

# Manager's Corner

## Storing Produce for Optimal Quality

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## The University of Mississippi

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### **PURPOSE**

Improve the operation of child nutrition programs through research, education and training, and information dissemination.

### **VISION**

Lead the nation in providing research, education, and resources to promote excellence in child nutrition programs.

### **MISSION**

Provide relevant research-based information and services that advance the continuous improvement of child nutrition programs.

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## Professional Standards

### RECEIVING AND STORAGE – 2500

**Employee will be able to ensure proper inventory management including correct delivery and storage of inventory, and that which has been placed on hold or recalled.**

2520 – Receiving and Storage

Apply safe and effective inventory receiving and storage procedures.

## Introduction

*Manager's Corner: Storing Produce for Optimal Quality* is designed to empower managers to use in training their staff. Each lesson is roughly 15 minutes. This lesson plan contains:

- Learning objective
- Statement explaining the importance of the topic
- List of materials
- Instructions on how to present the information
- Questions to ask staff
- An activity to strengthen or refresh the knowledge of the staff

## Lesson Overview

### Instructions for lesson:

- Review the lesson objective and background information.
- Review why it is important.
- Ask staff the questions.
- Facilitate the activity outlined.
- Provide time for staff to ask questions.

**Objective:** Identify best practices for storing produce (fruits and vegetables) to ensure optimal quality.

**Background information:** The way a school nutrition program stores and cools its produce can influence its flavor, texture, tenderness, and how quickly it decays. There are two areas of consideration when storing produce. The first is identifying the optimal storage temperature for produce items. The second is understanding which items can and cannot be stored near each other due to the effects of the naturally occurring gas, ethylene, which some foods produce.

Certain produce items maintain better quality at warmer temperatures. These items may include:

- Citrus Fruits
- Cucumbers
- Melons
- Peppers
- Pineapple
- Summer Squash

Some items do not need refrigeration. Items that should be stored in a cool dry storage room with temperatures between 60–70 °F include:

- Bananas
- Dry Onions
- Potatoes
- Sweet Potatoes
- Winter Squashes

Certain foods produce ethylene gas. Ethylene gas is produced naturally in many fruits and some vegetables that causes ripening—and then over ripening. While refrigeration and humidity slow the effects of ripening, they don't stop the production of ethylene gas. Fruits are usually producers of ethylene gasses, and vegetables are generally sensitive to ethylene which causes them to become overripe and deteriorate more quickly. Ideally, fruits and vegetables should be stored as far apart from each other as possible to lessen the over ripening effects of ethylene gas.

**Why it is important:** Ensuring proper storage of produce items allows for longer shelf life of products. Proper storage reduces food waste and helps to ensure produce items maintain a higher quality of freshness.

## Questions for Staff

- **Some fruits and vegetables naturally give off a gas called ethylene. Ethylene can affect the quality of produce by causing it to ripen—then become overripe. What is a quick way to determine if a food is an ethylene producer or if the food is ethylene sensitive?**

**Answer:**

- Ethylene-producing foods are most often fruits while ethylene-sensitive foods are mostly vegetables.
- **Why is it important to ensure produce items are properly stored according to temperature and ethylene sensitivities?**
- Possible Answers:**
- Ensures products have a better eye and textural appeal for customers
  - Promotes longer shelf life, products will not deteriorate as quickly
  - Reduces food waste

**Please note:** The answers provided are only examples and are not an inclusive list of possible responses.

## Activity: Storing Fresh Produce

**Activity materials included in this document:**

- **Storing Fresh Produce** (worksheet and handout)
- **Storing Fresh Produce Answer Key**

**Materials provided by school nutrition operation:**

- Copies of handouts
- Pens/pencils

**Activity Instructions:**

- Print the handouts and worksheets.
- Individually or in teams, complete the **Storing Fresh Produce worksheet**.
- Write the names of foods listed, in the key, in the proper storage area.



## Storing Fresh Produce

There are two areas of consideration when storing produce. The first is identifying the optimal storage temperature for produce items. The second is understanding which items can and cannot be stored near each other due to the effects of the naturally occurring gas, ethylene, which some foods produce.

Walk-in refrigerators are required to maintain a temperature of 41 °F or less, but temperatures inside the walk-in may range from 32 °F to 41 °F depending on proximity to the door. The coldest part of the walk-in refrigerator tends to be the back wall, the furthest location from the door. Certain produce items maintain better quality at warmer temperatures. These items may include:

- Citrus Fruits
- Cucumbers
- Melons
- Peppers
- Pineapple
- Summer Squash

Some items do not need refrigeration. Items that should be stored in a cool dry storage room with temperatures between 60–70 °F include:

- Bananas
- Dry Onions
- Potatoes
- Sweet Potatoes
- Winter Squashes

Certain foods produce ethylene gas. Ethylene gas is the ripening agent that many fruits and vegetables produce naturally. Ethylene causes them to ripen—and then become overripe. While refrigeration and humidity slow the effects of ripening, they don't stop the production of ethylene gas. Fruits are the primary producers of ethylene gasses. While ethylene gasses help fruits to ripen, the gas can also cause some other fruits and many vegetables to become overripe and deteriorate more quickly. Ideally, fruits and vegetables should be stored as far apart from each other as possible to lessen the ripening effects of ethylene gas.

Food items that are high ethylene gas producers include:

- Apples
- Apricots
- Kiwifruit
- Melon
- Pears
- Stone Fruits
- Tomatoes

Foods that are sensitive to ethylene gas include:

- Broccoli
- Cabbage
- Carrots
- Cauliflower
- Cucumbers
- Leafy Greens
- Peppers
- Squash – all varieties

## Storing Fresh Produce

### Instructions:

Use the words listed in the word bank below and place the food items in the appropriate storage location for optimal quality.

- Apples
- Asparagus
- Avocados
- Banana
- Berries
- Broccoli
- Brussels Sprouts
- Cabbage
- Cantaloupe
- Carrots
- Cauliflower
- Corn
- Cucumbers
- Dry Onions
- Fresh-Cut Produce
- Grapefruit
- Green Beans
- Greens
- Herbs
- Honeydew
- Lemons
- Lettuce
- Limes
- Mangoes
- Mushrooms
- Nectarines
- Okra
- Oranges
- Peaches
- Pears
- Peppers
- Pineapple
- Plums
- Potatoes
- Radishes
- Spinach
- Summer Squash
- Sweet Potatoes
- Tangerines
- Tomatoes
- Watermelon

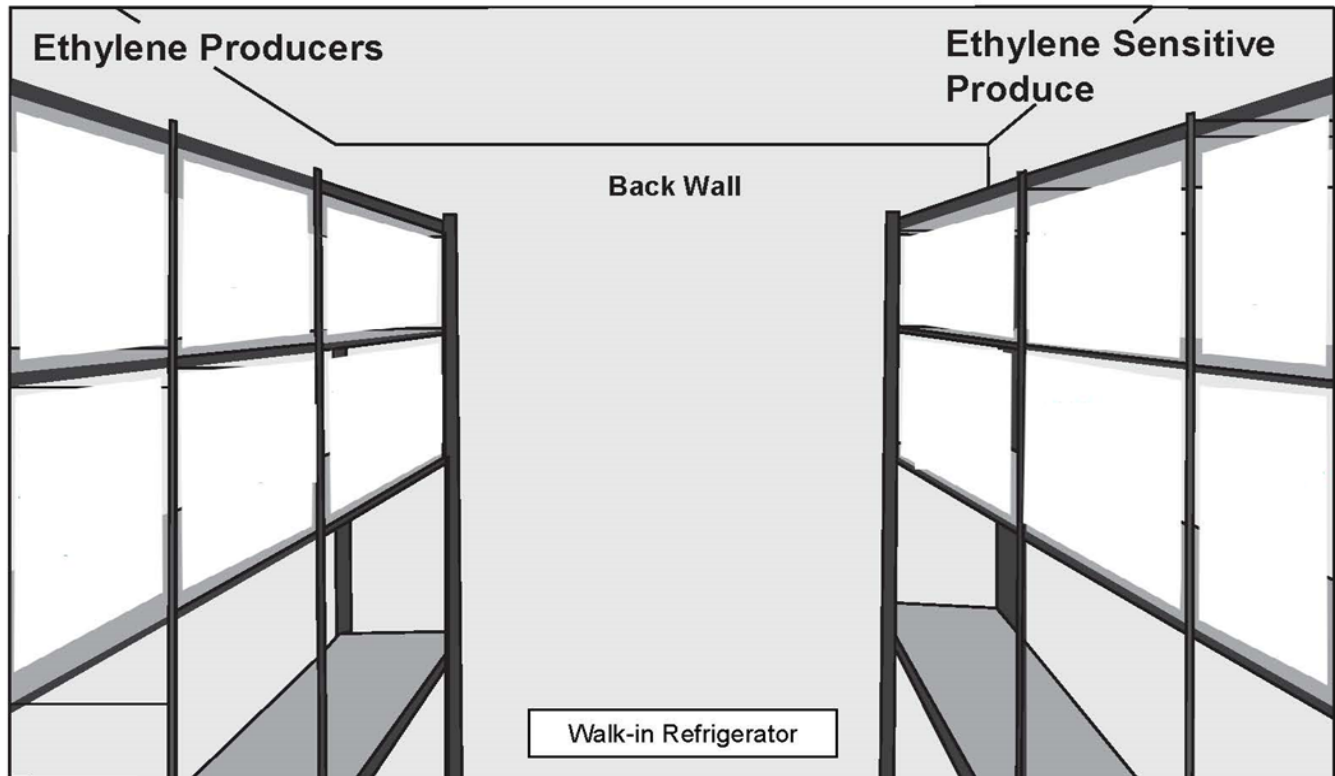
List the items that should **not** be refrigerated.  
Items best stored between 60 °F and 70 °F.

1.

2.

3.

4.

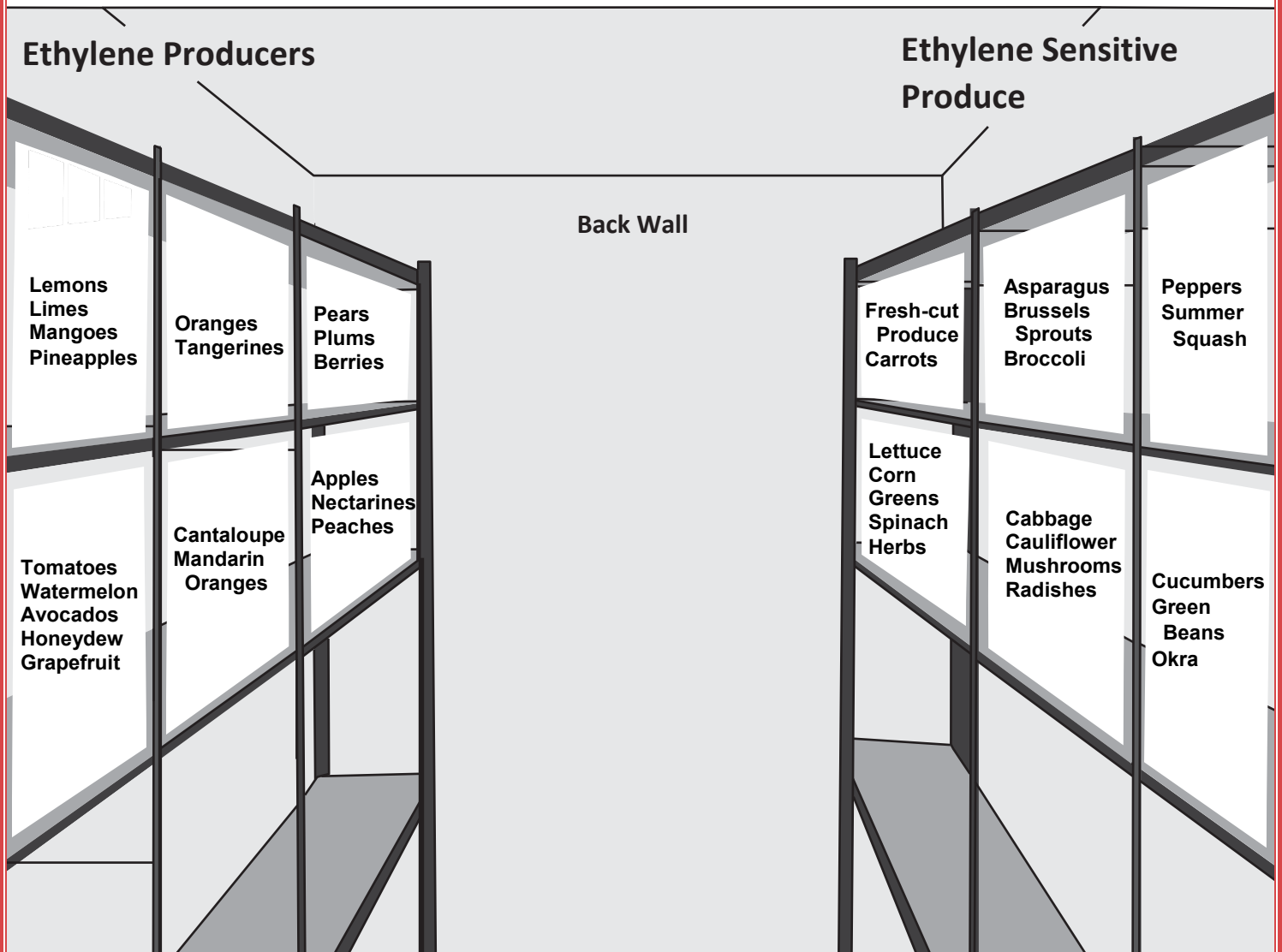


## Storing Fresh Produce Answer Key

Refrigerators should maintain a temperature of 41 °F or less, but temperatures inside a refrigerator can range from colder (32 °F) to warmer (41 °F), depending on the location. Colder temperatures are found in the back and warmer temperatures in the front, near the door. Some kinds of produce should be stored at warmer temperatures near the door for best quality. The location of fruits and vegetables is important because fruits, in general, produce ethylene gas, which fosters natural ripening, but it also can cause most vegetables and a few non-ethylene producing fruits to deteriorate more quickly and develop undesirable characteristics. Ideally, ethylene-producing fruits should be stored in the refrigerator as far from ethylene-sensitive fruits and vegetables as possible.

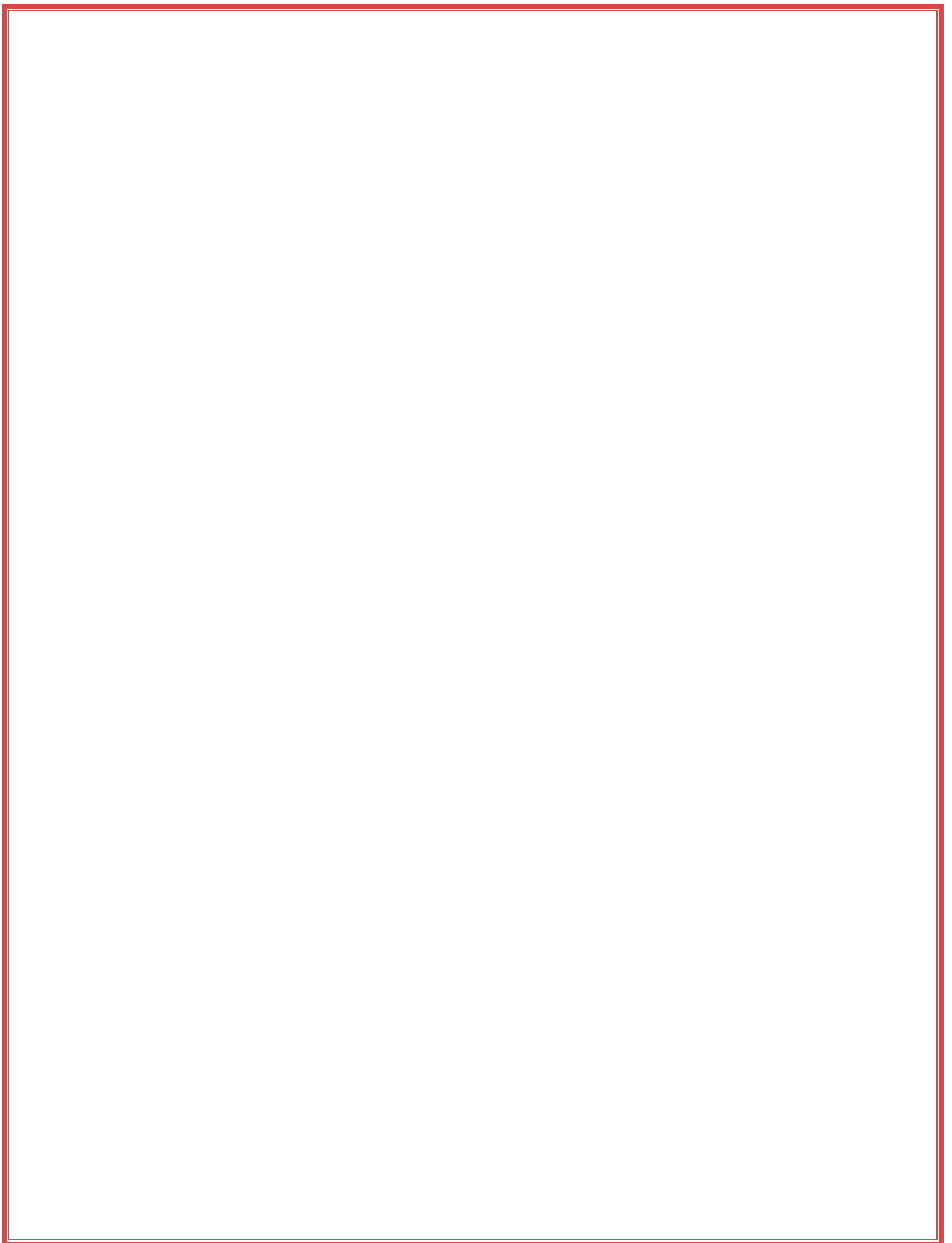
**These items should not be refrigerated. Store ideally between 60 °F and 70 °F**

Bananas      Sweet Potatoes      Potatoes      Dry Onions  
Walk-in Refrigerator



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