/A	43	46		
3/15/2024	New York, New Y	Cucumbers	1 1/9 bushel c	Mexico	medium	N/A	38	40		
3/15/2024	Philadelphia, Per	Cucumbers	1 1/9 bushel c	Mexico	medium	Fair Quality	35	36		
3/15/2024	Philadelphia, Per	Cucumbers	1 1/9 bushel c	Mexico	medium	Ordinary Q	40	40		
3/15/2024	Philadelphia, Per	Cucumbers	1 1/9 bushel c	Honduras	medium	Fair Quality	32	35		
3/15/2024	Philadelphia, Per	Cucumbers	1 1/9 bushel c	Mexico	medium	N/A	42	45	44	45
3/15/2024	San Francisco, C	Cucumbers	1 1/9 bushel c	Mexico	medium-large	N/A	48			

Market News Activity

Directions: Answer the following questions based on the *AMS Market News* handouts, PPT slide, and/or reports:

1. Per the Sept. 24th, 2024, *Philadelphia Terminal Market Report* for California strawberries in eight 1 lb. containers with lids, what is the reported appearance of the large-extra large berries? (Handout 1)
2. What is the reported appearance definition of the fine berries. (Handout 2)
3. Using the May 13th, 2024, *Chicago Terminal Market Report* for strawberries in 8 1 lb. containers with lids, calculate the high price per pound for the California grown, large-extra-large, fine appearance strawberries. (Handout 3)
4. A school nutrition program in Illinois uses a market price plus fixed fee for delivery type annual bid for fresh produce. It is your responsibility to periodically check bi-monthly bid quotes against prices stated in the *Chicago Terminal Market Report*. Pretend it is May 13th, 2024; this week your vendor quoted 8 1 pound container strawberries at \$24.00 per case plus delivery fee. (Handout 3)
 - a. Is the produce quote acceptable for your district based on current market prices for domestic strawberries? YES/NO Explain why?
5. On the *Los Angeles Terminal Market Fruit Prices* report for cantaloupes week of August 20, 2024 (Handout 4), what does item size 6s, 9s, and 12s refer to?

6. This week, your vendor quotes a 15-count case of cantaloupe at \$10.00 per case or \$0.67 each (rounded up). You want to determine if processing in-house is the best buy, as compared to buying it precut.
- a. Using the following formula, calculate the ½ cup Edible Portion (EP) cost of the melon and write the answer to in the shaded block of the table below.

As Purchased (AP) Cost $\$0.67 \div 8.33 \frac{1}{2} \text{ c servings per melon} = \$\underline{\hspace{1cm}} \frac{1}{2} \text{ c EP Portion}$
 (\$10.00 ÷ 15 = \$0.6666 rounded to \$0.67)

Cantaloupe Processor	Product Pack	Cost per Case	Cost per ½ c Portion
School (in-house)	15 ct. case	\$10.00	
Vendor A	2/5 lb tubs/case – splits allowed	\$41.60	\$0.70
Vendor B	2/5 lb tubs/case – no splits	\$26.50	\$0.45

Note: Labor and packaging, if applicable, should be added to in-house processed fruit or vegetable portion costs, because labor and packaging are included in the price of precut products.

- b. Considering the cost of in-house processing above to purchasing precut from Vendor A or B, what would be the best buy for your operation? Why?
7. According to the December 3, 2024, *National Shipping Point Trends* report, how many pounds of **2024 CROP** apples were shipped from New York for the week ending November 23? (Handout 5 & slide)
8. Your school nutrition program offers a popular cucumber and tomato salad each week on the high school salad bar. The produce vendor cannot offer domestic cucumbers for the week of March 15, 2024, so the program decides to justify using non-domestic product to maintain customer satisfaction. State the process for documenting non-domestic product use. (Handout 6)


INSERT "Buy Smart, Save Smart" TAB



Buy Smart, Save Smart





PRODUCE SAFETY UNIVERSITY


Cyndie Story, PhD, RDN, Chef, SNS



Objectives

PRODUCE SAFETY UNIVERSITY

-  Review the Food Safety Modernization Act (FSMA) rules followed by reputable vendors.
-  Identify the benefits and challenges to food traceability in school meals programs
-  Describe the 2025-2032 phased-in Buy American Provision implementation plan and exemptions list as outlined in the 2024 Child Nutrition Programs final rule.
-  Apply fresh produce cost saving measures in school meal operations.





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

A photograph of several stacked punnets of strawberries. Each punnet is labeled with "JAEMOR FARMS" and "SWEET & JUICY". The strawberries are bright red and appear fresh. The punnets are arranged in a grid, showing multiple units of the product.

A decorative border at the bottom of the slide consists of a repeating pattern of small, stylized vegetable icons.

Vendor Options

PRODUCE SAFETY
UNIVERSITY

Types of vendors supplying fresh fruits and vegetables to your school nutrition program:

- Broad Line Distributor
- Produce Distributor
- Produce Cooperative
- Food Hub
- Direct from the Farm
- Farmer's Market
- School Garden



Buying Local Produce from a Distributor

PRODUCE SAFETY
UNIVERSITY

- **Indicate your interest in buying local produce in the solicitation.**
Use geographic preference, note local purchasing goals in the introduction, or use specifications.
- **Distributors may supply local produce without asking because local products in season are often available at lower prices.**
- **Distributors may buy from food hubs/cooperatives.**
Make sure backhauling procedures incorporate measures to prevent cross contamination.



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



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

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



Intentional Adulteration (Food Defense)

- Conduct vulnerability assessment
- Implement mitigation strategies



Sanitary Transportation Rule

- Proper refrigeration
- Cleaning between loads
- Prevent cross contamination and allergen cross contact



Buyer Due Diligence: From the wholesale market

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 Due Diligence: Directly from the farm

PRODUCE SAFETY
UNIVERSITY

A smart buyer will:

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



Are you covered?

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, parasites, or other foodborne hazards



Traceability Systems used in School Districts (N=124)

Current System Perception of Completeness:

- One-third (36%) complete
- Over half (55%) partially complete

Source: Boutros, B., Roberts, K., Lin, N., & Sauer, K.. Food Traceability in School Foodservice Operations: Benefits and Challenges (2019). *Health and Sport Science Faculty Publications*. 102



Traceability Systems used in School Districts (N=124)

The Majority of Types of Systems:

- 38% paper trail
- 27% manually entered data; electronically stored
- 25% barcodes
- Almost 5% Radio Frequency Identification (RFID)

Source: Boutros, B., Roberts, K., Lin, N., & Sauer, K.. Food Traceability in School Foodservice Operations: Benefits and Challenges (2019). *Health and Sport Science Faculty Publications*. 102



Buyer Due Diligence: Trace Your Case!

PRODUCE SAFETY
UNIVERSITY

Traceability Systems used in School Districts (N=124)

Trace Back Frequency: Average 9 times (0-150)

Type of Food:

- Milk and dairy items (19%)
- Fresh fish and shellfish (15%) (usually local-harvest)
- Canned fruits (9%)
- Canned vegetables (9%)
- Raw meat & poultry (1.7%)

Source: Boutros, B., Roberts, K., Lin, N., & Sauer, K.. Food Traceability in School Foodservice Operations: Benefits and Challenges (2019). *Health and Sport Science Faculty Publications*. 102



Buyer Due Diligence: Trace Your Case!

PRODUCE SAFETY
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Traceability Systems used in School Districts

Benefits	Challenges
Support food safety	Unexpected vendor substitutions
Prevent bioterrorism	High cost of traceability systems
Reduce recall process costs	

Source: Boutros, B., Roberts, K., Lin, N., & Sauer, K.. Food Traceability in School Foodservice Operations: Benefits and Challenges (2019). *Health and Sport Science Faculty Publications*. 102



Recommendations

PRODUCE SAFETY
UNIVERSITY

- Review your traceability system for completeness
- Track food supply in all stages of production, preparation, and service
- Clearly define substitutions in bid solicitation
- Conduct a Mock Recall with vendors to test effectiveness

Source: Boutros, B., Roberts, K., Lin, N., & Sauer, K.. Food Traceability in School Foodservice Operations: Benefits and Challenges (2019). *Health and Sport Science Faculty Publications*. 102



Buy American Provision

Buy American Provision

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Requires nutrition operators in the contiguous United State to:

- purchase a domestic commodity or product to the maximum extent practicable;
- select commodity or product substantially using over 51% of a U.S. grown food product (by weight or volume).



Buy American Provision

PRODUCE SAFETY
UNIVERSITY

Requires nutrition operators in the contiguous United State to:

- Include Buy American requirements in documented procurement procedures, solicitations, and contracts.

“We certify that ___ (insert product name)___ was processed in the U.S. and contains over 51% of its agricultural food component, by weight or volume, from the U.S.,” with space for the supplier to fill in the name of the product and its specific percentage of the domestic agricultural food component contained therein.



Buy American Provision

PRODUCE SAFETY
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Limited exceptions to the rule:

Exception 1 - Product is listed on the Federal Acquisition Regulations (FAR) 25.104 Non-available list and/or is not domestically grown in sufficient and reasonably available quantities or satisfactory quality.

Exception 2 - Competitive bids reveal U.S. product costs are significantly higher than non-domestic.



Buy American Provision – Exception Threshold

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10%

SY 2025-26

of total commercial food costs from non-domestic food purchases



Buy American Provision – Exception Threshold

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8%

SY 2028-29

of total commercial food costs from non-domestic food purchases



Buy American Provision – Exception Threshold

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5%

SY 2031-32

of total commercial food costs from non-domestic food purchases



Buy American Provision - Exception Documentation and Reporting

Exception 1: FAR 25.104 List – No further documentation required

- Bananas
- Oranges, mandarin, canned
- Pineapple, canned



Code of Federal Regulations

A point in time eCFR system



Buy American Provision USDA Documentation/Tracking Tool

EXCEPTION TYPE	UNIT	PRICE PER UNIT	NUMBER OF UNITS	TOTAL AMOUNT
<p>Exception 1. The product is listed on the Federal Acquisitions Regulations Nonavailable articles list found at 48 CFR 25.104 and/or is not produced or manufactured in the U.S. in sufficient and reasonably available quantities of a satisfactory quality.</p> <p>Exception 2. Competitive bids reveal the cost of a U.S. product is significantly higher than the non-domestic product.</p>	<p>Optional (e.g., case, dozen, pound, bunch).</p> <p>If you prefer not listing items by unit, you can leave this column blank or enter "N/A".</p>	<p>Optional.</p> <p>If you prefer not listing items by unit, you can leave this column blank or enter zero.</p>	<p>Optional.</p> <p>If you prefer not listing items by unit, you can leave this column blank or enter "N/A".</p>	<p>Enter the total cost for this line.</p> <p>If you choose to include price per unit and number of units, you can use this column to calculate the total by multiplying price per unit by number of units.</p>
Exception 2	Case	\$ 40.00	25	\$ 1,000.00
Exception 1, listed on the Nonavailable articles list	N/A	\$ -	N/A	\$ 300.00



Buy American Provision USDA Documentation/Tracking Tool

Buy American Exceptions Summary

Total Non-domestic Costs

\$ - .00

This will be automatically calculated.

Total Annual Commercial Food Costs

Please enter the SFA's total annual commercial food costs here.

Percentage of Commercial Food Costs
from Non-domestic Foods

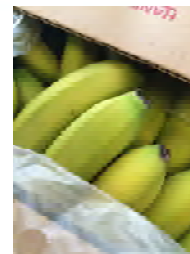
#DIV/0!

This field will highlight green, yellow, or red depending on the percentage calculated.



Buy American Provision - Example

- School district size: 6 -10 schools
- Annual food expenditures: \$1,550,000
- Student enrollment: 5,500
- Bananas: \$32/40 lb case
- Amount served: Once per week for breakfast and lunch
- Amount purchased: 49 cases x 36 weeks x \$32 = \$56,448



Buy American Provision - Example

PRODUCE SAFETY
UNIVERSITY

Buy American Exceptions Summary

Total Non-domestic Costs

\$ 56,448.00

This will be automatically calculated.

Total Annual Commercial Food Costs

\$ 1,550,000.00

Please enter the SFA's total annual commercial food costs here.

Percentage of Commercial Food Costs
from Non-domestic Foods

4%

This field will highlight green, yellow, or red depending on the percentage calculated.



Are we compliant?

PRODUCE SAFETY
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To ensure compliance, School Food Authorities (SFAs) (N=562):

- Include clause in bid solicitation (49%)
 - Examine food product packaging (48%)
 - Include in product specification (42%)
 - Request certification on food product origin (34%)
-
- Note: A higher percentage of very large SFAs (83%) included Buy American Provision in bid documents as compared to small SFAs (36%).



Source: Williams, K., Kimathi, M., Papa, F., Miller, M., Beyler, N. (2021). Study of School Food Authority Procurement Practices. U.S. Department of Agriculture, Food and Nutrition Service.



Would you buy it?

PRODUCE SAFETY
UNIVERSITY

Canned Fruit

Processed and Packed in the
U.S.

California Style
USDA Approved



Buy American provision

Would you buy it?

PRODUCE SAFETY
UNIVERSITY

Canned Fruit

100% Imported fruit &
juice



Buy American provision

Would you buy it, now?

PRODUCE SAFETY
UNIVERSITY

Canned Fruit

100% Imported fruit &
juice

\$32.00 per case

Note: 100% USA fruit &
juice

\$34.00 per case



Buy American provision

Would you buy it, now?

PRODUCE SAFETY
UNIVERSITY

Canned Fruit

100% Imported fruit &
juice

\$32.00 per case

Note: 100% USA fruit &
juice

\$49.00 per case



Buy American provision

Would you buy it?

PRODUCE SAFETY
UNIVERSITY

Juice

51% Water,
49% Imported juice
concentrate



Buy American provision

Would you buy it?

PRODUCE SAFETY
UNIVERSITY

Fresh Fruit
Imported bananas



Buy American provision

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%



Buy American provision



Save Smart

Maximize product shelf life or yield through:

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



Photo credit: Chef Cyndie & K12 Team



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)






Questions




Save Smart
Live Demonstration & Activity



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



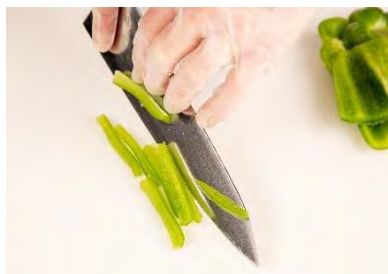
Step 1 (AP 4.6 oz)



Step 2



Step 3



Step 4



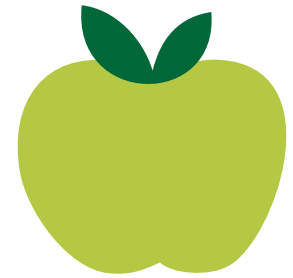
Step 5



Step 6 (EP 3.8 oz)

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

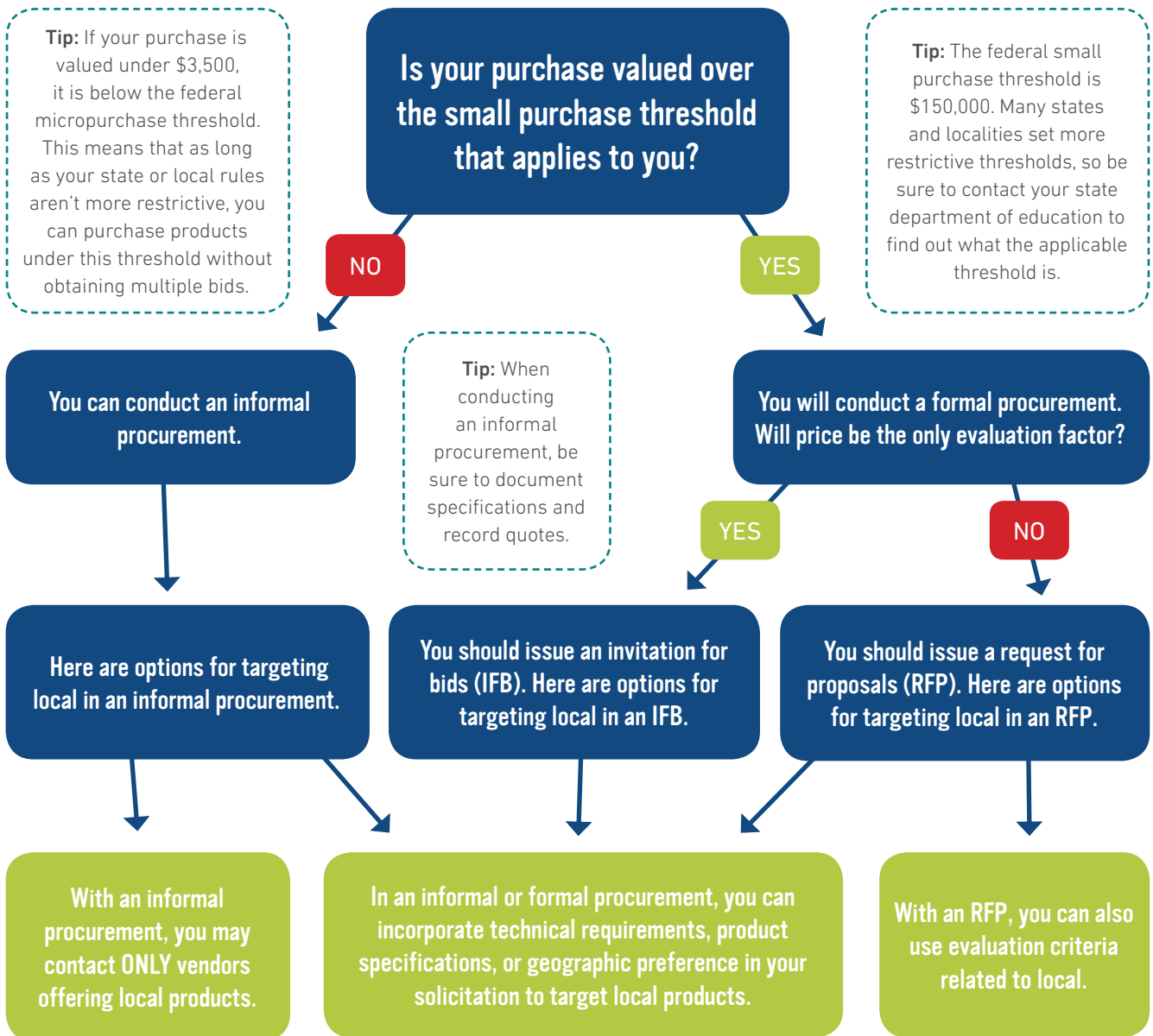
DECISION TREE: How Will You Bring Local Foods into the Cafeteria with Your Next Food Purchase?



* * * * *

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.



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.

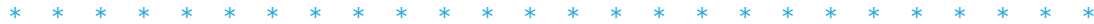
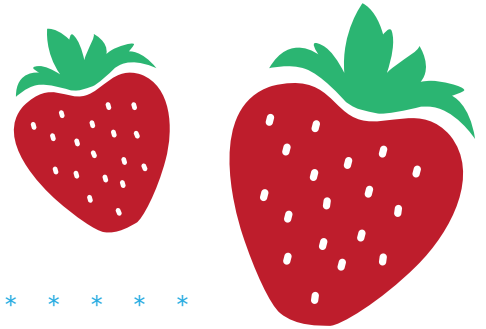
Questions? Email us at farmtoschool@fns.usda.gov.

USDA is an equal opportunity provider and employer. Updated August 2017.



OFFICE of
COMMUNITY
FOOD SYSTEMS

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!



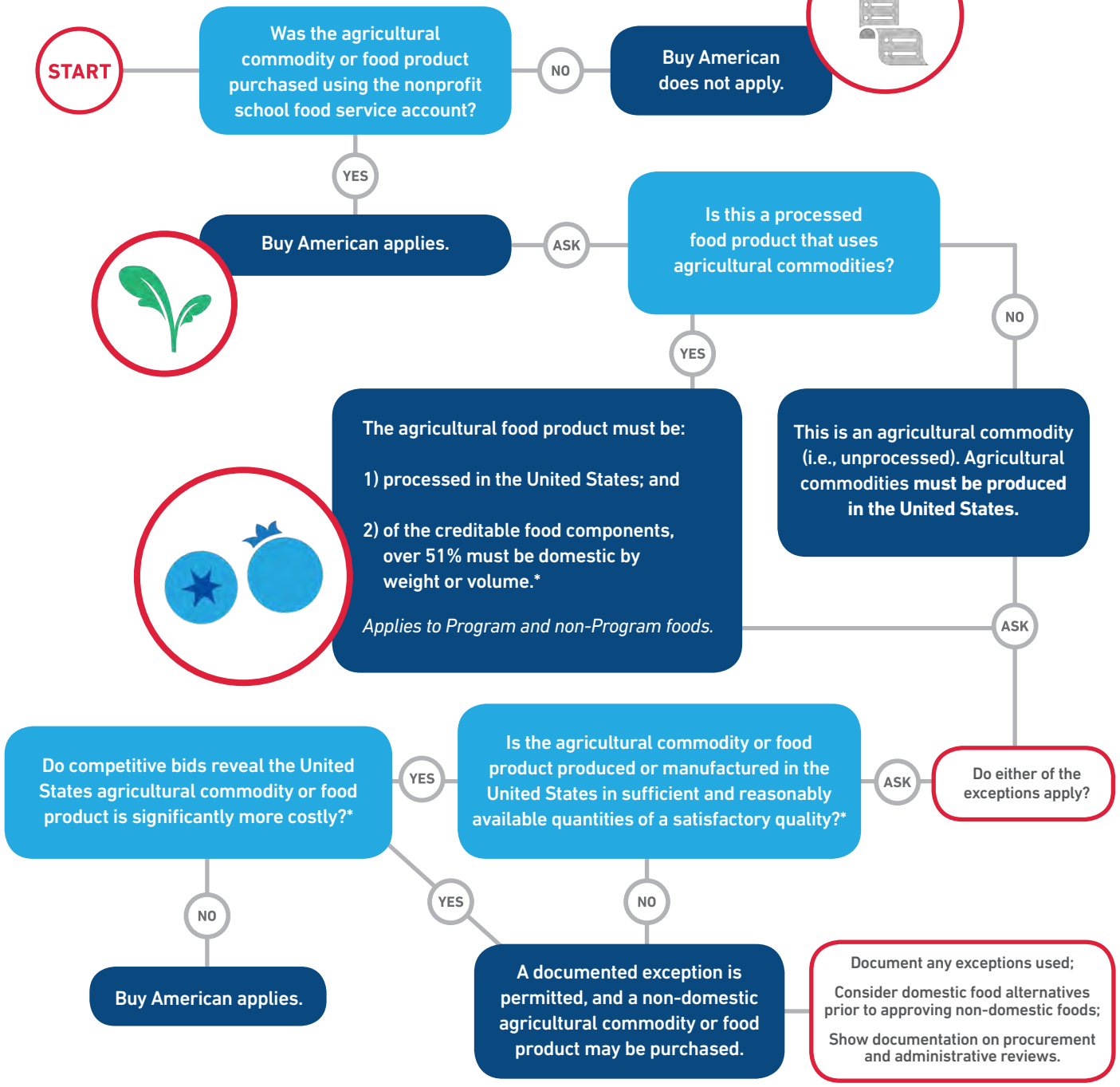
*SFAs in Alaska, Hawaii, and the U.S. territories are exempt from the Buy American provision. However, SFAs in Hawaii are required to purchase food products produced in Hawaii in sufficient quantities, as determined by the SFA, per 7 CFR 210.21(d) (3). Likewise, SFAs in Puerto Rico are required to purchase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



BUY AMERICAN

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



* * * * *

*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.



INSERT "Mock Recall" TAB



Mock Produce Recall

PRODUCE SAFETY
UNIVERSITY



United States Department of Agriculture

Introduction

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



Cherry High School



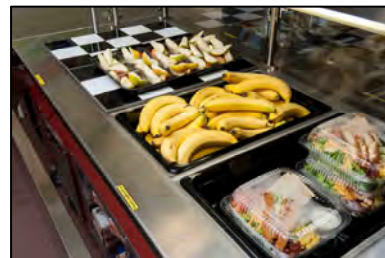
Apricot Middle School



Peach Elementary School



Plum Elementary School

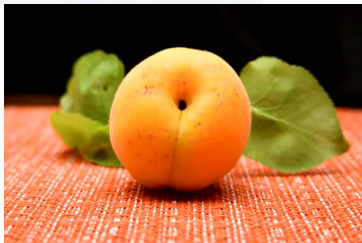


Objectives

- Determine the efficacy of the Mock Recall Activity conducted by Stone Fruit School District.
- Identify the impact of site characteristics and challenges.
- Develop Corrective Action Plan for the areas of improvement.



Breakout Activity



Let's Hear it for the Cherries!



How Effective is Your Recall?

Cherry High School (Formula only)

$$\begin{aligned} & \underline{\hspace{2cm}} \text{ Amt. in Inventory} + \underline{\hspace{2cm}} \text{ Amt. in Food Production} \\ & + \underline{\hspace{2cm}} \text{ Amt. Served/Consumed} = \underline{\hspace{2cm}} \text{ Cases Found} \\ & \div \text{ Amt. Delivered} = \underline{\hspace{2cm}} \times 100 = \underline{\hspace{2cm}} \% \text{ Effectiveness} \end{aligned}$$

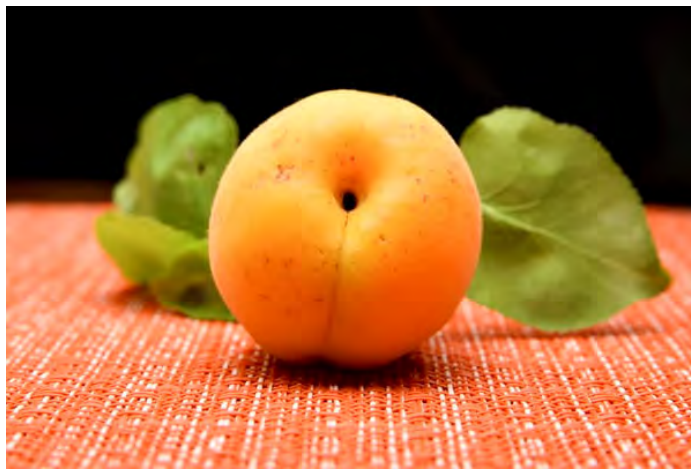


What's Your Plan of Action?

Based on site characteristics and challenge(s)
develop a Corrective Action Plan.



Let's Hear it for the Apricots!



How Effective is Your Recall?

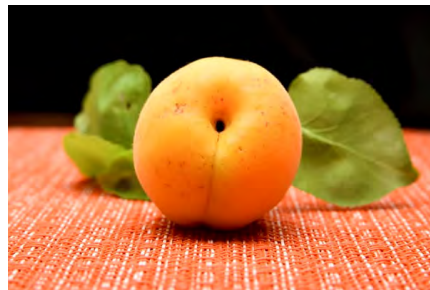
Apricot Middle School (Formula only)

$$\frac{\text{_____ Amt. in Inventory} + \text{_____ Amt. in Food Production} + \text{_____ Amt. Served/Consumed}}{\text{_____ Amt. Delivered}} = \text{_____ Cases Found} \times 100 = \text{_____ \% Effectiveness}$$



What's Your Plan of Action?

Based on site characteristics and challenge(s) develop a Corrective Action Plan.



Let's Hear it for the Peaches!



How Effective is Your Recall?

Peach Elementary School

$$\begin{aligned} & \text{_____ Amt. in Inventory} + \text{_____ Amt. in Food Production} \\ + & \text{_____ Amt. Served/Consumed} = \text{_____ Cases Found} \div \text{Amt.} \\ & \text{Delivered} = \text{_____} \times 100 = \text{_____} \% \text{ Effectiveness} \end{aligned}$$



What's Your Plan of Action?

Based on site characteristics and challenge(s)
develop a Corrective Action Plan.



Let's Hear it for the Plums!



How Effective is Your Recall?

Plum Elementary School (Formula only)

$$\begin{aligned} & \underline{\hspace{2cm}} \text{ Amt. in Inventory} + \underline{\hspace{2cm}} \text{ Amt. in Food Production} \\ & + \underline{\hspace{2cm}} \text{ Amt. Served/Consumed} = \underline{\hspace{2cm}} \text{ Cases Found} \\ & \div \text{ Amt. Delivered} = \underline{\hspace{2cm}} \times 100 = \underline{\hspace{2cm}} \% \text{ Effectiveness} \end{aligned}$$



What's Your Plan of Action?

Based on site characteristics and challenge(s)
develop a Corrective Action Plan.



By Show of Hands

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

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



INSERT "Mock Recall Activity" TAB



Mock Recall of Fresh Produce – In Person Activity

Instructions: After reviewing/reading the Stone Fruit School Nutrition Program Description and site challenges, participants will be divided into four groups and assigned one of the four district sites to: 1) read the site scenario and answer questions 1-3; 2) determine the efficacy of the recall; 3) develop a corrective action plan based on the impact of site characteristics and challenges identified.

Stone Fruit School Nutrition Program Description

The nutrition program is planning a district-wide mock produce recall activity. The district consists of four schools: Cherry High School, Apricot Middle School, Peach Elementary School, and Plum Elementary School. Each school receives produce deliveries, prepares and serves 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 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. To accurately evaluate program strengths and weaknesses, the Director decided not to alert the school nutrition staff that the recall is a mock recall.

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:

Cherry High School

- New manager at high school with previous restaurant experience

Apricot Middle School

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

Peach Elementary School

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

Plum Elementary School

- Understaffed, frequent substitute staff





Cherry High School

When the staff receives the call from the Nutrition Director, they immediately jump into action. They locate all 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. Twenty 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.

Instructions: As a group, fill out the Recall Report, and answer questions 2 and 3. Select a spokesperson to report back to class at the designated time.

1. Fill out the recall report based on findings from the above scenario:

Recall Report from Cherry High

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

2. Using the formula below, what is the Percent Effectiveness of Cherry High?

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

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

$$\text{_____ Amt. in Inventory} + \text{_____ Amt. in Food Production} + \text{_____ Amt. Served/Consumed}$$

$$= \text{_____ Cases Found} \div \text{_____ Amt. Delivered} = \text{_____} \times 100 = \text{_____} \% \text{ Effectiveness}$$





Cherry High School

3. Based on site characteristics and challenge(s), develop a Corrective Action Plan. Use the following table as a guide. Site may not have challenges in all areas.

Challenge(s)	Area of Improvement	Corrective Action Plan
	Receiving	
	Inventory Management	
	Food Production	
	Recordkeeping	
	Serving	
	Staffing	
	Training	
	Food Safety	
	Other	





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 more 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 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.

Instructions: As a group, fill out the Recall Report, and answer questions 2 and 3. Select a spokesperson to report back to class at the designated time.

1. Fill out the recall report based on findings from the above scenario:

Recall Report from Apricot Middle

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

2. Using the formula below, what is the Percent Effectiveness of Apricot Middle?

% 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 Apricot Middle.

_____ Amt. in Inventory + _____ Amt. in Food Production + _____ Amt. Served/Consumed

= _____ Cases Found \div _____ Amt. Delivered = _____ X 100 = _____ % Effectiveness





Apricot Middle School

3. Based on site characteristics and challenges, develop a Corrective Action Plan. Use the following table as a guide. Site may not have challenges in all areas.

Challenge(s)	Area of Improvement	Corrective Action Plan
	Receiving	
	Inventory Management	
	Food Production	
	Recordkeeping	
	Serving	
	Staffing	
	Training	
	Food Safety	
	Other	





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 unsigned 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 and one is still in food production. 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.

Instructions: As a group, fill out the Recall Report, and answer questions 2 and 3. Select a spokesperson to report back to class at the designated time.

1. Fill out the recall report based on findings from the above scenario:

Recall Report from Peach Elementary

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

2. Using the formula below, what is the Percent Effectiveness of Peach Elementary?

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

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

_____ Amt. in Inventory + _____ Amt. in Food Production + _____ Amt. Served/Consumed

= _____ Cases Found ÷ _____ Amt. Delivered = _____ X 100 = _____ % Effectiveness





Peach Elementary School

3. Based on site characteristics and challenges, develop a Corrective Action Plan. Use the following table as a guide. Site may not have challenges in all areas.

Challenge(s)	Area of Improvement	Corrective Action Plan
	Receiving	
	Inventory Management	
	Food Production	
	Recordkeeping	
	Serving	
	Staffing	
	Training	
	Food Safety	
	Other	





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.

Instructions: As a group, fill out the Recall Report, and answer questions 2 and 3. Select a spokesperson to report back to class at the designated time.

1. Fill out the recall report based on findings from the above scenario:

Recall Report from Plum Elementary

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

2. Using the formula below, what is the Percent Effectiveness of Plum Elementary?

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

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

$$\begin{aligned} & \text{_____ Amt. in Inventory} + \text{_____ Amt. in Food Production} + \text{_____ Amt. Served/Consumed} \\ & = \text{_____ Cases Found} \div \text{_____ Amt. Delivered} = \text{_____} \times 100 = \text{_____} \% \text{ Effectiveness} \end{aligned}$$





Plum Elementary School

3. Based on site characteristics and challenges, develop a Corrective Action Plan. Use the following table as a guide. Site may not have challenges in all areas.

Challenge(s)	Area of Improvement	Corrective Action Plan
	Receiving	
	Inventory Management	
	Food Production	
	Recordkeeping	
	Serving	
	Staffing	
	Training	
	Food Safety	
	Other	



INSERT "Traceability Activity" TAB



Healthy Harvest Farms Operational Overview

- Healthy Harvest Farms produces several varieties of vine-ripe tomatoes on 40 acres of land (two 15-acre plots and a 10-acre plot). The farm has been in operation for over 25 years.
- Tomatoes are mainly sold through a local produce cooperative and a farmer's market held every Saturday.
- The two 15-acre growing fields are separated by a seasonally tested surface pond that is used for drip irrigation. The 10-acre field receives drip irrigation water via a drilled 120 foot well. Date of last water test for the drilled well is unknown.
- The farm is not GAP certified, but the farmer did attend a free, one day GAP course provided by the local cooperative extension agent.
- The packing shed contains a stainless-steel post-harvest wash tank, conveyor belts for sorting and packing, and a restroom for three migrant workers and one full-time employee.
- Reusable plastic containers (RPCs) are used to store tomatoes from the field to the packing house.
- Only warm, chlorinated municipal water is used for washing tomatoes.

The farm maintains the following records:

- Harvest date(s)
- Pack date/ship date
- Number of times per day wash tank is emptied and refilled
- Customer contact records
- Employee training logs for handwashing and glove use (during post-harvest handling only)





Healthy Harvest Farms Food Safety Concerns

Based on the operational overview, please list any food safety areas of concern using the following table as a guide.

Food Safety Area of Concern	List Food Safety Concern(s)
Growing (includes soil, water, animals, compost)	
Harvesting (includes field sanitation, equipment, containers, chemicals/pesticides, product and personnel identification)	
Packing (includes water, food contact surfaces, product flow, ice and cooling, drains, pest control, traceability)	
Storing & Transporting (includes packing containers, cleanliness, pest control, ice and refrigeration, traceability, prevent cross contamination, temperatures during transit)	
Worker Health & Personal Hygiene (includes handwashing, glove use, employee facilities, hair restraints, jewelry)	
Recordkeeping	
Other (including Food Defense)	





Green Acre Farms Operational Overview

- Green Acre Farms grows romaine and other specialty greens that are sold only to a local produce distributor. The 30-acre farm has been in the same family for several generations.
- The farm next door has a livestock operation.
- The produce distributor uses back hauling to reduce the costs. Romaine is picked up from Green Acre Farms after regular delivery routes.
- A drilled and properly capped 100 foot well is used for drip irrigation. This year the farm has used less water due to frequent rains. The well is tested annually for fecal coliforms.
- The greens are field packed, immediately cooled, and transported to a refrigerated unit until picked up by the produce distributor.
- Many customers prefer to use pre-cut lettuce; therefore, some romaine is diverted to FreshCut, Inc. for processing.
 - Romaine heads for processing are delivered by Green Acre Farms to FreshCut, Inc.
 - Romaine is bagged, placed in coolers and topped with ice packs, then delivered within two hours to FreshCut, Inc.
 - Romaine is typically processed into dices the following day.
- Last month, the local school district included a “buy local when available” clause in their produce bid documents. The produce distributor responded to the bid stating locally grown romaine and other leafy greens could be provided.
- The bid required the farm to complete a food safety checklist. The farm is not GAP certified, but successfully met most of the requirements listed on the food safety checklist.
- The produce distributor required Green Acre Farms to obtain one million in product liability coverage in addition to the general farm insurance already secured.

The farm maintains the following records:

- Harvest date(s)
- Pack date/ship date
- Customer contact records
- Employee training logs for personal hygiene, handwashing, and glove use in the field
- Annual well water test





Green Acre Farms Food Safety Concerns

Based on the operational overview, please list any food safety areas of concern using the following table as a guide.

Food Safety Area of Concern	List Food Safety Concern(s)
Growing (includes soil, water, animals, compost)	
Harvesting (includes field sanitation, equipment, containers, chemicals/pesticides, product and personnel identification)	
Packing (includes water, food contact surfaces, product flow, ice and cooling, drains, pest control, traceability)	
Storing & Transporting (includes packing containers, cleanliness, pest control, ice and refrigeration, traceability, prevent cross contamination, temperatures during transit)	
Worker Health & Personal Hygiene (includes handwashing, glove use, employee facilities, hair restraints, jewelry)	
Recordkeeping	
Other (including Food Defense)	





School Nutrition Program Operational Overview

- Farefield Public School District operates six schools and has a student enrollment of approximately 9,000 students.
- The director shared their goal of increasing fresh fruits and vegetables at the elementary level at the beginning of the school year.
- To support the farm to school initiative, the produce bid document included a “buy local when available” clause. The produce distributor responded to the bid stating romaine, other leafy greens, tomatoes, and other locally grown produce could be provided when in season.
- School nutrition managers are allowed to make school-level produce purchasing decisions based on a bi- monthly quote.
- Some managers prefer to buy pre-cut romaine, while others continue to process romaine in house.
- A mock recall of fresh produce has never been conducted and staff may or may not be aware of how to handle recalled foods.
- The contract includes the following requirements:
 - Produce must be delivered in a cleaned and refrigerated truck.
 - The vendor must maintain a minimum of five million dollars in product liability insurance and maintain a food safety plan for the warehouse.
- The vendor must follow local, state, and federal regulations. Three of the elementary schools operate a school garden. When available, the school nutrition program serves produce from the garden(s).

The school nutrition program maintains the following records:

- Original invoices with batch/lot numbers (Sent to central office from kitchen sites monthly)
- Supplier contact information
- Bid documents, including food safety requirements of vendors
- HACCP Plan has not been updated in over three years





Farefield School Nutrition Program Food Safety Concerns

Based on the operational overview, please list any food safety areas of concern using the following table as a guide.

Food Safety Area of Concern	List Food Safety Concern(s)
Purchasing	
Receiving	
Food Production	
Recordkeeping	
Personnel (includes training)	
Traceability	
Other	





Farefield Site Kitchen(s) Operational Overview

(This group represents the three elementary schools within the district)

- Farefield's school district operates three elementary schools with approximately 600 students in each building.
- The director shared their goal of increasing fresh fruits and vegetables at the elementary level at the beginning of the school year.
- Fresh produce is received weekly (Tuesday) from a produce distributor, and periodically from the school garden.
- Salads are prepared each day as an option and are stored in a refrigerator. Due to the slow movement of fresh product, especially lettuce and tomatoes, kitchen staff often remove decayed product and transfer the remaining acceptable produce to a storage container in the walk-in refrigerator.
- During meal production, employees rinse fresh produce under running water prior to handling. Employees wear gloves when handling fresh produce.
- When school garden produce is received, it is stored with the produce from the distributor.
- Some produce is received from the distributor in untraceable containers.
- Tracking information is not retained at some sites.
- Some managers prefer to buy pre-cut romaine, while others continue to process romaine in house.
- This week (Monday), Farefield Elementary School 1 received produce from the produce distributor and micro greens from the school garden. Farefield Elementary School 2 and Farefield Elementary School 3 received produce from the distributor only. On Friday, the following quantities of each type of produce remained in the schools:
 - Farefield Elementary School 1: (from Distributor and school garden) A 5 gallon plastic storage container of vine ripe tomatoes (not labeled), a few apples still in the original container, and no grapes.
 - Farefield Elementary School 2: (from Distributor only) Half a case of carrot sticks, a few apples still in original box, and one bag of grapes.
 - Farefield Elementary School 3: (from Distributor only) No apples or grapes, a few cherry tomatoes in a leftover Ranch dressing plastic storage container (not labeled), and several 5 pound cellophane bags of carrot sticks.

The school kitchen maintains the following records:

- Copy of invoices from produce distributor
- Production records
- Temperature logs for all storage areas
- Serving line temperature logs





Farefield Site Kitchen(s) Food Safety Concerns

Based on the operational overview, please list any food safety areas of concern using the following table as a guide.

Food Safety Area of Concern	List Food Safety Concern(s)
Receiving	
Storing	
Food Production	
Recordkeeping	
Personnel (includes training)	
Traceability	
Other	





Farefield Harmony School Garden Operational Overview

- The Farefield Harmony School Garden has been providing fresh herbs and some produce for classroom education and to supplement produce in the school nutrition program, when available.
- Farefield school district hired a school garden coordinator through a community grant to manage the gardens at all three elementary schools.
- Students are responsible for planting, maintaining, and harvesting fresh herbs and produce under the school garden coordinator's supervision.
- The garden coordinator works closely with the school nutrition director to plant crops near the playground that can be prepared in the school kitchens and fit into the elementary school menu.
- The school gardens produce bell peppers, micro greens, tomatoes, and various herbs for use in the school cafeterias.
- Due to the increased amount of spring rain, the garden coordinator requested and received a rain barrel donated by the local hardware store to collect water for the garden. Students learn how to water the soil, not the plants, to prevent possible cross contamination.
- No pesticides, manure or chemicals are used in the school garden, and it is fenced to keep out animals and people.
- If bathroom facilities are needed, students and staff use the main building. A portable handwashing facility is available near the garden.
- At harvest the school garden produce is washed using a garden hose from a municipal water source, then placed in plastic, cleaned tubs.
- Produce is transferred to school kitchens or classrooms; harvest dates are recorded.





Farefield Harmony School Garden Food Safety Concerns

Based on the operational overview, please list any food safety areas of concern using the following table as a guide.

Food Safety Area of Concern	List Food Safety Concern(s)
<p>Growing (includes soil, water, animals, compost, food defense against intentional tampering or contamination intentional or unintentional from neighborhood pets, for example)</p>	
<p>Harvesting (includes field sanitation, equipment, containers, chemicals/pesticides, product and student and staff identification, adult oversight during harvest)</p>	
<p>Storing & Transporting (includes packing containers, cleanliness, pest control, traceability, prevent cross contamination, temperature control, if required)</p>	
<p>Student Health & Personal Hygiene Training (includes handwashing, glove use, dress code)</p>	
<p>Recordkeeping</p>	
<p>Other (including Food Defense)</p>	





Best Produce Distributor Operational Overview

- The Best Produce Company provides fresh produce to school districts, hospitals, and restaurants within a 50-mile radius. All trucks are refrigerated.
- Because customers want local produce, the distributor purchases vine ripe tomatoes from Healthy Harvest Farms through a produce cooperative, and leafy greens from Green Acre Farms. Some leafy greens are diverted to FreshCut, Inc for dicing or shredding.
 - The produce cooperative delivers tomatoes in a non-refrigerated truck to the produce distributor.
 - Unwashed, packed heads of romaine are picked up several times per week from Green Acre Farms after regular delivery routes (backhauled).
 - Romaine heads for processing are delivered by Green Acre Farms FreshCut, Inc. Romaine bagged, placed in coolers and topped with ice packs, then delivered within two hours to FreshCut, Inc., then delivered to Best the following day.
- Storage areas in the distributor's warehouse are temperature-controlled according to fruit and vegetable post-harvest handling recommendations. In addition, the distributor operates an ethylene gas ripening room for tomatoes.
- Fresh produce is typically kept in the warehouse for less than 2 days before being delivered to a customer. All employees are trained in food safety and handling of fresh produce.
- The company's HACCP plan has been in effect for several years without any complaints of foodborne illness.
- The company maintains a five-million-dollar product liability insurance policy that includes product recall and intentional contamination coverage. In addition, Green Acre Farms was required to obtain one million in produce liability coverage prior to becoming a supplier.

The distributor maintains the following records:

- Customer contact records
- Supplier contact records
- Employee training logs as required in HACCP plan





Best Produce Distributor Food Safety Concerns

Based on the operational overview, please list any food safety areas of concern using the following table as a guide.

Food Safety Area of Concern	List Food Safety Concern(s)
Purchasing	
Receiving	
Storing (includes temperature control, preventing cross contamination, pest control)	
Transporting (includes cleanliness and backhauling)	
Recordkeeping (includes traceability)	
Worker Safety and Personal Hygiene	
Other (includes processing, repacking, food defense)	





FreshCut, Inc. Produce Processor Operational Overview

- FreshCut Produce, Inc. provides minimal processing of fresh produce.
- Specifically, the processor dices or shreds lettuce, slices or dices onions, slices or dices tomatoes, chops broccoli into florets, peels and cubes winter squash, and will provide custom processing upon request (minimum quantity required).
- Currently, FreshCut Produce, Inc. dices romaine lettuce for Green Acre Farms:
 - Romaine heads for processing are delivered by Green Acre Farms to FreshCut, Inc.
 - Romaine is bagged, placed in coolers and topped with ice packs, then delivered within two hours to FreshCut, Inc.
 - Processed romaine is delivered in refrigerated trucks, and sold through the Best Produce Company (produce distributor).
- The processing equipment is scheduled for cleaning and sanitizing after use, or after four hours of operation during continual use.
- Fresh cut produce is washed in chlorinated water.
- All employees are trained in food safety and handling of fresh produce.
- The company's follows recommendations for safe produce handling as outlined in the *FDA Guidance for Industry: Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables*.
- The company maintains a five-million-dollar product liability insurance policy that includes product recall and intentional contamination coverage.
- Farms do not have to be GAP certified in order to sell to processor, but must show food safety records for handling compost (when applicable), water source testing, and personal hygiene training for harvesters.

The processor maintains the following records:

- Customer contact records
- Supplier contact records
- Employee food safety training logs
- Sanitizer level test records for washing produce
- Temperature of storage areas





FreshCut, Inc Produce Processor Food Safety Concerns

Based on the operational overview, please list any food safety areas of concern using the following table as a guide.

Food Safety Area of Concern	List Food Safety Concern(s)
Purchasing	
Receiving	
Storing (includes temperature control, preventing cross contamination, pest control)	
Processing	
Transporting (includes cleanliness and backhauling)	
Recordkeeping (includes traceability)	
Worker Safety and Personal Hygiene	
Other	





Peck's Produce Cooperative Operational Overview

- Three years ago, several local farms pooled their resources to form Peck of Produce Cooperative, or “Pecks” for short.
- Healwas one of the initial supporters of the cooperative’s approach to buying and selling fresh produce in the local area. Approximately nine farms currently participate in the cooperative.
- The cooperative maintains a large, refrigerated warehouse and re-packing shed for tomatoes and other products.
- Produce must be washed prior to receiving at the cooperative’s packinghouse.
- At times, tomatoes are commingled during the re-packing process and a clear record of where the tomatoes came from is lost.
- A 5-million-dollar product liability umbrella covers all sales originating from the cooperative.

The cooperative maintains the following records:

- Customer contact records
- Supplier contact records
- Shipping dates
- Employee training logs for produce handling





Peck's Produce Cooperative Food Safety Concerns

Based on the operational overview, please list any food safety areas of concern using the following table as a guide.

Food Safety Area of Concern	List Food Safety Concern(s)
Purchasing	
Receiving	
Storing (includes temperature control, preventing cross contamination and co-mingling, pest control)	
Transporting (includes cleanliness and backhauling)	
Recordkeeping (includes traceability)	
Worker Safety and Personal Hygiene	
Other (includes repacking, food defense)	





Conducting a Mock Recall of Produce in a School Nutrition Operation

Introduction

A food recall occurs when there is reason to believe that a food may cause consumers to become ill. A food manufacturer or distributor initiates the recall to take foods off the market. In some situations, food recalls are requested by government agencies (USDA or FDA). Some reasons for recalling food include:

- Discovery of an organism in a product which may make consumers sick.
- Discovery of a potential allergen in a product.
- Mislabeling or misbranding of food.
- Physical hazards found in the product, such as plastic, glass, metal, etc.

Food recalls are classified in three classes. The following table describes the three classes of food recalls:

Class	Definition	Examples
Class I	A health hazard situation where there is a reasonable probability that eating the food will cause serious, adverse health consequences or death.	<i>E. coli</i> O157:H7 in bagged spinach; <i>Salmonella</i> in tomatoes
Class II	A health hazard situation where there is a remote probability of adverse health consequences from eating the food.	Product containing a foreign material
Class III	A situation where eating the food will not cause adverse health consequences.	Food product not labeled correctly

Note: Undeclared presence of a potential allergen may be classified as I or II depending on FDA severity of hazard determination.

From 2005 to 2009, there was an average of more than 600 food recalls per year in the U.S. food system. This estimate includes both domestic and imported products. Fresh fruits and vegetables, and prepared salad mixes made up 15 % of recalls during this time period (Congressional Research Service, 2010). Food recalls may affect foods used in school meal programs that are distributed by USDA, or purchased from a commercial source.

School nutrition program staff are responsible for maintaining the safety and security of foods once they are received and stored. Maintaining the chain of custody also is an important responsibility of school nutrition program operators because it allows food products to be traced one step back to the vendor and one step forward to the consumer. In the event of a recall, a food product must be traced to its current location, and schools are to follow the recall procedures outlined in the manufacturer's instructions, or sent by USDA. To respond to recalls of commercially purchased foods, you can be proactive and expedite the process by signing up to receive food recall notifications from the federal government at www.foodsafety.gov/recalls-and-outbreaks.



If a recall affects a USDA Food, you also can sign up for free email notifications through the Commodity Alert System at www.envoyprofiles.com/USDA-ALERTS.

This mock recall resource provides instruction on how to practice conducting a school district-wide recall of fresh produce. Many other produce safety training materials have been developed by USDA and the National Food Service Management Institute. These materials may be found at www.theicn.org/icn-resources-a-z/produce-safety. The goal for this activity is to encourage school nutrition program directors to conduct a district-wide mock recall of a fresh produce item that includes the participation of all school site kitchens and fresh produce distributors. Select a fresh produce item or fresh-cut produce item for this exercise. You can adapt this resource to conduct a mock recall of other types of food, including canned and frozen produce, or any other food.

Conducting an Effective Mock Recall

Through a mock food recall, a school nutrition program can test its response time and identify any weaknesses in the program's ability to respond to food recalls. Iowa State University Leopold Center for Sustainable Agriculture recommends that growers conduct a timed mock recall annually. The National Restaurant Association Educational Foundation's ServSafe® training program recommends that restaurant operators test their crisis management plans at least annually. School nutrition program directors should test, on an annual basis, their ability to respond to food recalls and identify areas that need improvement.

A mock recall is a simulated recall exercise with a designated time limit (Grower's Manual: A template for grower cooperatives, 2011). The amount of time that would be realistic and appropriate varies from school district to school district. School nutrition program directors and/or supervisors should be responsible for setting a realistic target for the amount of time to conduct the mock recall exercise in their district. Examples of factors that might affect response time include district size, amount of produce involved, and type of notification system used.

The following steps outline how to conduct a mock recall of a fresh produce item in a school nutrition operation:

Step Review Applicable Standard Operating Procedures (SOPs)

- 1**
 - Review all SOPs that pertain to food recalls. These may address procedures for handling a recall, receiving deliveries, or transporting food between sites.
 - Update SOPs, if necessary.
 - Communicate updated SOPs to school nutrition staff, if necessary.
 - Conduct this step at least one month prior to the planned exercise.

Step Review Emergency Notification Contact List

- 2**
 - Create or update the school district's and school nutrition department's emergency notification lists to be used in the event of a recall. The lists should include phone numbers and email addresses where staff can be reached both during and after regular work hours.
 - Distribute the updated emergency notification contact list to school nutrition program staff at the beginning of the school year, or at any time that staff or contact information changes. In an effort to conduct an unannounced mock recall, distribute the revised emergency contact list at least one month prior to exercise.

Step 3 Planning the Mock Recall

All communications should begin with “This is a test.” Begin all phone calls, emails, or anything else in print with “This is a test.”

3

- Conduct a review during training at the start of the school year, or at least one month prior to the mock recall exercise. During this review, discuss SOPs that address food recalls with all school nutrition staff at the district and school levels and warehouse personnel, if applicable. Any school personnel who have a role during a food recall should be included in the review.
- Determine which produce item will be used in the recall simulation. You may want to include your vendor when making this decision. For fresh produce mock recalls, select a fruit or vegetable that is typically ordered weekly by the school district for use at all school sites, such as salad greens. If seasonal produce is selected, choose a product that will be shipped to all or a majority of schools.
- Identify the date and time that the mock recall will take place within the school district. Although it may be more convenient to conduct a mock recall at certain times because of staff and production schedules, remember that an actual recall could take place at any time of day. By conducting the exercise at unannounced and unpredictable times, you will be able to determine more accurately how long the response might take during an actual recall.
- Set a goal for the amount of time that it should take to identify the locations of all recalled product. Again, the time may vary depending on factors such as district size, day and time of recall, amount of produce affected, and type of communication used in notification.
- Inform school district administrators, including the district’s communications officer and emergency manager, that a mock recall of produce will be conducted. Provide administrators with information on the date(s), time(s), and location(s) of the mock recall exercise. Communicate that the mock recall is only a drill to test the district’s response time and recall procedures and that produce served to students during the drill is safe to eat.

Step Conduct the Mock Recall*

4

- Identify the date and time of the mock recall. Performing the exercise at unannounced, unpredictable times will result in a more accurate test of the school nutrition program's recall response capability.
- Place the produce order as usual. Be sure that the vendor knows that "this is a test."
- Get produce tracking information from the produce vendor including:
 - Produce name/description.
 - Produce identification numbers (product code, Lot/Batch number, or GTIN, if available) and where they are located on product packaging.
 - Produce date(s) (examples: ship date, best if used by, or expiration date).
 - Quantities shipped to each school.
 - Photograph of labeling containing identification numbers and dates, if possible
- Record the start time of the mock recall.
- Communicate the produce recall to all necessary personnel at each school site. Follow the SOPs. Be sure to convey that "this is a test."
- Identify the amount of the produce found at each site. Be sure to record the amounts found in inventory, food production, and served to children from all feeding sites. The attached worksheet is a sample form that may be used to record information.
- For each school, compare the amount of produce that was received to the amounts in inventory, in production that day, and produce already served, as reported by the site staff.
- If the total amount of produce reported does not match the amount received, contact the school to find out why too much or too little product was identified. Reasons might include the following:
 - More or less produce was received than ordered.
 - The school also had the same item on hand from another source (such as a local farm) that was counted in recall.
 - Leftovers from the previous week were counted in recall.
 - Production records were not accurate.
- Once produce has been accounted for at each school, record the ending time and calculate the total amount of time it took to conduct the mock recall exercise.

*Conduct this mock recall according to your SOP. If the SOP states that the vendor or warehouse will communicate recall information and provide product identification directly to school sites, work with your vendor or warehouse to establish mock recall procedures and documentation.

Step Mock Recall Debrief

5

- Determine who should participate in the mock recall debrief. Suggested attendees include: school nutrition director, central office supervisory or training staff, manager(s), and administrative assistant(s).
- Determine whether the mock recall was completed within the time frame identified in advance of the exercise.
- Identify weaknesses or problem areas in your mock recall exercise.
- Weaknesses might include:
 - Produce was delivered in untraceable packages or containers.
 - Produce was commingled with other product.
 - Produce was taken out of original packages or containers and labeling information was lost.
 - Unable to contact school personnel.
 - School personnel were slow in responding or not responsive to requests for recalled produce information.
 - School personnel were unsure of how to identify produce tracking information on packaging.
 - The amount of produce received by sites did not match the amount of produce found in inventory, production, or already served.
- Identify corrective action(s) needed to improve recall procedures. Develop a plan to implement corrective action(s), including person(s) responsible and a time frame. An example is provided in the case study.
- If necessary, revise SOPs or conduct staff training related to food recalls based on the outcomes of your mock recall.

Mock Recall Effectiveness

The effectiveness of the mock recall exercise can be measured by using a simple formula. Upon completion of the recall, calculate the effectiveness to determine if corrective action is needed.

Recall effectiveness formula:

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

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

Example:

- A Amount delivered 42 cases
- B Amount in inventory 35 cases
- C Amount in food production 4 cases
- D Amount served or consumed 1 case

Formula: $35 + 4 + 1 = 40$ cases divided by 42 cases $\times 100 = 95\%$

Effectiveness should be calculated first by site, then by district. If the mock recall is less than or greater than 100% effective, identify what caused the discrepancy and determine appropriate corrective actions. When all of the produce is not identified, the recall effectiveness will be less than 100% effective. In a real recall situation, the unaccounted for produce may already have been served or potentially could be served in the future, resulting in increased risk and possible harm. If more produce is identified than was delivered, the recall effectiveness will be greater than 100%. Operators may think it is not a problem to identify more produce than what was recalled, but the inability to trace the actual recalled produce shows that the system is not working properly. Both outcomes result in a loss of traceability and increased risk of serving, or consuming recalled food in the event of an actual emergency.

Conclusion and Next Steps:

Upon completion of the mock recall, the school nutrition program director, supervisors, and other necessary staff should discuss and identify corrective action steps. After this mock recall another exercise should be planned, even if the effectiveness was 100%. Consider using different products; choose a different day of the week and a different time of day.

While this resource provides information needed to conduct a mock recall of produce received from a distributor, consider all of your produce sources, including local farms, fresh-cut processors, produce cooperatives, and school gardens. Consider conducting a mock recall of produce from each of your produce sources.

Conducting a Mock Recall of Fresh Produce: A Case Study

October 14



ABC School District's school nutrition program is planning a district-wide mock recall of a fresh produce item. The school district operates 18 sites with approximately 15,000 students. 17 schools have on-site kitchens, and one school has only storing, reheating, holding, and serving capabilities. ABC School District's high school kitchen prepares approximately 300 meals per day, using bulk service, for the school site without on-site preparation capacity. The produce distributor delivers weekly to the 17 on-site kitchens. Each site manager places his or her produce order every Wednesday for delivery on the following Tuesday.

During the previous summer, the school nutrition director reviewed and updated the following SOPs:

- Handling a Food Recall
- Receiving Deliveries
- Storing Foods
- Transporting Food to Remote Sites

The director also updated the emergency notification contact list based on information requested in end-of-year documents in June. There were no personnel changes over the summer.

At the annual "Back-to-School" workshop for site-level managers held in August, the school nutrition director handed out and discussed the updated SOPs. In addition, managers were given the emergency contact list and asked to review, update, and send the revisions to the central office within one week. The final emergency contact list was emailed to all site-level managers by the first day of school.

One month later, the school nutrition director contacted Star Produce Company, the district's produce vendor, to discuss conducting a mock recall of fresh produce. Pre-cut salad mix was selected as the item to be used in the exercise because the majority of schools purchased this item weekly. The vendor confirmed that the company would be able to provide tracking information using product code numbers, including lot number, best if used by date, ship date, and quantity shipped to each site.



The school nutrition director and central office staff met and identified Thursday, October 13th at 11:00 am as the date and time for the mock recall. All site-level staff were unaware of the mock recall. The school nutrition director and central office staff chose this date and time to test recall procedures because it would be inconvenient for site-level staff who were participating in National School Lunch Week, where most of the schools promote increased participation in school lunch and encourage health and wellness. The time was selected because the majority of sites serve lunch at 11:00 am. The goal for completing the recall exercise was set at three hours, or by 2:00 pm (the end of the work day).

The school nutrition director contacted school officials, including the communication's officer and emergency manager to inform them of the upcoming mock recall of produce and to assure them that the produce would be safe. The school nutrition director emphasized that the scheduled recall would only be a drill to determine how quickly staff at the schools could locate the product and evaluate the effectiveness of existing procedures.

On the day produce was delivered, the distributor provided the school nutrition director with the tracking information via fax as requested in advance of the exercise. The school nutrition director made a copy for the school nutrition administrative assistant, as well as a copy of the recall worksheet. The school nutrition administrative assistant emailed all school nutrition site managers and notified them of the pre-cut salad mix recall as outlined in the Handling a Food Recall SOP and reminded them that "this is a test." At noon, the administrative assistant called all managers who had not yet responded. Voice mail messages were left for the seven managers who had not responded either via email or phone. Three of the seven responded by 12:30 pm. The administrative assistant emailed the remaining four managers at 1:00 pm. By close of day, 2:00 pm, all but one manager had responded to the recall notification. The central office did not get the recall information from the last school, George Washington Elementary, until the following morning.



The school nutrition director learned that the response from George Washington Elementary was delayed because the manager was out and did not report his absence to the central office. No one at the site had access to the manager's email or phone messages. The central office had not included contact information outside of the work day on the emergency contact list.

The following day, the school nutrition director calculated the mock recall efficiency at 88%. One site did not respond at all, and three sites could not locate some of the product. These three sites had difficulty because the salad mix had been commingled and the boxes with the tracking information were discarded. Also, product transported to the satellite site was not recorded and could not be traced.

A	Amount delivered	<u>42 cases</u>
B	Amount in inventory	<u>32 cases</u>
C	Amount in food production	<u>4 cases</u>
D	Amount served or consumed	<u>1 case</u>

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

$$32 + 4 + 1 = 40 \text{ cases divided by } 42 \text{ cases} \times 100 = 88\%$$

During the debriefing, the school nutrition director and central office staff identified several corrective actions that would improve their crisis management of a food recall. Staff members were assigned responsibilities with clear timelines to complete these next steps.

- Update the emergency contact list to include how to reach staff outside of school.
- Review Handling a Food Recall SOP at upcoming manager's meeting, including timely response.
- Review manager absence notification procedures at upcoming manager's meeting.
- Identify a key person at each site who is responsible for checking phone messages in the event of a manager's absence.
- Create a school district email address for key personnel at each site.
- Review Storing Foods SOP at upcoming manager's meeting, including maintaining tracking information and preventing commingling of product in storage.
- Plan a future mock recall of fresh produce within three months to retest the system.

Corrective Action	Person(s) Responsible	Timeframe
Update emergency contact list	School nutrition director and administrative assistant	October 28 (2 weeks)
Identify a key person at each site who is responsible for checking phone messages in the event of a manager's absence	School nutrition director, all managers	October 28 (2 weeks)
Create an email address for key personnel at each site.	School nutrition director, all managers, technology department	November 6 (3 weeks)
Review SOP for handling a food recall	School nutrition director, all managers	Next manager's meeting (November 15)
Review manager absence notification procedures	School nutrition director, all managers	Next manager's meeting (November 15)
Review storing foods SOP	School nutrition director, all managers	Next manager's meeting (November 15)
Determine date for next mock recall and coordinate with produce vendor	School nutrition director and central office staff	Next manager's meeting (November 15)

Glossary

Commingling: Combining different sources (i.e. lots or batches) of produce into one container. Traceability may be impaired.

Global Trade Item Numbers (GTIN): The GS1 Identification Key used to identify products such as a specific brand and product. The key is comprised of a GS1 or U.P.C. company prefix and an item identification number.

Lot: The batch or lot number associates an item with information the manufacturer considers relevant for traceability e.g., the time and date it was manufactured.

Recall: A process used to remove products from the marketplace when there is reason to believe the products may be contaminated, misbranded, or cause health problems.

Standard Operating Procedure (SOP): Detailed written instructions for a process that must be followed to ensure a desired outcome.

Traceability: The ability to trace the origin, movement, or location of a product.

Trace or track back: The ability to determine the path a product took through the supply chain before it reached the end customer.

Trace or track forward: The ability to determine the path a product takes through the supply chain on its way to the end customer.

INSERT "Writing Specifications" TAB



Writing Specifications

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United States Department of Agriculture

Objectives

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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.



Key Points to Consider

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Key Points

What

Confidently writing produce specifications for your school nutrition operation that communicate the quality, condition and quantity of the desired produce will help your vendors efficiently provide produce that meets your needs.



Key Points to Consider Continued...

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Key Points

Why

- Clearly written specifications improve vendor relations and reduce product delivery delays, increased food cost, food waste and potential food safety hazards

How

Resources for Implementation:

- **USDA AMS Grade Standards** (<https://www.ams.usda.gov/grades-standards>)
- **USDA FNS Fruits & Vegetables Galore** (<https://www.fns.usda.gov/tn/fruits-vegetables-galore-helping-kids-eat-more>)
- **USDA FNS Produce Information Sheets** (<https://www.fns.usda.gov/psu/graduates>)
- **USDA AMS Commercial Item Descriptions (CIDs)** (<https://www.ams.usda.gov/grades-standards/cids>)



Right Product, Right Price

Four-Step Process

1. Create the cycle menu (e.g., menu item, Menu Ingredient Approach (MIA) & portion size)
Consider customer preferences, local availability swaps, nutrition requirements, available equipment, staffing, food safety, storage space, and more
2. Determine product availability
3. Write product specifications and conduct competitive procurement
4. Receive the specified product



Menu Ingredient Approach (MIA)



Photo credit: Chef Cyndie & the K-12 Team



Menu Ingredient Approach (MIA)

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Photo credit: Chef Cyndie & the K-12 Team



Menu Ingredient Approach (MIA)

PRODUCE SAFETY
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Photo credit: Chef Cyndie & the K-12 Team



Menu Ingredient Approach (MIA)

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Photo credit: Chef Cyndie & the K-12 Team



Menu Ingredient Approach (MIA)

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Photo credit: Chef Cyndie & the K-12 Team



Local *When Available*

PRODUCE SAFETY
UNIVERSITY



Photo credit: Chef Cyndie & the K-12 Team



Local *When Available*

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UNIVERSITY



Photo credit: Chef Cyndie & the K-12 Team



Staffing Considerations: Meals Per Labor Hour

Description	Conversion Factor	Meal Equivalents (ME)
Lunches	No conversion	1 ME
Breakfasts	÷ 3	1 ME
Afterschool snacks	÷ 4	1 ME
A la carte sales	\$0.00 ÷ Value of Reimbursable Meal + USDA Foods Value	1 ME
TOTAL		

_____ ME ÷ _____ Total labor hours = _____ MPLH



Specification Resources



United States Department of Agriculture

U.S. Grade Standards

Agricultural Marketing Service



U.S. GRADE STANDARDS for Fruits, Vegetables, Nuts, and Other Specialty Products



USDA AMS Commercial Item Descriptions (CIDs)

Source: <https://www.ams.usda.gov/grades-standards/cids>



USDA Commercial Item Descriptions (CIDs)

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- Available, free, for use as purchase specifications.
- Contain product information: packaging, labeling, size, grade, temperature, etc.
- Include requirements for: cGMP, GAP, food defense/security plan, analytical and microbiological testing, defects



Sample CIDs Specification: Broccoli Florets

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Fresh Broccoli Florets – EXAMPLE



Photo credit: Chef Cyndie & the K-12 Team

- Size A, 3/4 to 2 3/4" diameter at the widest part of the crown with 10 % or less over 2 3/4" and no more than 10% less than 3/4"
- Ready-to-eat, grown, harvested, packed, micro tested and transported according to FDA's Guidance for Industry, FSMA, cGMP, & HARPC food safety requirements.



Sample CIDs Specification: Broccoli Florets

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Fresh Broccoli Florets – EXAMPLE



Photo credit: Chef Cyndie & the K-12 Team

- Compact, fresh, firm to touch; no open flowering bead, stems shall not be excessively elongated, tough, fibrous, slimy or mushy.
- Bright, distinct dark green to blue-green in color.
- Kept under refrigeration during preparation, storage and delivery; temps between 32 and 41°F.



Sample CIDs Specification: Broccoli Florets

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Fresh Broccoli Florets – EXAMPLE

- Shelf life from time of processing must not be less than 14 days.
- School nutrition operators should expect 5-7 days of shelf life upon receiving.
- MAP or vacuum pack may be used to retain quality; package not to be bloated or on verge of rupturing.
- Must contain traceability code.



Specification Resources

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 bluish; sweet flavor. Good for eating out of hand and salads.

Empire - Dark red with some yellow flakes; 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 bluish; 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. to-crate
 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.



Produce Marketing Association

Fresh Produce Manual
 Free online!

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.

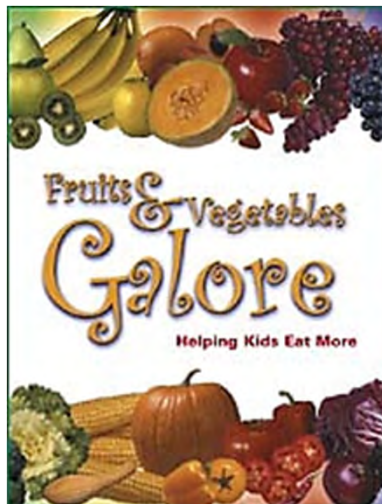
Storing and Handling

Temperature/humidity recommendations for short-term storage of 7 days or less:
 32-36 degrees F/D-2 degrees C
 85-95% relative humidity



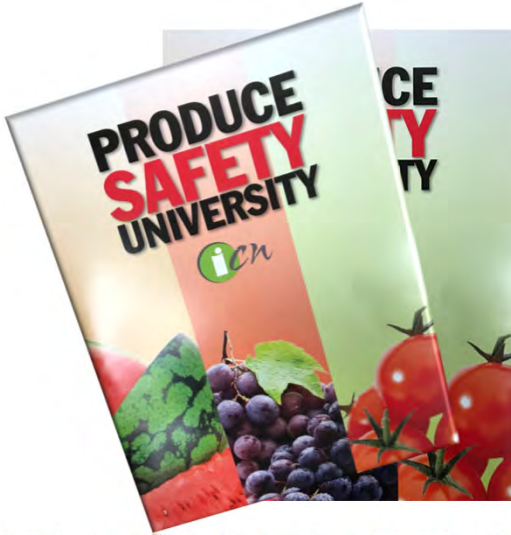
Specification Resources

PRODUCE SAFETY UNIVERSITY



Specification Resources

PRODUCE SAFETY
UNIVERSITY



The Rainbow Book!

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

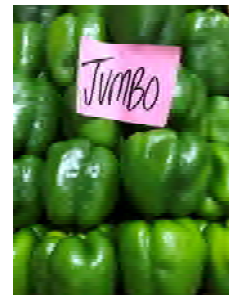
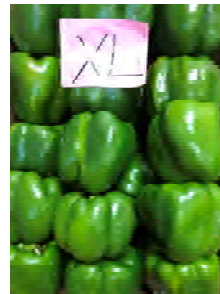


Specification Resources

PRODUCE SAFETY
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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



What's in Your Spec?

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



What's in Your Spec?

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Other requirements:

- Temperature
- Packaging
 - Type
 - Weight
 - Count
- Origin labeling
- Menu item



USDA Foods, DoD Fresh, & FFAVORS

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- Compare DoD produce cost against commercial produce.
- Inspect DoD produce - Specification minimum U.S. Number 1.
- DoD vendors are encouraged to purchase local products. About 15 to 20% of the produce DoD provides to schools is currently considered local.
- Products are marked with a local tag in the FFAVORS catalog.



Poorly Written Specification Results

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- Create confusion (may lead to dispute)
- Limit competition
- Increased cost without increasing value
- Decreased quality and/or condition
- Increased cost when product is not easily attainable



What Else?

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**What would you
add to your
specification?**



By Show of Hands!

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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



Guiding Procurement Principles

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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.





Questions



Specification Writing Activity

Time to Buy Tomatoes

INSERT "Writing Specifications Activity" TAB

Writing Specifications Activity

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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)

Specification (all may not 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:



Example One (With Instructor)

Size of product:

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.







Specification Writing Activity

(all may not 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:

Shape of product:

Color requirement:

Quality:

Condition:

Degree of ripeness:
(maximum and minimum*)

Shipping temperature:

GAP certification or other food safety
documentation required (local):



*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.

*All ingredients and finished product shall be clean, sound, wholesome, and free from any foreign material including, but not limited to soil, sand, grit, metal, glass, wood, paint, and evidence of insect or rodent infestation.



**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.

51.1856 U.S. Combination.

51.1857 U.S. No. 2.

51.1858 U.S. No. 3.

Size

51.1859 Size.

Color Classification

51.1860 Color classification.

Tolerances

51.1861 Tolerances.

Application of Tolerances

51.1862 Application of tolerances.

Standard Weight

51.1863 Standard weight.

Definitions

51.1864 Similar varietal characteristics.

51.1865 Mature.

51.1866 Soft.

51.1867 Clean.

51.1868 Well developed.

51.1869 Fairly well formed.

51.1870 Fairly smooth.

51.1871 Damage.

51.1872 Reasonably well formed.

51.1873 Slightly rough.

51.1874 Serious damage.

51.1875 Misshapen.

51.1876 Very serious damage.

51.1877 Classification of defects.

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;

¹Compliance 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	

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

²Will 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:

²Shipping 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

²Shipping 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

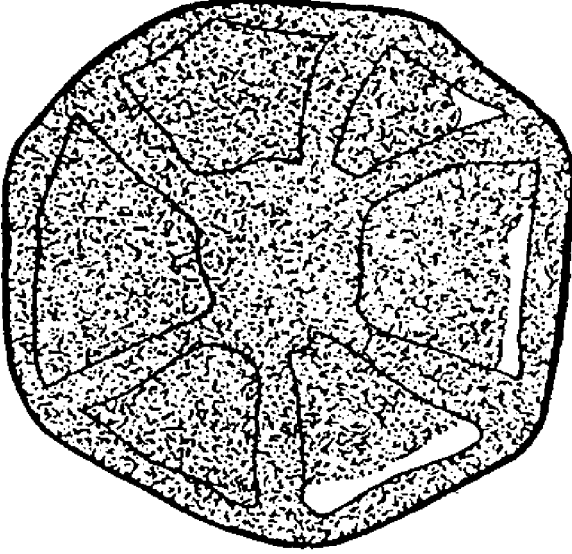
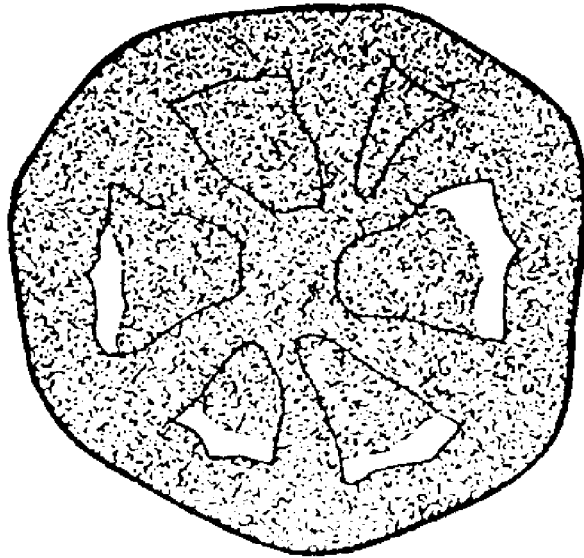
Factor	Damage	Serious Damage	Very serious damage
Cuts and broken skins	Not shallow or not well healed, or shallow, well healed cut more than 1/2 inch (13 mm) in length, or other shallow, well healed skin breaks aggregating more than a circle 3/8 inch (10 mm) in diameter.	Not shallow or not well healed, 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.

¹Conversion 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.

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

PUFFINESS

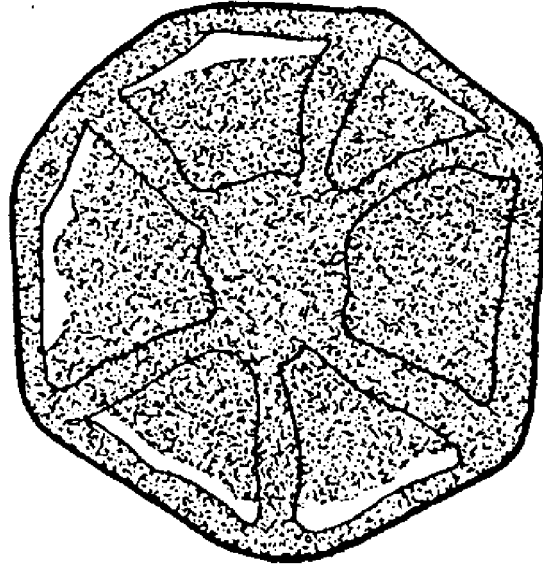
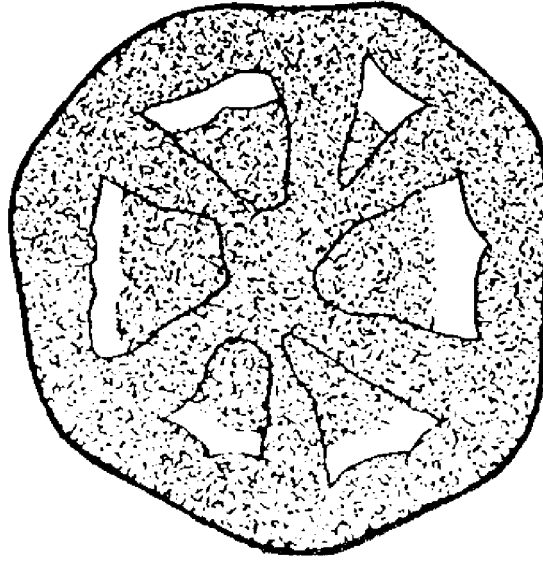


LOWER LIMIT U.S. NO. 1

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

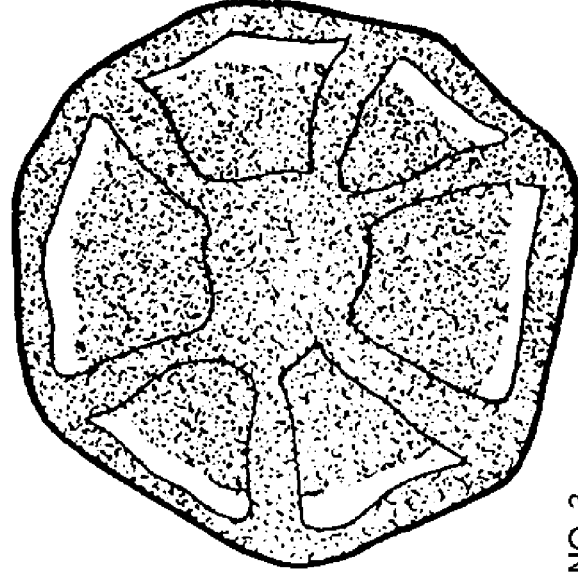
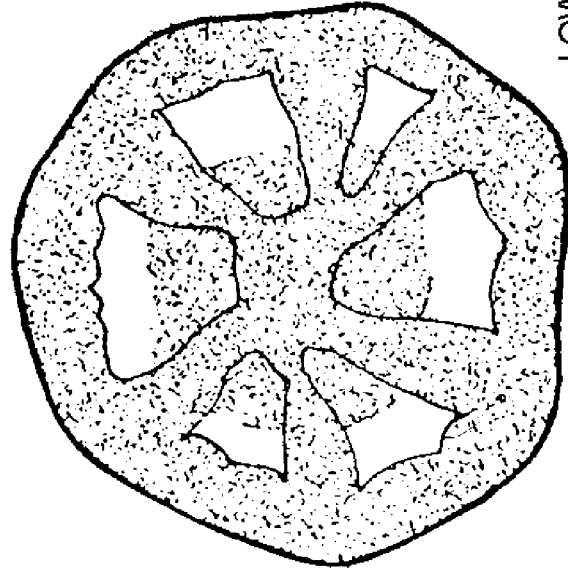


LOWER LIMIT U.S. NO. 2

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

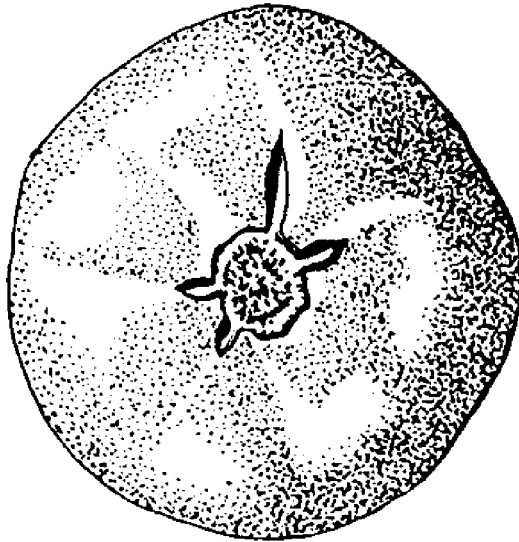


LOWER LIMIT U.S. NO. 3

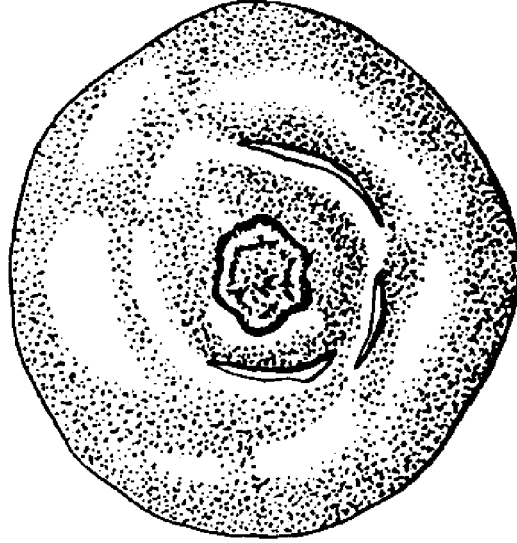
The proportion of open space permitted is dependent upon the thickness of walls. Tomatoes with thicker walls than those in the above illustrations may have proportionately greater amounts of open space. Tomatoes with thinner walls than illustrated shall have proportionately lesser amounts of open space.

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

INSERT "Receiving and Storage" TAB



Receiving and Storage

**PRODUCE SAFETY
UNIVERSITY**

Objectives

**PRODUCE SAFETY
UNIVERSITY**

Inspecting and verifying quality and condition upon receipt ensure that product that was paid for is what was received.

Understand the impact of storage conditions such as temperature, humidity, and ethylene on produce safety and freshness.

324

Key Points to Consider

PRODUCE SAFETY
UNIVERSITY

Key Points

What

- When receiving produce, it is important to check temperature, quality, condition, and ensure that the produce meets the purchase specifications
- Proper storage is crucial to keep produce fresh; separate ethylene sensitive items from ethylene producers and ensure proper temperatures for cold and dry storage.



Key Points to Consider Continued...

PRODUCE SAFETY
UNIVERSITY

Key Points

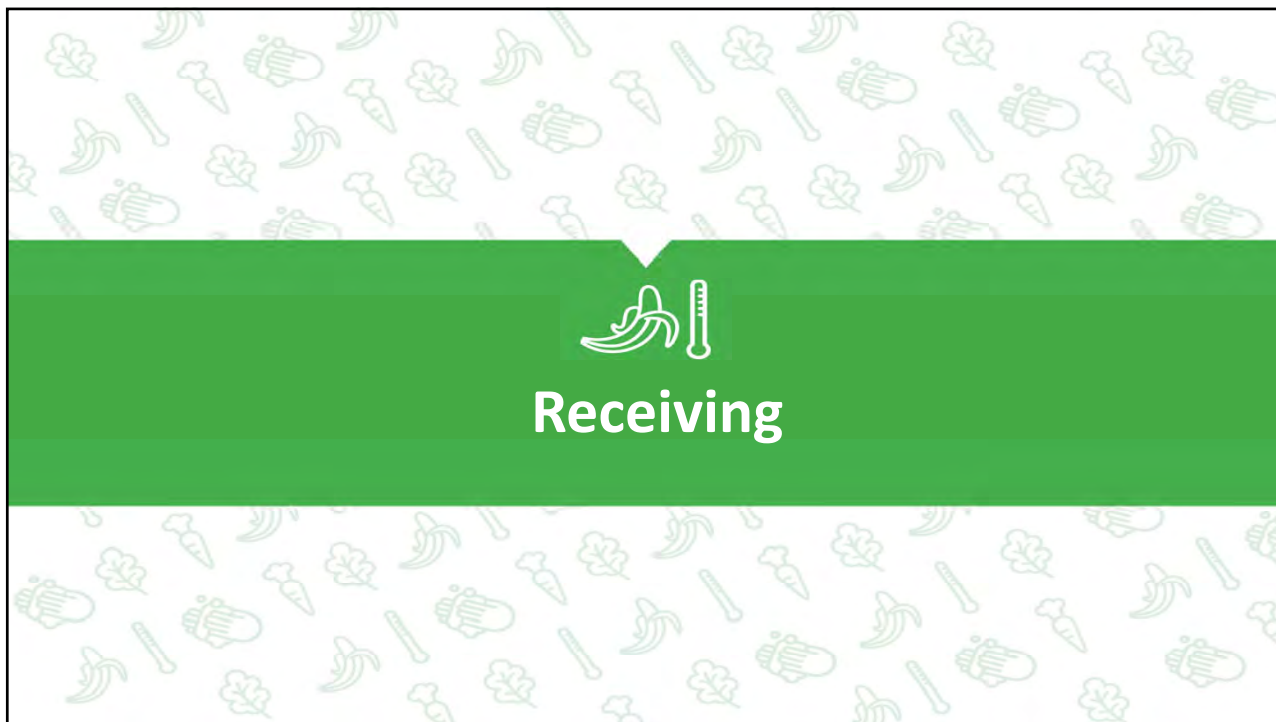
Why

- Properly verifying, inspecting, receiving and storing produce ensures food safety, maximizes cost savings and optimizes produce shelf life

How


- Resource for Implementation: **U.S. Grade Standards** (<https://www.ams.usda.gov/grades-standards>)
- Resource for Training Others: **Optimum Produce Storage Guide** (located in PSU Binder)






Receiving Produce

PRODUCE SAFETY UNIVERSITY



Check produce BEFORE 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 specified 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

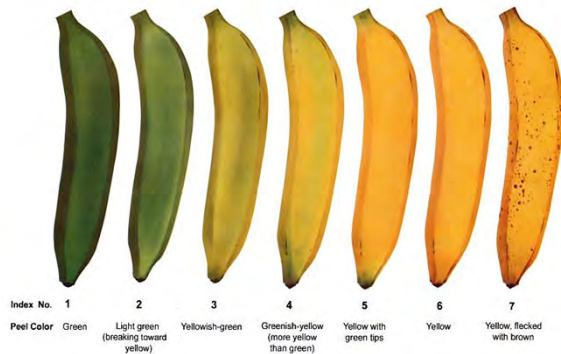
PRODUCE SAFETY
UNIVERSITY

Open cartons from bottom to inspect contents.



Receiving: Tips

Check color

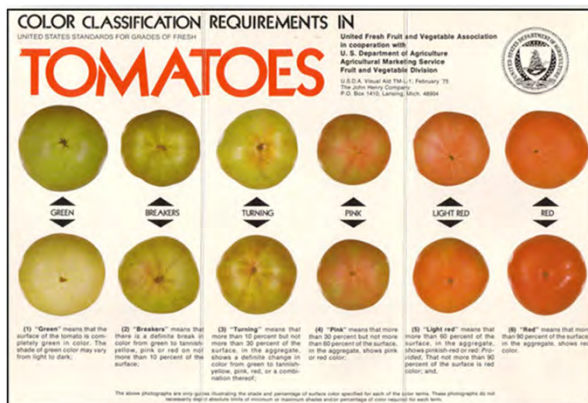


Color is an indication of ripeness



Receiving: Tips

Check color



Color is an indication of ripeness



Receiving: Tips

JULIAN DATE CALENDAR PERPETUAL													
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Day					
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	182	212	243	274	304	335	365	31		

Julian Calendar
Date:
Mark Cartons
001 = Jan 1st



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

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Ethylene is "**introduced**" to ensure "**uniform**" ripening of:

- Avocados
- Bananas
- Mangoes
- Tomatoes



Separate

Ethylene Sensitive



Ethylene Producer



Ethylene Sensitivity

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



Refrigerate

Apples	Broccoli
Cabbage	Carrots
Cauliflower	Celery
Corn	Cucumbers *
Fresh-cut	Grapes
Green Beans *	Lettuce
Oranges *	Peppers *
Spinach	Strawberries

* Ideal to store at 45-50°F



Refrigerate

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



Dry Storage

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

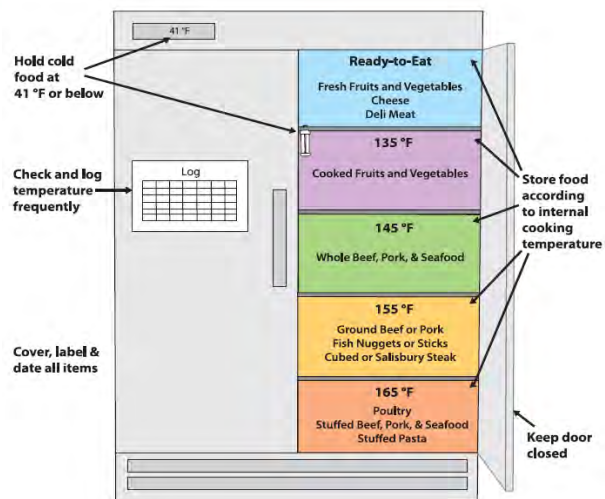


Storage

Ready to Eat Product

Fully Cooked and Leftovers

Iced or Wet





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)								
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)								
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)								
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)								
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)								
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)								
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	Yes	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)								
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)								
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)								
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



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.



Key Points to Consider

PRODUCE SAFETY
UNIVERSITY

Key Points

What

- The Process Approach to HACCP defines the Temperature Danger Zone (TDZ) and categorizes food preparation processes by the number of trips through the TDZ.
- Reduce food safety risks by storing produce properly, practicing hand hygiene, avoiding bare-hand contact (by using gloves), washing fresh produce when appropriate, holding and serving at appropriate times and temperatures



Key Points to Consider Continued...

PRODUCE SAFETY
UNIVERSITY

Key Points

Why

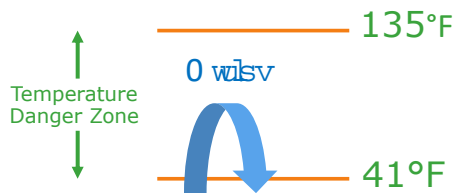
- Reducing food contamination through safe produce preparation ensures that school meals are safe for student consumption.
- Identifying food production methods and merchandizing strategies that produce eye appealing foods help school nutrition staff encourage student acceptance.

How

- Resources for Implementation: **ICN Food Safety Standard Operating Procedures** (<https://theicn.org/icn-resources-a-z/standard-operating-procedures/>)
- Resource for Training Others: **Tips for Marketing Your School Nutrition Program** (<https://theicn.org/icn-resources-a-z/marketing-your-SNP>)



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.



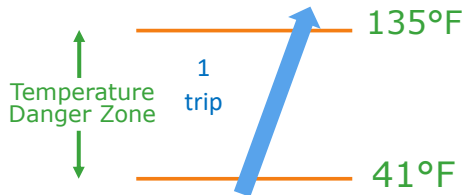
Process 1: Non-TCS Examples

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.



Process 2: Same Day Service



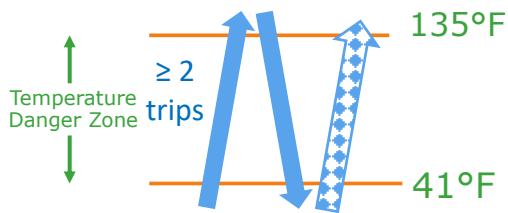
Fruit, Hot
Vegetables, Hot

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



7

Process 3: Complex



Fruit, Hot <i>Cooked, Cooled, Reheated</i>
Vegetables, Hot <i>Cooked, Cooled, Reheated</i>

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





Reduce the Risks – Storing

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- 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





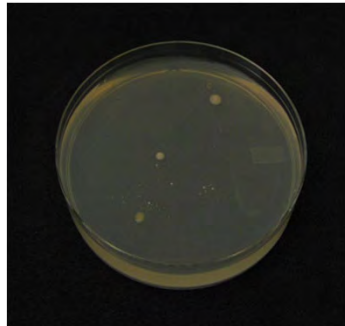
Photo credit: Chef Cyndie & the K-12 Team



Reduce the Risks – Food Preparation

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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



Handwashing Study

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UNIVERSITY

Fast Food and Full-Service Restaurants Comparison Study

- Are hands washed properly?
- Are hands washed when required?
- Are handwashing facilities conveniently located?
- Are supplies available?

Source: Boyer, M., Williams, L. Otto, J., Lando, A., Dawood, N., & Liggins, G. (2021). Handwashing Observations In Fast-Food and Full-Service Restaurants . *Journal of Food Protection*, Vol 84, No. 6, 1016 – 1022



Photo credit: Chef Cyndie & the K-12 Team



Handwashing Study - Findings

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Fast Food and Full-Service Restaurants Comparison Study

Observation	Fast-Food (n=425)	Full-Service (n=396)
Hands washed properly	55%	43%
Hands wash when required	57%	78%
Conveniently located handwashing facilities	80%	70%
Are supplies available?	88.7%	78.5%



Reduce the Risks – Food Preparation

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Simple cues may increase handwashing

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

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



Reduce the Risks - Handwashing

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Findings:

- Over 97,000 handwashing opportunities in the 10-week study.
- Towel presented group used greater volume of towels and soap than control group.
- Increase in both products indicated complete handwashing with stimulus applied.



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



Reduce the Risks – Food Preparation

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Photo credit: Chef Cyndie & the K-12 Team

- Avoid bare-hand contact by:
- Properly wearing single-use gloves
 - Using utensils & deli paper
 - Dispensing equipment



Reduce the Risks – Food Preparation

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16%

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



Reduce the Risks – Food Preparation

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Handling fresh produce

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



Photo credit: Chef Cyndie & the K-12 Team

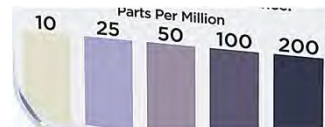


Reduce the Risks – Commercial Produce Anti-microbial Wash

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Commercial produce wash examples

- 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



Classroom Question By Show of Hands

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**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



Reduce the Risks – Food Preparation Equipment

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Remove excess moisture to improve quality and safety by using a:

- commercial salad spinner
- colander or perforated pan
- disposable paper towel



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

Reduce the Risks – Food Preparation Equipment

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Use Approved Equipment

- Cutting boards, knives
- Food storage containers
- Food processors/blenders
 - Manual
 - Mechanical



Photo credit: Chef Cyndie & the K-12 Team



Reduce the Risks – Food Preparation Equipment

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Equipment to meet the Occupational Safety and Health Administration (OSHA) and Federal Food, Drug, and Cosmetic Act standards through approved, private, third-party evaluation, testing, and certification.

Note: The non-profit American National Standards Institute (ANSI) is responsible for maintaining public health food equipment and environmental standards based on the FD&C Act since 1918.



Reduce the Risks – Food Preparation Equipment

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OSHA maintains the Nationally Recognized Testing Laboratories (NRTL)

Organizations may include:

- Edison Testing Laboratories – (ETL)
- Edison Testing Laboratories – (ETL Sanitation Listed)
- National Sanitation Foundation (NSF)
- Underwriters Laboratories (UL)
- Underwriters Laboratories Solutions (Sanitation) (EPH)



Reduce the Risks – Holding and Serving

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- 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.



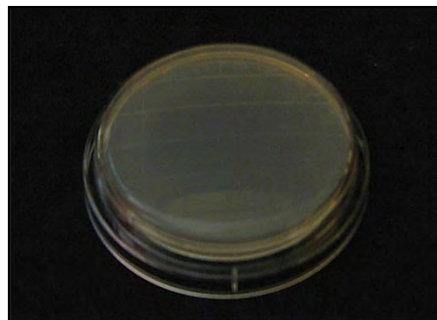
Reduce the Risks - Cleaning and Sanitizing

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Photo credit: Chef Cyndie & the K-12 Team

A clean and sanitized cutting board shows no sign of microorganisms



Source: Iowa State University Extension Service



Food Safety Behavioral Intentions Research – Child Nutrition Employees

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School nutrition staff (n=408) attitudinal survey: cleaning and sanitizing food contact surfaces, handwashing, and using thermometers to take food temperatures outcomes:

Respondents felt:

- A very positive food safety attitude
- Social pressure to practice proper food safety (supervisor, students, parents, health inspector)
- Not in control (i.e., lack of supplies and equipment)

Source: Roberts, K., Sauer, K., Paez, P., & Alcorn, M. (2020). Use of Theory of Planned Behavior to Determine Food Safety Behavioral Intentions among Child Nutrition Employees. *Food Protection Trends*, 40(6), 424-434.



Food Safety Behavioral Intentions Research – Child Nutrition Employees

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UNIVERSITY

Recommendations from authors:

1. Incorporate motivational training strategies using emotional stories and personal examples
2. Provide staff with access to adequate supplies and equipment to increase control beliefs

Source: Roberts, K., Sauer, K., Paez, P., & Alcorn, M. (2020). Use of Theory of Planned Behavior to Determine Food Safety Behavioral Intentions among Child Nutrition Employees. *Food Protection Trends*, 40(6), 424-434.



AI

Power Up!

- Food safety systems and monitoring plans
- Supply chain management
- Rapid bacteria detection



Marketing for
Improved Student Appeal

Marketing Questions

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1. How does the food look from the customer's point of view?
2. Do the colors complement each other?
3. Is the item attractive and eye appealing? *Remember top quality/condition/grade may not be necessary!*
4. Is the item in a form that is easy for children to eat?
5. Is the food being served at the correct, safe temperature?



Marketing Questions

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1. Is your marketing plan aligned with core values to promote student health?
2. How much marketing in schools is for unhealthy food?



Photo credit: Chef Cyndie & the K-12 Team



Food & Beverage Marketing in Schools

Focus groups of superintendents from all four U.S. Census regions were conducted.

Theme outcomes:

1. Food and beverage marketing was a means to an end – marketing tied to budget deficit or academic goal
2. Parent group fundraising oversight deemed complex issue due to hesitancy to restrict afterschool fundraising and student activities
3. Restaurant fundraisers most common – unhealthy food marketing endorsed

Source: Asada, Y., Harris, J.L., Mancini, S., Schwartz, M.B., & Chriqui, J.F. (2020) Food and beverage marketing in schools: school superintendents' perspectives and practices after the Healthy, Hunger-Free Kids Act. *Public Health Nutrition*, 23(11), 2024-2031.



Merchandize – Entrée Salads



Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Entrée Salads

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Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Grab and Go

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Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Parfaits

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Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Mixed Salads

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Photo credit: Chef
Cyndie & the K-12 Team



Merchandize – Roasted Vegetables



Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Roasted Potatoes



Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Blueberry Crisp

PRODUCE SAFETY
UNIVERSITY



Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Combine Canned and Fresh

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UNIVERSITY



Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Spicy Tuna with Pickled Vegetables

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UNIVERSITY



Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Grilled Cheese & Roasted Vegetables

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UNIVERSITY



Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Entrees (Beef and Sweet potato Chili)

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Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Entrees (Teriyaki Noodles)

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Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Improve Appeal

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Photo credit: Chef Cyndie & the K-12 Team



Merchandize – Improve Appeal

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



Merchandize – Improve Appeal



Photo credit: Chef Cyndie & the K-12 Team



Merchandizing - Small Equipment



Photo credit: Chef Cyndie & the K-12 Team



Merchandize in the Serving Area

PRODUCE SAFETY UNIVERSITY

Each reimbursable meal must include at least three food groups:
 • Half a cup of fruit or vegetables and
 • At least two other food groups

Eat Right, Be Bright.

Fruit	cal	Protein	cal	Dairy	cal
Chilled Mixed Fruit	80	Oven Baked Fish Patty	490	1% White Milk	100
Fresh Pineapple Chunks	60	Chicken Pot Pie	330	Fat Free White Milk	90
		Beef Nachos w/Corn Tortilla Chips	550	Fat Free Lactose Milk	90
Vegetables	cal			Bread/Grains	cal
Fresh Celery Sticks	100			Whole Bun	200
Oven Baked Potato Wedges	150			Cornbread	125
				Trail Mix	80

NUTRITION & ALLERGEN GUIDELINES



The Key to Your Program's Success!

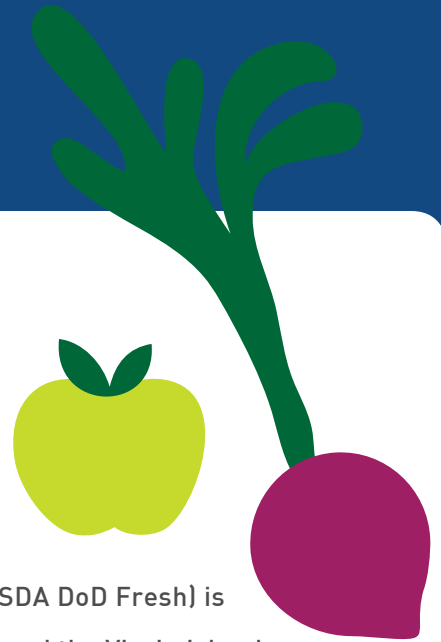
PRODUCE SAFETY UNIVERSITY



Photo credit: Chef Cyndie & the K-12 Team







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.



USDA is an equal opportunity provider and employer. Updated August 2017.



INSERT "Additional Resources" TAB

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. <i>"This apple represents our planet."</i>
3/4	Water	2. Cut the apple into quarters. Hold out 3/4 in one hand. Ask the class: <i>"What do these 3/4 represent?" (Water.)</i>
1/4	Land	3. Set the three "water" sections aside and hold out the remaining quarter. Ask the class: <i>"What fraction of the apple remains?" (1/4.) This 1/4 represents the total land surface."</i>
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: <i>"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."</i>
1/8	Habitable Land	5. Set that 1/8 aside and hold out the other. <i>"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."</i>
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. <i>"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."</i>
1/32	Arable Land	7. Set 3/32 aside and hold out 1/32. <i>"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."</i>
1/32 Peel	Topsoil	8. Carefully peel the 1/32 slice of Earth. 9. Hold up the peel. <i>"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 percent of U.S. croplands lose topsoil above the sustainable rate."</i>

COMPATIBILITY, TEMPERATURE GUIDELINES & ETHYLENE SENSITIVITY

COMPATIBILITY, TEMPERATURE GUIDELINES

Source: United States Department of Agriculture (USDA)

Load Compatibility Groups¹

Group 1

Apples	Grapes ² (see groups 2 and 6a)
Apricots	Peaches
Berries (except cranberries)	Pears
Cherries	Persimmons
Figs (not with apples, danger of odor transfer to figs; also see group 6a)	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 CO²
- **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 (SO²) in vehicle and if no chemicals that release SO² are included in packages.

Group 2

Avocados	Honey Dew
Bananas	Persian
Eggplants (also see group 5)	Olives, fresh
Grapefruit ³	Papayas
Guava	Pineapples (not with avocados, danger of avocados odor absorption)
Limes	Tomatoes, green
Mangoes	Tomatoes, pink (also see group 4)
Muskmelons, other than cantaloupes	Watermelons (also see groups 4 and 5)
Casaba	
Crenshaw	

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 tangerines compatibility 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	Mushrooms
Asparagus	Parsley
Beets, red	Parsnips
Carrots	Peas
Endive and escarole	Rhubarb
Figs (also see group 1)	Salsify
Grapes (also see group 1)	Spinach
Greens	Sweet corn
Leeks (not with figs or grapes)	Watercress
Lettuce	

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	herbs
asparagus	leek ⁸
Belgian/endive	lettuce
broccoli	mustard greens
Brussels sprouts	parsley
cabbage ¹	snow peas
carrot ^{1,3}	spinach
cauliflower	sweet peas
celery ^{1,3,9}	turnip greens
collard	watercress
escarole	
green onion ⁹	

(45-50° F)

chayote	cucumber
eggplant ⁵	okra
squash, summer	

(55-65° F)

squash: pumpkin, winter, yam	sweet potato
---------------------------------	--------------

Not sensitive to ethylene vegetables (55-65° F)

dry onion ⁹	ginger ⁵
jicama	melon: bitter
potato	tomato

Ethylene-producing (very low) fruits and melons (32-36° F)

apple ^{1,3,9}	grape ^{6,7,8}
apricot	loquat
avocado (ripe)	nectarine
berries	peach
cantaloupe	pear ^{1,9}
cherry	plum
coconut	plumcot
currant	pomegranate
date	prune
fig ^{1,7,8}	quince

Ethylene-sensitive fruits (45-50° F)

grapefruit ^{4,9}	lemon ^{4,9}
lime ^{4,9}	

Not sensitive to ethylene vegetables

(32-36° F)

alfalfa sprouts	mint
amaranth	mushroom ⁷
anise	parsnip
artichoke	radicchio
beans: fava, lima	radish
bean sprouts	rhubarb ⁷
beet	rutbaga
bok choy	shallot
garlic	sweet corn ⁷
horseradish	water chestnut
kale	

(45-50° F)

basil	beans: green, snap ¹⁰
cowpea	pepper: bell, chili ¹⁰
tomatillo	

Not sensitive to ethylene fruits

(45-50° F)

avocado (unripe)	orange ^{4,9}
cactus pear ^{1,9}	passion fruit
cranberry	pineapple ^{2,10}
guava	tamarillo
kumquat	tamarind
mandarin ^{4,9}	tangelo ^{4,9}
olive	watermelon

(55-65° F)

banana	breadfruit
jackfruit	mango
melon: casaba, crenshaw, honeydew	papaya
Persian	rambutan
plantain	
soursop	

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. 11/9-bushel crates
 10-lb. baskets/cartons

Romaine

40-lb. 2/3 cartons/crates
 28-lb. 11/3-bushel cartons
 22-lb. 11/9-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. 11/9 -bushel crates/cartons

Snow, China, Sugar, Sugar Snap

10-lb. cartons

Southern

25-lb. bushel hampers

PEPPERS*Bells*

35-lb. 11/4 -bushel cartons
 30-lb. cartons/crate
 28-lb. bushel and
 11/9 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. 12/3-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 11/9-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. 11/9-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 layered

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

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