

Unit F: Harvesting Fruits and Nuts

Lesson 2: Grade, Pack, Store and Transport Fruits and Nuts

Student Learning Objectives: Instruction in this lesson should result in students achieving the following objectives:

1. Discuss how to grade fruit and nuts.
2. Choose proper packaging for fruits and nuts.
3. Determine the best storage methods for fruit and nuts.
4. Discuss the transportation of fruits and nuts.

Recommended Teaching Time: 3 hours

Recommended Resources: The following resources may be useful in teaching this lesson:

- A PowerPoint has been developed for use with this lesson plan

List of Equipment, Tools, Supplies, and Facilities

Writing surface
PowerPoint Projector
PowerPoint Slides
Copies of student lab sheets
Fruits and nuts of various quality
Examples of fruit and nut packaging

Interest Approach: Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Provide students with three examples of a fruit (apples will work). Find a high, medium and poor quality apple. If a poor quality apple cannot be found, drop it on the ground and bruise it or scratch it. Present these apples to the class and ask them to rank the apples in order of quality. Once they have done this, ask them why they graded the fruits the way they did.

Use this approach to move into Objective 1.

Summary of Content and Teaching Strategies

Objective 1: Discuss how to grade fruit and nuts.

(PowerPoint Slide #2)

- I. After the fruit and nuts are safely harvested, they need to be graded so they can be sold at market.

(PowerPoint Slide #3)

- A. Grading fruit and nuts is done for many reasons.
 1. It gives the grower an idea of how the growing season affected the fruits and nuts.
 2. Grading allows the grower to adjust cultural practices for the next crop.
 3. Once fruit and nuts are graded they can be sorted into categories.
 - a. Higher quality fruits and nuts will go to market and earn higher profits.
 - b. Lower quality fruits can be sold to food producers to be put into breads, jams and other food products.
 4. Grading fruits and nuts gives consumers an idea of the product they are purchasing.

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- B. When fruits and nuts are being graded, the individual fruit or nut will determine grading characteristics, but overall the following qualities are graded:
 1. Cleanliness
 - a. The fruit or nut should be free of dirt and other particles.
 2. Shape
 - a. Fruits and nuts should be free from deformities and should portray the fruit or nut they are being marketed as.
 - b. Deformities do not affect taste but consumers are likely to pick fruits and nuts of proper shape.

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3. Size
 - a. The fruit or nut should be of mature size and shape.
 - b. The weight should be heavy for its size, which indicates a good quality fruit.
4. Blemishes
 - a. Fruits and nuts should be free of scratches, bruises, discoloring, and disease marks.
 - b. Blemishes will have an impact on fruit and nut pricing.
 - c. Harvest can have a major impact on blemishes, so care should be taken to prevent blemishes during harvest.

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5. Maturity
 - a. The fruit or nut should be ready for the consumer to eat straight from the market.
 - b. Over or under-mature fruit are not desirable to the consumer.
 - c. Depending on the fruit or nut it should be firm.
6. Color
 - a. Each fruit and nut is different but color should portray the fruit or nut being sold.
 - b. Fruits like apples that have an array of yellows and reds will depend upon variety.

Using the apples from the beginning of the lesson as an example, have students make grading criteria for each of the fruits and nuts covered in class (from Unit E). Provide copies of LS: F2-1 to aid the students in organizing their data.

Objective 2: Choose proper packaging for fruits and nuts.

(PowerPoint Slide #7)

II. Packaging fruits and nuts is the next important step in delivering quality produce to the market.

- A. Proper fruit and nut packaging will contain the fruits, protect it from further quality degradation and identify it for consumers.

(PowerPoint Slide #8)

B. The container must enclose the produce in convenient units for handling and distribution.

1. The produce should fit well inside the container, with little wasted space.
2. Small produce items that are spherical or oblong (such as apples) may be packaged efficiently utilizing a variety of different package shapes and sizes.
3. However, many produce items such as berries or soft fruit may require containers specially designed for that item.

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C. The package must protect the produce from mechanical damage and poor environmental conditions during handling and distribution.

1. To consumers, torn, dented, or collapsed produce packages usually indicate lack of care in handling the contents.
2. Produce containers must be sturdy enough to resist damage during packaging, storage, and transportation to market.
3. Produce destined for export markets requires that containers to be extra sturdy.
 - a. Air-freighted produce may require special packing, package sizes, and insulation.
 - b. Marketers who export fresh produce should consult with freight companies about any special packaging requirements.

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4. Damage resulting from poor environmental control during handling and transit is one of the leading causes of rejected produce and low buyer and consumer satisfaction.
5. Each fresh fruit and vegetable commodity has its own requirements for temperature, humidity, and environmental gas composition.
 - a. Produce containers should be produce friendly - helping to maintain an optimum environment for the longest shelf life.
 - b. This may include special materials to slow the loss of water from the produce, insulation materials to keep out the heat, or engineered plastic liners that maintain a favorable mix of oxygen and carbon dioxide.

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D. The package must identify and provide useful information about the produce.

1. Generally, information such as the produce name, brand, size, grade, variety, net weight, count, grower, shipper, and country of origin are included.
2. In consumer marketing, package appearance has also become an important part of point of sale displays.

Provide the students with examples of packaging used in Afghanistan. Ask the students to list the positives and negatives of each example of packaging. Once they have done that, have them determine the best type of packaging for each fruit.

Objective 3: Determine the best storage methods for fruit and nuts.

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III. Each fruit and nut has its own specific storage requirements which will improve quality and shelf-life.

A. All fruits can be dried which greatly increases the shelf life from days to sometimes up to a year or more.

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B. Nuts

1. Nuts keep almost twice as long in the shell as they do out of the shell
2. Walnuts, pine nuts and pistachios have a high fat content and will quickly go rancid if kept in warm temperatures for too long.
 - a. Cold storage is the best option for these nuts.
 - b. Freezing is also a good option but the nuts can pick up other flavors from the freezer.
3. Almonds are less susceptible to spoiling but can still go rancid.

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C. Apples and Pears have similar storage requirements.

1. Store apples and pears in clean wooden or cardboard boxes that are ventilated to allow air circulation.
 - a. Do not line the boxes with paper or individually wrap the fruit.
 - b. An old but still serviceable refrigerator makes a good fruit storage place.
 - c. Ideally, storage temperature should be around 0°C, but such conditions are difficult to achieve at home.
 - d. An unheated garage, shed, or basement may be satisfactory if temperatures below 0°C and above 7°C can be avoided.
 - e. An insulated box, storage cabinet, or dug-out underground room that can be ventilated at night for cooling makes a good storage place.

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2. Maintain high humidity in storage by placing the fruit in unsealed or perforated plastic bags.
 - a. Placing an open pan of water in the storage place will increase the humidity.
3. Store fruit immediately after it's picked.
 - a. Do not store fruit with onions, potatoes, or other strong-smelling items because the fruit will absorb flavor volatiles from them.
 - b. Inspect regularly for mold, flesh breakdown, freezing, or excessive ripening.

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D. Pomegranates

1. The pomegranate is equal to the apple in having a long storage life.
2. It is best maintained at a temperature of 0° to 5° C and can be kept for a period of 7 months within this temperature range and at 80 to 85% relative humidity without shrinking or spoiling.

3. The fruits improve in storage, becoming juicier and more flavorful.

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E. Grape

1. Most grapes are immediately used for raisin production or wine so their storage is not crucial.
2. If grapes are to be sold fresh for consumers they should be refrigerated to prevent further ripening.
3. In refrigeration they will last 3 to 5 days.

(PowerPoint Slide #18)

F. Citrus

1. Once harvested, citrus fruits can withstand room temperature for up to a week.
2. Longer storage will require refrigeration.

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G. Berries (mulberry, raspberry, blackberry).

1. Berries are delicate and should be refrigerated if not being consumed the same day as harvested.
2. Another popular method of storing berries is freezing.
 - a. Place berries in a single layer on a pan and place in a freezer.
 - b. Once the berries are frozen they can be put in bags or containers and kept for up to 3 months.

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H. Fig

1. Because of losses in transport and short shelf life, figs are a high-value fruit of limited demand.
2. The best outlet is direct sale at roadside or farmers markets, but do not permit handling of the fruit.
3. Figs for shipping are collected daily just before they reach the fully ripe stage, but yield to a soft pressure, usually indicated by small cracks in the skin.
4. They should be immediately refrigerated.
5. For commerce, choose a cultivar that parts readily from the branch and does not tear the neck.

After covering this objective, have students discuss how they store fruit and nuts at their home. Also, compare how fruits and nuts are stored when they purchase fruit from the market.

Objective 4: Discuss the transportation of fruits and nuts.

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IV. Fruits destined for the market should continue to be protected so that quality is maintained for the consumer.

A. Packaging will determine the safety of the fruit.

1. Soft fruits such as pears, apples, and figs should be carefully packed so that any bumps or impact on the side of the container does not dent, scratch or bruise the fruit.
2. Thicker skinned fruits like some citrus and pomegranates can handle a little more abuse but care should still be taken to protect the fruit's quality.

3. Nuts can handle rough handling and transport if still in the shell.
 - a. Nuts which have been shelled can suffer from breakage.

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- B. Fruits being transported long distances sometimes require refrigerated trucks.
- C. Fruits and nuts damaged in transport are not as desirable to the consumer and will likely not earn as much profit as undamaged fruit.

Discuss with the students ways they have seen fruit and nuts transported throughout Afghanistan. Discuss the positives and negatives of each method.

Review/Summary: Use the student learning objectives to summarize the lesson. Have the students explain the response to the anticipated problem of each objective. Student responses can be used to determine which objectives need to be reviewed. Questions on **PowerPoint Slide #23** can be used as review.

Application: Take the students to a local market or provide them with fruit and nuts to grade. Use LS: F2-1 Fruit and Nut Grading for this activity. Have them determine what was done correctly or incorrectly in the handling and transportation of the fruit and nuts.

Evaluation: Evaluation should focus on student achievement of this lesson's objectives. A sample written test is attached.

Answers to Sample Test:

Short Answer

1. Why are fruits and nuts graded?
 - It gives the grower an idea of how the growing season affected fruit and nuts.
 - Grading allows the grower to adjust cultural practices for the next crop.
 - Once fruit and nuts are graded they can be sorted into categories.
 - Grading fruits and nuts gives consumers an idea of the product they are purchasing.
2. What are the 6 characteristics used to grade fruit?
Cleanliness, Size, Shape, Blemishes, Maturity, Color
3. What are three requirements of proper fruit and nut packaging?
Contain the fruits, protect it from further quality degradation and identify it for consumers
4. What storage conditions are required for apples and pears?
Information from Objective 3 Letter C should be included as well as any information specific to Afghanistan.
5. What happens to the fats in nuts if they are not refrigerated?
They will go rancid.
6. Why are figs a high value fruit of limited demand?
Because of losses in transport and short shelf life.

Sample Test

Name _____

Test

Unit F Lesson 2: Grade, Pack, Store and Transport Fruits and Nuts

Part One: Short Answer

Instructions. Provide information to answer the following questions.

1. Why are fruits and nuts graded?
2. What are the 6 characteristics used to grade fruit?
3. What are three requirements of proper fruit and nut packaging?
4. What storage conditions are required for apples and pears?
5. What happens to the fats in nuts if they are not refrigerated?
6. Why are figs a high value fruit of limited demand?

LS: F2-1

Fruit and Nut Grading

Fruit or Nut	Color	Shape	Maturity	Size