DISCOVER

4-H FOOD DEHYDRATION

EXTENSION
UtahStateUniversity

DISCOVER

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Description

The Discover 4-H Clubs series guides new 4-H volunteer leaders through the process of starting a 4-H club or provides a guideline for seasoned volunteer leaders to try a new project area. Each guide outlines everything needed to organize a club and hold the first six club meetings related to a specific project area.

Purpose

The purpose is to create an environment for families to come together and participate in learning activities while spending time together as a multi-family club. Members will experiment with new 4-H project areas.

What is 4-H?

4-H is one of the largest youth development organizations in the United States. 4-H is found in almost every county across the nation and enjoys a partnership between the U. S. Department of Agriculture (USDA), the state land-grant universities (e.g., Utah State University), and local county governments.

4-H is about youth and adults working together as partners in designing and implementing club and individual plans for activities and events. Positive youth development is the primary goal of 4-H. The project area serves as the vehicle for members to learn and master project-specific skills while developing basic life skills. All projects support the ultimate goal for the 4-H member to develop positive personal assets needed to live successfully in a diverse and changing world.

Participation in 4-H has shown many positive outcomes for youth. Specifically, 4-H participants have higher participation in civic contribution, higher grades, increased healthy habits, and higher participation in science than other youth (Lerner et al., 2005).

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Utah 4-H

4-H is the youth development program of Utah State University Extension and has more than 90,000 youth participants and 8,600 adult volunteers. Each county (Daggett is covered by Uintah County) has a Utah State University Extension office that administers the 4-H program.

The 4-H Motto

"To Make the Best Better!"

The 4-H Pledge

I pledge: My HEAD to clearer thinking, my HEART to greater loyalty, my HANDS to larger service and my HEALTH to better living, for my club, my community, my country, and my world.

4-H Clubs

What is a 4-H Club? The club is the basic unit and foundation of 4-H. An organized club meets regularly (once a month, twice a month, weekly, etc.) under the guidance of one or more volunteer leaders. It elects its own officers, plans its own program, and participates in a variety of activities. Clubs may choose to meet during the school year, only for the summer, or both.

Club Enrollment

Enroll your club with your local Extension office. Each member will need to complete a Club Member Enrollment form, Medical History form, and a Code of Conduct/Photo Release form. (Print these from the www.utah4h.org website or get them from the county Extension office).

Club Officers

Elect club officers during one of your first club meetings. Depending on how many youth are in your club, you can decide how many officers you would like. This will typically include a president, vice president, pledge leader, and secretary. Other possible officers or committees are: song leader, activity facilitator, clean-up supervisor, recreation chair, scrapbook coordinator, contact committee (email, phone, etc.), field trip committee, club photographer, etc. Pairing older members with younger members as Sr. and Jr. officers may be an effective strategy to involve a greater number of youth in leadership roles and reinforce the leadership experience for all ages. Your club may decide the duration of officers (6 months, 1 year, etc.).

A Typical Club Meeting

Follow this outline for each club meeting:

- ☐ Call to order – President
- ☐ Pledge of Allegiance and 4-H Pledge – Pledge Leader (arranges for club members to give pledges)
- ☐ Song – Song Leader (leads or arranges for other club member to lead)
- ☐ Roll call – Secretary (may use an icebreaker or a "get acquainted" type of roll call to get the meeting started)
- ☐ Minutes of the last meeting – Secretary
- ☐ Business/Announcements – Vice President
- ☐ Club Activity – Activity Facilitator arranges this. It includes a project, lesson, service, etc. These are outlined by project area in the following pages.
- ☐ Refreshments – Refreshment coordinator
- ☐ Clean Up – Clean-up supervisor leads others in cleaning up

Essential Elements of 4-H Youth Development

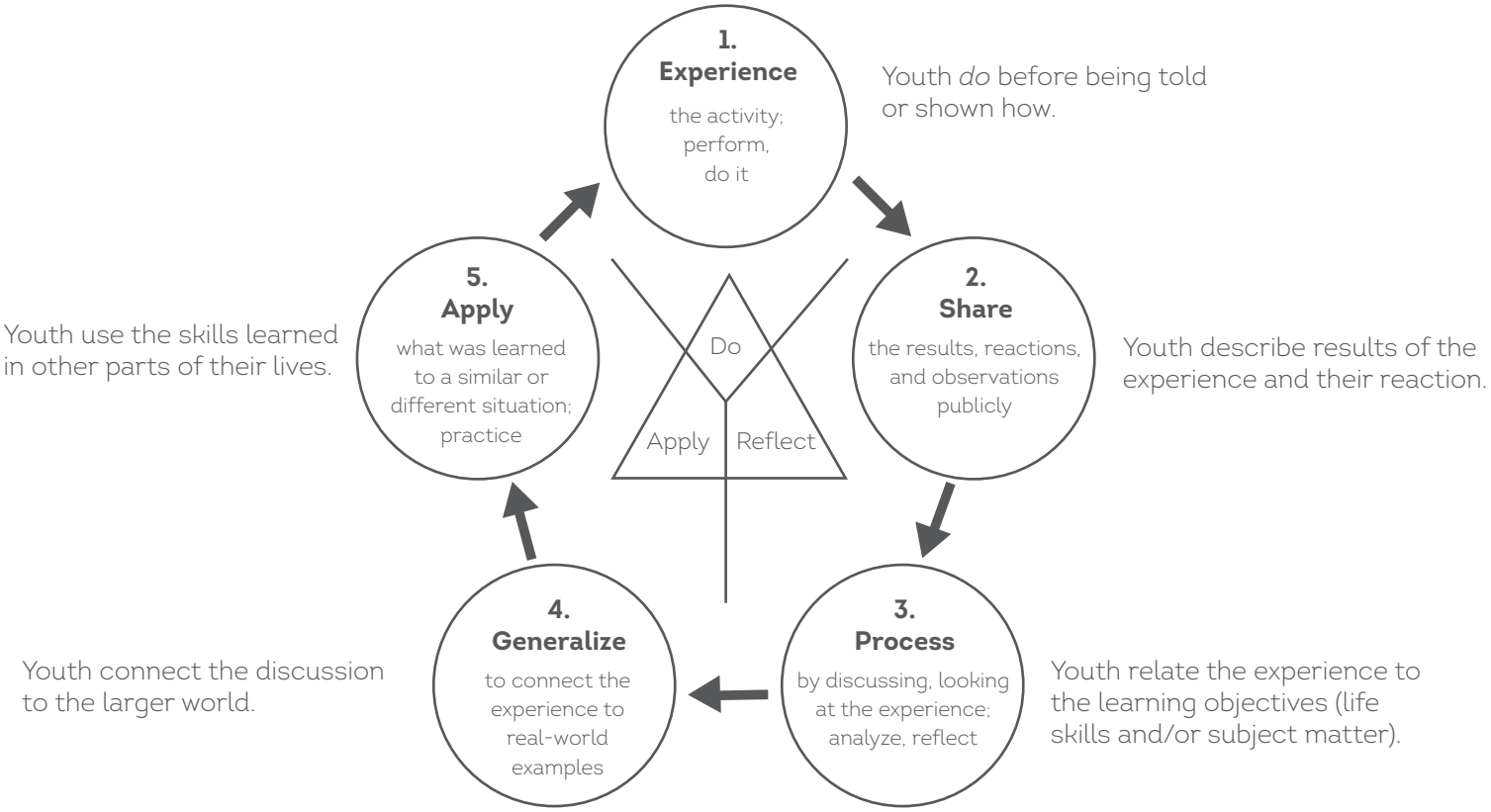
The essential elements are about healthy environments. Regardless of the project area, youth need to be in environments where the following elements are present in order to foster youth development.

1. **Belonging**: a positive relationship with a caring adult; an inclusive and safe environment.
2. **Mastery:** engagement in learning, opportunity for mastery.
3. **Independence:** opportunity to see oneself as an active participant in the future, opportunity to make choices.
4. **Generosity:** opportunity to value and practice service to others.

(Information retrieved from: http://www.4-h.org/resource-library/professional-development-learning/4-h-youth-development/youth-development/essential-elements/)

4-H "Learning by Doing" Learning Approach

The Do, Reflect, Apply learning approach allows youth to experience the learning process with minimal guidance from adults. This allows for discovery by youth that may not take place with exact instructions.



4-H Mission Mandates

The mission of 4-H is to provide meaningful opportunities for youth and adults to work together to create sustainable community change. This is accomplished within three primary content areas, or mission mandates - citizenship, healthy living, and science. These mandates reiterate the founding purposes of Extension (e.g., community leadership, quality of life, and technology transfer) in the context of 21st century challenges and opportunities. (Information retrieved from: http://www.csrees.usda.gov/nea/family/res/pdfs/Mission_Mandates.pdf)

1. **Citizenship:** connecting youth to their community, community leaders, and their role in civic affairs. This may include: civic engagement, service, civic education, and leadership.
2. **Healthy Living:** promoting healthy living to youth and their families. This includes: nutrition, fitness, social-emotional health, injury prevention, and prevention of tobacco, alcohol, and other drug use.
3. **Science:** preparing youth for science, engineering, and technology education. The core areas include: animal science and agriculture, applied mathematics, consumer science, engineering, environmental science and natural resources, life science, and technology.

Getting Started

1. Recruit one to three other families to form a club with you.
    a. Send 4-H registration form and medical/photo release form to each family (available at utah4h.org).
    b. Distribute the Discover 4-H Clubs curriculum to each family.
    c. Decide on a club name.
    d. Choose how often your club will meet (e.g., monthly, bi-monthly, etc.).
2. Enroll as a 4-H volunteer at the local county Extension office (invite other parents to do the same).
3. Enroll your club at the local county Extension office.
    a. Sign up to receive the county 4-H newsletter from your county Extension office to stay informed about 4-H related opportunities.
4. Identify which family/adult leader will be in charge of the first club meeting.
    a. Set a date for your first club meeting and invite the other participants.
5. Hold the first club meeting (if this is a newly formed club).
    a. See *A Typical Club Meeting* section above for a general outline.
        i. Your activity for this first club meeting will be to elect club officers and to schedule the six project area club meetings outlined in the remainder of this guide. You may also complete a-d under #1 above.
    b. At the end of the first club meeting, make a calendar outlining the adult leader in charge (in partnership with the club president) of each club meeting along with the dates, locations, and times of the remaining club meetings.
6. Hold the six project-specific club meetings outlined in this guide.
7. Continue with the same project area with the 4-H curriculum of your choice (can be obtained from the county Extension office) OR try another Discover 4-H Club project area.

Other Resources

Utah 4-H website: www.utah4-h.org

National 4-H website: www.4-h.org

4-H volunteer training:

To set up login:

http://utah4h.org/volunteers/training/

To start modules: (password = volunteer)

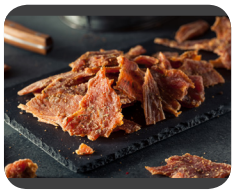
References

Information was taken from the Utah 4-H website (utah4h.org), the National 4-H website (4h.org), the Utah Volunteer Handbook, or as otherwise noted.

Lerner, R., M. et al. (2005). Positive youth development, participation in community youth development programs, and community contributions of fifth grade adolescents: Findings from the first wave of the 4-H Study of Positive Youth Development. Journal of Early Adolescence, 25(1), 17-71.

We would love feedback or suggestions on this guide; please go to the following link to take a short survey:
Go to https://goo.gl/iTfiJV or Click here to give your feedback

4-H FOOD DEHYDRATION CLUB *Meetings*



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DISCOVER
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4-H Club Meeting 1

Dehydrating

Supplies

- Home/facility/classroom with basic kitchen
- Cutting board
- Paring knife
- Pre-treatment bowl
- Measuring spoons
- Larger slicing knife
- Copies of recipes
- Measuring cups
- Paper towels
- Note: It is helpful to have two different types of dehydrators available (e.g., round stackable and oblong stackable or slide-in).

OBJECTIVES

- Learn about and use kitchen equipment safely.
- Have a basic knowledge of dehydrating history.
- Understand importance and techniques of dehydrating.
- Have a basic understanding of why dehydrating preserves food.

SET-UP

- Make sure your space has a counter/table area, sink, refrigerator, and range. Larger classes/groups will benefit from additional work space.
- If youth are divided up into two or more groups, it is helpful to have a separate set of the supplies listed above.
- Warm up activity: Who am I? (Have group members share their names and favorite meal.)

Activity #1

KITCHEN SAFETY

TIME: 15 MINUTES

1. Explore the following questions and kitchen guidelines with club members:
   a. What might be dangerous in a kitchen? (e.g., hot surfaces, sharp objects, slick floors)
   b. What is kitchen cleanliness?

i. Kitchen cleanliness is important because without it, diseases can spread. Food poisoning can spread when one food, usually raw foods like meat or poultry, come in contact with other types of food through surfaces, hands, tools, and clothes. When this happens, it is called cross-contamination.

c. What tools are we using today? What should we be aware of?

2. Discuss the Do's and Don'ts of handling sharp objects with club members.

3. See: https://medlineplus.gov/ency/patientinstructions/000444.htm and discuss the safety tips below:

   a. DO NOT uncover or unwrap any sharp object until it is time to use it.

   b. Keep the object pointed away from yourself and other people at all times.

   c. Never recap or bend a sharp object.

   d. Keep your fingers away from the tip of the object.

   e. If the object is reusable, put it in a secure, closed container or holder after using.

   f. Never hand a sharp object to someone else or put it on a tray for another person to pick up.

   g. Tell the people you are working with when you plan to set the object down or pick it up.

4. Discuss with club members the techniques of handling hot objects.

5. See: https://prezi.com/nng4dfox9khg/handling-hot-objects/ and discuss the following tips:

   a. Prepare a landing spot for the hot object before removal of hot pot or pan.

   b. NEVER use wet materials to handle hot objects. The water will absorb the heat right through the material and burn you.

   c. Be extra careful removing lids, and stirring hot liquids, steam can escape and WILL burn you.

   d. Warn others in the kitchen that you have a hot object and that you are moving with it. "HOT!!"

   e. Wear personal protective equipment (PPE).

   f. Personal protective equipment helps keep us safe in such a fast-moving environment.

   g. Hot pads/oven mitts will help you from burning your hands when handling hot pots filled with soup or sauce and when handling any hot spills from the oven.

   h. Aprons help protect your body from hot spills or splashes, depending on what your handling.

   i. Closed-toe shoes are recommended while working in the kitchen. They will protect you from cuts, burns, and can even prevent slips.

THE HISTORY OF DEHYDRATION

TIME: 10 MINUTES

1. Show club members examples of dried and fresh fruits and discuss the differences (color, weight, size, texture, etc.).
    a. You can show apples, bananas, tomatoes, etc.
    b. A few foods change names when they are dehydrated (e.g., plums/prunes; grapes/raisins; cranberries/craisins).
    c. Show some commonly used fresh vs. dried herbs (e.g., celery leaves, parsley, basil, etc.).
2. Explain to club members that food drying is one of the oldest methods of preserving food.
    a. It can either be an alternative to canning or freezing, or compliment these methods. Drying foods is simple, safe, and easy to learn. With modern food dehydrators, fruit leathers, banana chips, and beef jerky can all be dried year-round.
    b. Reference and discuss this pdf: http://nchfp.uga.edu/publications/uga/uga_dry_fruit.pdf
3. Explore the following questions with club members:
    a. What does it mean to dehydrate something? (Dehydrating takes the water out of it.)
    b. What are some foods you have seen at home or at the grocery store that are dried?
    c. How do we dry food today? Do we use the same methods as they did back before electricity was available?
    d. What are some examples of dehydrated foods you've eaten?
    e. When do you believe it would be useful or convenient to have a supply of dried foods on hand?
    f. Dehydrating is not for all kinds of foods. What kinds of foods may not be good for dehydrating?
        i. Lettuce, melons, and cucumbers because of the high-water content
        ii. Dairy–may be done commercially with specialized equipment
        iii. Dehydrated foods shouldn't be confused with freeze-dried foods
4. Discuss with club members that 2000 years ago - even 200 years ago - technology/electricity was not available to assist in drying food and yet individuals did dry food. ASK: If you didn't have access to electricity, how do you think you would dry foods?
    a. Show examples of primitive set ups for drying. Ask why each set up may have been effective. (Sun, salt, reflective heat, etc.)

i. Rocks, netting, racks, smoke house, etc.

b. What types of foods would have been fairly easy to dry even without much knowledge or equipment available? (Think of how wind and sun could have been used.)

Activity #3

GROUP ACTIVITY

TIME: 15 MINUTES

1. Split into teams of three to five.
2. Use popsicle sticks, twine or thread, and a wet paper towel to design a device and method to dry a paper towel in the fastest manner.
3. Challenge club members to go home and try using a larger version of the apparatus you designed to dry something.

Activity #4

EXPLORE THE DEHYDRATOR

TIME: 15 MINUTES

1. Help club members become familiar with the dehydrator.
   a. Disassemble the dehydrator and present each part. Explain how the dehydrator works.
      i. Go over the heat source and circulation, temperature control, uses for various tray types, etc., with club members.
   b. What safety rules would be beneficial when working with the dehydrator?
   c. What other safety considerations can we make when preparing to dehydrate food?
      i. Discuss cleanliness, space, amount of food, size of the food, storage containers, time frame, etc., with club members.
   d. Have students practice taking the dehydrator apart and putting it back together.
2. Discuss the following concepts for proper dehydration:
   a. Placement -
      i. To dehydrate some foods, you have to peel to let out moisture. What are some foods that might need to be peeled?

ii. When dehydrating, it is important to have small, even slices, and space them evenly apart. It is important to be careful not to overfill dehydrators and make sure the dehydrator's vents are not blocked or clogged.

b. Conditioning -

i. Conditioning means ensuring that everything is evenly dry. If it seems that the pieces may not be dry, store in a glass or plastic container covered by a cloth for about a week. Stir daily. IF there is any sign of moisture (like fog on the glass), place the food back into the dryer.

ii. Why do you think we do it? Conditioning ensures an equalization of moisture and a reduction of the chance of spoiling the food.

c. Storage -

i. To keep food cool and dry, where could you store it?

ii. In what kinds of containers should you store it?

Reflect

- What techniques worked when drying the paper towel? Which ones didn't? Why?
- What are the parts of a dehydrator and what they do?
- What are some important things to remember when dehydrating?

Apply

- Why is it important to understand how a dehydrator works before using one?
- In what circumstances would it be important to know how to dry food? (You could use this question to lead a discussion on emergency preparedness.)

4-H MISSION MANDATES

Science

Youth will learn the science behind dehydrating food. They will also brainstorm and create their own hand-made device to dry objects faster.

Healthy Living

Youth will learn how to prepare food using sanitary and healthy practices.

ESSENTIAL ELEMENTS

Belonging

By getting to know the other club members and particpating in group activities, youth will feel more belonging among their peers.

Mastery

Club members will learn proper practices for handling kitchen equipment and food safely.

References and Other Resources

https://medlineplus.gov/ency/patientinstructions/000444.htm

https://prezi.com/nng4dfox9khg/handling-hot-objects/

http://nchfp.uga.edu/publications/uga/uga_dry_fruit.pdf

4-H Club Meeting 2
Drying Fruit

Supplies

- Kitchen facility
- Fruit for drying - see individual activities for specific fruit and quantities
- Supplies for making fruit leather (see Activity 6)
- Note: It is helpful to have two different types of dehydrators available (e.g., round stackable and oblong stackable or slide-in)

OBJECTIVES

- Apply knowledge of food preservation via dehydrating.
- Obtain knowledge and ability to preserve foods through dehydrating.
- Obtain knowledge of how to judge quality of dried fruit and fresh fruit.

SET-UP

- Make sure to get enough fruit for dehydrating.
- Get all the supplies for making fruit leather.
- Make sure there will be enough time for the fruit leather making activity (at least 1 1/2 - 2 hours).

Activity #1

SAMPLING

TIME: 15 MINUTES

1. Give samples of dried fruit and fresh fruit to each student and have them discuss the differences between them, and then ask the following questions:
   a. What makes a good dried/dehydrated product?
   b. Which foods do you think will take the longest to dry? Why?
   c. Which do you think will not dry well or taste good?
2. Optional- Use the handout at the end of the club meeting as a guide for tasting and judging the quality of the dried and fresh fruit.

OVERVIEW OF THE PROCESS

TIME: 10 MINUTES

Discuss different pre-treatments with club members.

1. Oxidation:
    a. What happens to sliced apples if you leave them out?
        i. Oxidation. Browning happens because of oxidation.
    b. What causes oxidation with fruits?
        i. A chemical reaction when flesh of certain fruits is exposed to air.
    c. Other examples of oxidation:
        i. Burning: rapid oxidation
        ii. Rust: when water gets on iron, the iron will fire up an electron to the oxygen in water and then turn a reddish color. Slow oxidation.
    d. Preventing oxidation:
        i. Preserves fresh appearance of fruit
2. Dipping (for fruits and vegetables):
    a. Done in specific types of acid. (Prevents oxidation): https://www.pubs.ext.vt.edu/348/348-597/348-597.html
    b. Dipping is a pretreatment used to prevent fruits such as apples, bananas, peaches, and pears from turning brown. Ascorbic acid, fruit juices high in vitamin C (lemon, orange, pineapple, grape, etc.), or commercial products containing ascorbic or citric acid may be used for dipping. For example, dipping sliced fruit pieces in a mixture of ascorbic acid crystals and water (1 teaspoon ascorbic acid crystals per 1 cup of water), or dipping directly in fruit juice for 3 to 5 minutes will prevent browning. Fruits may also be blanched as a means of treatment.

Review food placement, conditioning, and storage from the last club meeting.

1. Discuss drying placement and techniques:
    a. Peel to let out moisture.
    b. Crack or check skin.
    c. Slice into small, even pieces.

d. Space evenly apart.

e. Don't overfill.

f. Make sure that the dehydrator's vents are not blocked or plugged.

2. Discuss conditioning - after dehydrating:

   a. What is conditioning?

      i. Ensuring that everything is evenly dry. If it seems that the pieces may not be dry, store in a glass or plastic container covered by a cloth for about a week. Stir daily.

   b. Why do you think we use the process of conditioning?

      i. Conditioning equalizes the moisture and reduces the chance of spoiling the food.

3. Discuss proper storage with club members with the following questions:

   a. If we want to keep the food that is dehydrated cool and dry, where would be some good locations in your home to store it?

   b. What kinds of containers do you think would be best at keeping the food dry and safe from being exposed to air? Provide comparisons.

      i. Glass bottle with tight-fitting lid or glass bowl with no cover

      ii. Ziploc® baggie or paper bag

Activity #3

DRYING FRUIT

TIME: 1 1/2 - 2 hours

1. Prepare apples, pineapple, and mangos and place in dehydrators.

   a. Do one batch of bananas or apples without pre-treatment to compare later.

2. Ask club members: What differences do you think we will see? Jot their answers down and compare afterwards.

   a. Apples: Select mature, firm apples. Wash well. Pare, if desired, and core. Cut in rings or slices 1/8 to 1/4-inch thick or cut in quarters or eighths. Dip in ascorbic acid or other anti-darkening/antimicrobial solution for 10 minutes. Remove from solution and drain well. Lay slices on sides and arrange in a single layer on trays. Dry until soft, pliable, and leathery with no moist area in center when cut.

   b. Bananas: Select firm, ripe fruit. Peel. Cut in 1/8-inch slices. Dip in ascorbic acid or other solution for 3-10

minutes (Any longer and the fruit will begin to be mushy). Remove and drain well. Arrange in a single layer on trays. Dry until tough and leathery.

c. Apricots: Select firm, fully ripe fruit. Wash well. Cut in half and remove pit. Do not peel. Dip in ascorbic acid or other anti-darkening/antimicrobial solution for 10 minutes. Remove from solution and drain well. Arrange in a single layer on trays, pit side up with cavity popped up to expose more flesh to the air. Dry until soft, pliable, and leathery; no moist area in center when cut. (Note: Larger apricots may be sliced.)

3. 2. Pass out handout/resource chart to club members for drying fruit.

DRYING FRUIT TABLE

Fruit	Selection and preparation (thoroughly wash all fruits)	Pretreatment[1]	Tests for dryness and drying time guidelines[2]
Apples	Peel (optional) and core. Cut into slices or rings about 1/4 inch thick.	None, ascorbic acid/citric acid dip, syrup blanch, or honey dip	Leathery to crisp, no moist area in center (6–12 hours)
Apricots	Cut in half and pit. Fruits dry more rapidly if quartered or sliced.	Ascorbic acid/citric acid dip, syrup blanch, or honey dip	Springy, no moist area in center (24–36 hours for halves)
Bananas	Peel and slice 1/4 to 1/2 inch thick, crosswise or lengthwise.	None or ascorbic acid/citric acid dip	Pliable to crisp (8–10 hours)
Blueberries/ Huckleberries	Remove stems.	None, or dip larger berries in boiling water to crack skins	Shriveled, leathery (24–36 hours)
Cherries	Remove stems. Slice in half and remove pit, or pit and dry whole.	None	Pliable, leathery (24–36 hours)
Coconuts	Drain milk. Steam fruit 1 minute to loosen meat or pry meat out with a knife. Trim dark outer skin, and grate meat or slice in chunks.	None	Leathery to crisp; dry at 110°F
Cranberries	Remove stems.	Dip in boiling water to crack skins, or syrup blanch	Shriveled (24–36 hours)

Figs	If figs are small or have partly dried on the tree, they may be dried whole. Otherwise, cut in half. Dry with skin side down.	None or syrup blanch	Pliable, leathery, slightly sticky, no moist area in center (6–12 hours)
Grapes	Select seedless varieties.	Dip in boiling water 30 seconds to crack skins. Plunge in ice water to stop cooking. Drain on paper towels.	Pliable, leathery (12–20 hours)
Kiwi fruit	Remove outer skin. Slice 1/4 inch thick.	None	Pliable, leathery
Papayas	Cut in half and remove seeds. Peel and slice.	None or syrup blanch	Pliable, leathery
Peaches	Peel and slice. Fruits dry more rapidly if quartered or sliced.	None, ascorbic acid/citric acid dip, syrup or honey dip	Pliable, leathery (24–36 hours for halves)
Pears	Peel, cut in half lengthwise, and core. Section or slice about 1/4 inch thick.	None, ascorbic acid/citric acid dip, syrup blanch, or honey dip	Pliable. leathery (24–36 hours for halves)
Pineapples	Peel and remove thorny eyes; cut into 1/4-inch thick slices.	None, or syrup blanch	Leathery but not sticky (24–36 hours)
Plums	Cut in half and pit. Fruits dry more rapidly if quartered or sliced.	None or sulfating for light-colored fruit	Pliable, leathery (24–36 hours for halves)
Prunes	Cut in half and pit. Fruits dry more rapidly if quartered or sliced.	None	Pliable, leathery, a handful of properly dried prunes will fall apart after squeezing (24–36 hours for halves)
Rhubarb	Cut in 1-inch lengths.	None or blanch for 1–2 minutes	Very brittle, tough
Strawberries	Remove stems. Cut strawberries in half. Dry skin side down.	None	Pliable, leathery
Drying times are guidelines only. Test food frequently for dryness according to the criteria described in the chart. Cool food before testing.			

WHAT IS FRUIT LEATHER?

TIME: 10 MINUTES

Note: The following activities will take at least 1 1/2 - 2 hours in all.

The National Center for Home Food Preservation gives great information on fruit leather:

1. http://nchfp.uga.edu/how/dry/fruit_leathers.html
2. Discuss with club members what fruit leather is:
    a. What is fruit leather?
        i. Fruit leathers are homemade fruit rolls. They are a tasty, chewy dried fruit product. Fruit leathers are made by pouring pureed fruit on a flat surface for drying.
        ii. When dried, the fruit is pulled from the surface and rolled. It gets the name "leather" from the fact that when pureed fruit is dried, it is shiny and has the texture of leather.
3. Discuss with club members the advantages of making your own fruit leathers:
    a. Lower cost than commercial brands
    b. Sweeten to taste (usually less sugar)
    c. Can make without sugar to fit specialty diets
    d. Mixing fruit flavors
    e. May choose to convert home preserved fruits and jams to leathers

THE PREPARATION PROCESS

TIME: 10 MINUTES

1. Explain to club members how to prepare fruit leather.
2. When preparing fruit leather from fresh fruit -
    i. Select ripe or slightly overripe fruit
    ii. Wash the fresh fruit or berries in cool water
    iii. Remove the peel, seeds, and stem
    iv. Cut fruits into chunks (Use 2 cups of fruit for each 13" x 15" in fruit leather)
    v. Purée fruit until it is smooth

vi. Add 2 teaspoons of lemon juice or 1/8 teaspoon ascorbic acid (375 mg) for each 2 cups of light colored fruit to prevent darkening

3. Discuss sweetener options with club members.
    a. Corn syrup - best for longer storage because it prevents crystals
    b. Honey - best for longer storage because it prevents crystals
    c. Sugar - fine for immediate use or short storage
    d. Saccharin-based sweeteners - can be used to reduce tartness without adding calories
    e. Aspartame sweeteners may lose sweetness during drying
    f. Use 1/4 to 1/2 cup sugar, corn syrup or honey for each 2 cups of fruit.
4. Discuss the different options to enhance the flavor of fruit rolls.
    a. Spices
        i. Cinnamon, mint, pumpkin pie, ginger, etc. can be used frugally.
        ii. Start with 1/8 teaspoon per 2 cups of purée.
    b. Flavorings
        i. Lemon juice, almond extract, vanilla extract, orange juice, etc.
        ii. Use 1/8 to 1/4 teaspoon per 2 cups of purée.

Activity #6

MAKING FRUIT LEATHER

TIME: 45 MINUTES

Recipe

Mango Fruit Leather

- 4 cups mango purée (from about 4 large, unripe mangoes)
- 1 cup clover honey
- ½ teaspoon ground cinnamon

http://nchfp.uga.edu/how/dry/dryingmangoleather.html

Yield: About 2-3 dryer trays (14 inches in diameter); 8 fruit rolls.

- ¼ teaspoon ground nutmeg
- ¼ teaspoon ground cloves

Procedure:

1. Preheat electric dehydrator to 140°F. (If not using electric dehydrator, see notes below.)

2. Wash and peel mangoes, chop roughly into chunks. Purée in blender until smooth. Pass purée through a food mill or sieve; discard any coarse fiber extracted in food mill. Add honey and spices to the purée and mix thoroughly.

3. Lightly spray two fruit roll tray liners from an electric dehydrator with vegetable oil cooking spray. Spread mango mixture evenly to ¼-inch thickness on the trays.

4. Position fruit roll liners on dryer trays and place in dehydrator. Dry continuously for about 10 hours. Maintain dehydrator air temperature steadily at 140°F. (Monitor the dehydrator air temperature periodically with a thermometer.)

5. Remove trays from dehydrator when purée is dry, with no sticky areas (about 10 hours - this will be highly dependent on the relative humidity of the drying room). Test for dryness by touching gently in several places near center of leather; no indentation should be evident.

6. Peel leather from trays while still warm. Leave the second tray on the dehydrator while you peel the first leather, or re-warm leathers slightly in the dehydrator if they cool too much prior to peeling. Cut into quarters, lay on a piece of clean plastic food storage wrap about 1 to 2 inches longer at each end of the leather and roll together into fruit leather rolls. When cool, twist the ends of the plastic wrap tightly to close.

7. Store fruit rolls in freezer-quality zippered plastic bags or airtight plastic container for short-term storage, up to about 1 month. Leathers should be stored in a cool, dark, dry place. For longer storage up to 1 year, place tightly wrapped rolls in the freezer.

Notes (If not using an electric dehydrator):

Electric dehydrators produce the most reliable results. If you want to use an oven instead, follow the methods below. Your oven should be able to maintain a temperature as low as 140 to 145°F.

1. Use cookie sheets with edges (13" X 15" or 12" X 17" pans work well).

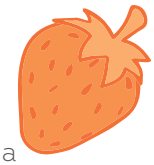
2. Line with plastic wrap or parchment paper, being careful to smooth out the wrinkles, or spray with vegetable oil cooking spray. Do not use waxed paper or aluminum foil.

3. Fruit leathers can be poured into a single large sheet or into several smaller sizes along the cookie sheet. Avoid pouring purée too close to the edge of the cookie sheet.

4. Set oven at the lowest setting possible, which should be 140 to 145°F. (Note: If your oven does not have a setting this low, it may not be suitable for home drying of foods.)

5. Place the cookie sheets with purée on oven racks.

6. Leave the oven door open about 2 to 6 inches. Check oven periodically with a thermometer to keep the air temperature at about 140°F.
7. If the temperature gets too high, the oven may have to be temporarily turned off, and then turned on again.



8. Note: Drying time will be longer for the large pans than for smaller ones. Drying time may also be longer in a regular oven than in an electric dehydrator, depending on temperature control during drying. Begin checking your leather at 8 to 10 hours.

Recipe

Applesauce-Pumpkin Spice Leather

Yield: About 3-4 trays (about 8 rolls)

- 1 cup canned pumpkin–or 1 cup fresh pumpkin cooked and pureed
- 1 cup applesauce
- 1/2 cup honey
- 1/4 teaspoon cinnamon
- 1/8 teaspoon nutmeg
- 1/8 teaspoon powdered cloves

Procedure

1. Blend ingredients well- the sauce should be smooth and without lumps.
2. Lightly spray dehydrator pan with cooking spray, then use a paper towel to wipe most of the spray off, leaving a very, very thin sheen of the oil.
3. Spread sauce on tray. It should be a consistent ¼ inch thick on the tray.
4. Dry at 140°F. It will take somewhere around 24 hours, depending on environmental humidity.

Adapted from: So Easy to Preserve, 2014 Edition, Cooperative Extension, The University of Georgia.

Reflect

- Why do we refer to dried fruit as fruit leather?

- What are some of the natural sweeteners that can be used to sweeten fruit leather?

Apply

- What are some other healthy snack options besides fruit leather that can be homemade?

4-H MISSION MANDATES

Healthy Living

Youth will get to sample different types of dried fruit. They will also learn how to make healthy, homemade fruit leather.

Science

Youth will learn the science behind oxidation and dipping to pretreat food for dehydrating.

ESSENTIAL ELEMENTS

Independence

By learning new ways of preparing and eating food, club members will expand their skills and be encouraged to keep learning. This will hep them feel more autonomy in their lives.

Mastery

Club members will learn about different pre-treatments and drying techniques and will get to master these techniques by doing.

References and Other Resources

https://www.pubs.ext.vt.edu/348/348-597/348-597.html

http://nchfp.uga.edu/how/dry/fruit_leathers.html

http://nchfp.uga.edu/how/dry/dryingmangoleather.html

Applesauce-Pumpkin Spice Leather adapted from: Easy to Preserve, 2014 Edition, Cooperative Extension, The University of Georgia.

Drying Vegetables

Supplies

- Kitchen facility
- List of vegetables for drying (found in Activity 3)
- Note: It is helpful to have two different types of dehydrators available (e.g., round stackable and oblong stackable or slide-in)

OBJECTIVES

- Apply knowledge of food preservation via dehydrating.
- Obtain knowledge and ability to preserve foods through dehydrating.
- Learn the basics of drying vegetables.

SET-UP

- Reference this pdf for how to dry vegetables: https://nchfp.uga.edu/publications/uga/uga_dry_fruit.pdf
- Make sure to get enough vegetables so the entire group can try the dried samples.

Activity #1

OVERVIEW OF THE PROCESS

TIME: 15 MINUTES

1. Discuss with club members the basic guidelines to drying vegetables.
   a. Select vegetables in prime condition.
   b. The time from garden to dryer should be as short as possible.
   c. Wash vegetables to remove dirt.
   d. Peel, trim, core, cut, slice, or shred, keeping pieces about the same size or thickness.

2. Discuss pretreatments for vegetables.

   a. Most vegetables benefit from being blanched before drying. Vegetables deteriorate rapidly because of the presence of enzymes. Enzymes are destroyed by heat during blanching. There are two types of blanching:

      http://extension.usu.edu/files/publications/publication/FN-330.pdf

   b. Blanching:

      i. Blanching is the scalding of vegetables in boiling water or steam for a short time. This is a must for most dehydrating vegetables. The purpose of blanching is to stop enzyme action, which causes loss of flavor, texture, and color. Blanching helps brighten the color and delays the loss of vitamins.

      ii. The blanching time is vital. Each vegetable and size of vegetable has a different blanching time. Not blanching for long enough motivates the enzyme activity, which is worse than no blanching. Blanching for too long can cause the vegetables to lose color, flavor, minerals, and vitamins.

      iii. Blanched vegetables should feel and taste firm, but tender. They should be heated through but not cooked as for eating.

      iv. Drain vegetables before drying. Blot with a paper towel if there is extra moisture.

3. Discuss with club members the two main ways to blanch vegetables:

   a. Water Blanching:

      i. When drying, this is the most suitable way to blanch most vegetables. The National Center for Home Food Preservation explains: Use a blancher which has a blanching basket and cover, or fit a wire basket into a large pot with a lid. Use one gallon of water per pound of prepared vegetables. Put the vegetable in a blanching basket and lower heat as necessary to maintain vigorously boiling water. Place a lid on the blancher. Start counting blanching time as soon as the water returns to a boil. Keep heat high for the time given in the direction for the vegetable you are blanching.

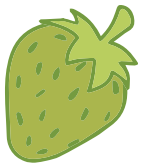
      ii. Steam Blanching:

         For pumpkin, broccoli, sweet potatoes, and some other vegetables, steam blanching and water blanching can be done. Steam blanching takes about 1 ½ times longer than water blanching.

         The National Center for Home Food Preservation explains: To steam blanch vegetables, use a pot with a tight lid and a basket that holds the food at least three inches above the bottom of the pot. Put an inch or two of water in the pot and bring the water to a boil. Put the vegetables in the basket in a single layer so that steam reaches all parts quickly. Cover the pot and keep heat high. Start counting steaming time as soon as the lid is on.

   b. Microwave Blanching:

      i. Microwave blanching is a second method requiring additional skills and safety measures.



TESTING FOR DRYNESS

TIME: 10-15 MINUTES

1. Discuss with club members the two ways to determine if the product is dry.

    a. By Weight:

        i. Calculate the percentage of water in each fruit and vegetable using the following steps:

        ii. First, Subtract the dehydrated weight from the initial weight.

        iii. Second, divide this difference by the initial weight of the food.

        iv. Last, multiply this number by 100.

        v. Vegetables should be dried until they are about 10% moisture. Because they are so dry, they do not need conditioning like fruits. (So Easy to Preserve, p. 341)

    b. By Feel:

        i. Vegetables should be dried until they are brittle or "crisp."

        ii. Fruits and fruit leathers can be tested for dryness by cutting several cooled pieces in half.

        iii. There should be no visible moisture.

        iv. Some fruits may remain pliable but they should not be sticky or tacky.

        v. If a piece is folded in half, it should not stick to itself (about 20% moisture)

        vi. Berries should be dried until they rattle when shaken.

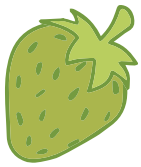
        vii. Banana "chips" are an exception to pliable dryness. They should break apart as described below for vegetables.

2. Discuss with club members what to do if they are unsure their product is dry.

    a. If there is a question as to whether vegetables are dry enough:

        i. Reduce the temperature and dry the product a little longer, using a low temperature toward the end of the drying period.

        ii. There is little danger of damage being done by this extra drying time.



DRYING VEGETABLES

TIME: 1 - 1/2 HOURS

Prepare corn on the cob, carrots, and zucchini for drying.

1. Corn on the cob:
    a. Select tender, sweet corn.
    b. Husk.
    c. Steam on the cob for 5-10 minutes, or until milk does not exude from kernel when cut. Steam blanch for 2 to 2 ½ minutes.
    d. Dry thoroughly and cut kernels from the cob after blanching. Arrange in single layer on the trays. Dry until crisp and brittle.
2. Carrots:
    a. Select crisp, tender carrots that are free from woodiness. Wash them and trim off the roots and tops and peel them. Cut into slices or strips about 1/4-inch thick. Steam blanch for three to four minutes. Dry carrots well and arrange in single layer on trays. Dry until tough and brittle.
3. Zucchini:
    a. Wash and trim the zucchini and then cut into 1/4-inch thick slices. This item does not have to be blanched but you may water or steam blanch it if you would like. If you do choose to blanch the zucchini, steam blanch it for 2-3 minutes, or water blanch it for 1 ½ minutes. Dry zucchini well and arrange in a single layer on the trays. Dry until texture is leathery to brittle.

DRYING VEGETABLES TABLES

Vegetable	Selection and preparation (thoroughly wash all vegetables)	Pretreatment and blanching time guidelines[1]	Tests for dryness and drying time guidelines[1]
Beets	Select small, tender beets of good color and flavor, free from woodiness. Steam or boil them until cooked through. Cool. Trim off the roots and crowns, and peel the beets. Cut into shoestring strips about 1/4 inch thick.	Steam or boil until tender (25–30 minutes for small beets).	Tough, brittle (10–12 hours)
Broccoli	Cut and trim for serving. Pieces need to be quarter stalks lengthwise.	Water or steam blanch (2–3 minutes in water, 3–5 minutes in steam).	Crisp (12–15 hours)
Cabbage	Remove outer leaves, quarter, and core. Cut into shreds about 1/8 inch thick.	Steam blanch (2–3 minutes).	Crisp (10–12 hours)
Carrots	Select crisp, tender carrots, free from woodiness. Wash; trim off the roots and tops. Cut into slices or strips about 1/4 inch thick.	Steam blanch (3–4 minutes).	Tough, brittle (10–12 hours)
Cauliflower	Separate into flowerets. Cut large flowerets in half.	Water blanch; add 1 tbsp. vinegar per 1 gallon water (3–4 minutes).	Tough, brittle (12–15 hours)
Celery	Strip off leaves. Cut stalks into 1/4 inch pieces. Stir occasionally during drying.	Water blanch (30 seconds to 2 minutes).	Crisp (10–16 hours)
Corn (cut)	Select tender, sweet corn; husk. Steam on the cob for 5–10 minutes, or until milk is set. Cut from cob.	Steam blanch.	Crisp, brittle (6–10 hours)
Green beans	Remove defective pods. Remove strings if necessary. Split pods lengthwise to hasten drying.	Water or steam blanch (2–3 minutes in water, 3–4 minutes in steam).	Brittle (8–14 hours)

Vegetable	Selection and preparation (thoroughly wash all vegetables)	Pretreatment and blanching time guidelines[1]	Tests for dryness and drying time guidelines[1]
Mushrooms	Slice off woody stems. Slice or dry whole if small. Spread no more than 1/2 inch deep on trays. Use only commercially-grown mushrooms.[2]	None	Crisp, brittle. Dry at 120°F
Okra	Use only young, tender pods. Cut 1/2 inch crosswise, slice lengthwise. Spread no more than 1/2-inch deep on trays.	Water blanch (2–3 minutes).	Tough, brittle (8–10 hours)
Onions	Remove outer, discolored layers. Slice 1/4-inch thick or chop.	None	Brittle, light-colored, feels like paper (3–9 hours)
Parsley and other herbs	No precooking is necessary. Hang bunches or whole plants in a dry, warm place. When dry, crush leaves and remove stems. When drying in a dehydrator or oven, keep temperatures below 120°F.	None	Brittle. Dry at 100°F (1–2 hours in a dehydrator)
Parsnips	Select crisp, tender parsnips, free from woodiness. Wash; trim off the roots and tops. Cut into slices 1/2 inch thick.	Water or steam blanch (2–3 minutes in water, 3–5 minutes in steam).	Tough, brittle
Peas	Select young, tender peas of a sweet variety. Shell. Stir frequently while drying.	Steam blanch quickly after shelling (2–3 minutes).	Hard, wrinkled, shatter when hit with a hammer (8–10 hours)
Peppers (green, red, or yellow)	Cut in 1/2-inch strips or rings. Remove seeds and "partitions." spread rings two layers deep; spread strips no more than 1/2 inch deep.	None, or water or steam blanch (2–3 minutes water, 3–5 minutes in steam).	Tough, brittle (8–12 hours)
Potatoes	Peel; cut into shoestring strips 3/16 inch in cross section or slice about 1/4 inch thick.	Rinse in cold water. Water or steam blanch. (5–6 minutes water, 6–8 minutes steam.)	Crisp (8–12 hours)

Vegetable	Selection and preparation (thoroughly wash all vegetables)	Pretreatment and blanching time guidelines[1]	Tests for dryness and drying time guidelines[1]
Pumpkin, yellow	Chop into strips about 1 inch wide. Peel off rind; scrape off fibers and seeds. Cut peeled strips into pieces about 1/8-inch thick.	Water or steam blanch until tender (1 minute in water, 2–3 minutes in steam).	Tough to brittle (10–16 hours)
Soybeans	Blanch pods until beans are tender but firm. Shell.	Water or steam blanch.	Shatter when hit with hammer
Spinach and other greens	Select young, tender leaves. Wash. See that leaves do not form wads when placed on trays. Cut large leaves crosswise into several pieces.	Water or steam blanch until wilted.	Brittle
Squash (Hubbard or winter types)	Chop into strips about 1 inch wide. Peel off rind; scrape off fiber and seeds. Cut peeled strips into pieces about 1/8-inch thick.	Water or steam blanch until tender (1 minute in water, 2–3 minutes in steam).	Tough to brittle (10–16 hours)
Squash (summer, crookneck, scallop, zucchini, etc.)	Wash, trim, and cut into 1⁄4-inch thick slices.	None, or water or steam blanch	Leathery to brittle (10–12 hours)
Tomatoes (meaty varieties)	Select tomatoes of good color. steam or dip in boiling water to loosen skins. Chill in cold water; peel. Cut into sections not more than 3⁄4 inch wide. Cut small pear or plum tomatoes in half.	None	Leathery to crisp (10–18 hours)

Reflect

- What are the different pretreatments for vegetables?

- What are the different ways we can tell if a vegetable is completely dry?

Apply

- Why are dried vegetables convenient and what are good uses of them?

4-H MISSION MANDATES

Citizenship

Learning new skills and particpating in activities with other youth will help club members learn how to contribute to society.

Healthy Living

Youth will learn different healthy ways to eat vegetables.

ESSENTIAL ELEMENTS

Mastery

Youth will learn by doing as they follow the drying process for corn, carrots, and zucchini.

References and Other Resources

https://nchfp.uga.edu/publications/uga/uga_dry_fruit.pdf

http://extension.usu.edu/files/publications/publication/FN-330.pdf

Drying Herbs

Supplies

- Kitchen facility
- Herbs for drying
- Equipment for pretreatments
- Note: It is helpful to have two different types of dehydrators available (e.g., round stackable and oblong stackable or slide-in)

INTRODUCTION

Many herbs can be dried successfully. Herbs such as parsley, basil, chives, mint, oregano, dill, rosemary, sage, tarragon, and thyme work well. Herbs may be dried in a dehydrator or air-dried in a paper bag. Dried herbs become spices used in many cuisines to flavor meat, salads, chili, soups, and more.

OBJECTIVES

- Youth will understand dried herbs better by testing for herb dryness.
- Youth will learn the techniques of pretreatments of drying herbs and how to dry different types of herbs.

SET-UP

- Much of the information that is in this section is from the 4-H Idaho Curriculum from Rachel Gates Food Press Drying. Reference this curriculum if in need of more ideas.
- Make sure you have all necessary herbs for the testing dryness and drying herbs activities.

Activity #1

PREPARING HERBS

TIME: 15 MINUTES

1. Have club members prepare two types of herbs for drying.
    a. Most herbs are available year-around in the grocery store, or you can select seasonal herbs from the garden or local Farmers Market.
    b. Suggestions include parsley and basil.

Activity #2

PRETREATMENTS OF DRYING HERBS

TIME: 15 MINUTES

1. Discuss the different pretreatment options with club members.

2. Tip: Use scissors to cut leaves and stems when gathering herbs. The leaves of most herbs should still be green and tender and should be harvested just before the plant begins to flower.

3. Dehydration Preparation:

    a. Wash and carefully roll leaves in a clean, dry towel to remove excess water.

    b. Dry in a single layer on a dryer rack. The dehydrator is the most efficient method and produces the highest quality dried herbs because it takes only 1-3 hours and has controlled temperature and good air circulation.

4. Hanging Bundles/Paper Bag Preparation:

    a. Small bundles of stem can be hung in a warm, dry place. The sturdier herbs, such as rosemary, sage, thyme, and parsley, are the easiest to dry without a dehydrator.

    b. Tie them into small bundles and hang them to air dry. You might also tie the bundle in a brown paper bag with a few holes in it. Then hang the bag to air dry in the kitchen, attic, or anywhere there is a warm, even temperature and good air circulation.

    c. Note that when the herbs are hung upside down, the flavoring oils from the stems concentrate in the leaves.

Activity #3

TESTING HERBS FOR DRYNESS

TIME: 15 MINUTES

1. Discuss with club members the characteristics of dry herbs:

    a. Herbs are dry when they crumble easily and are crispy.

    b. Stems should be brittle and break when bent.

    c. Air drying usually takes 5-10 days.

    d. If drying leaves in a bag, check for dryness by opening the bag and feeling the leaves. If they are dry enough, roll the bag gently between your hands so the leaves will fall from the stems to the bottom of the bag.

2. Discuss with club members what happens when herbs don't get the chance to dry completely:

    a. Leaves that are not completely dried will mold during storage.

3. Explain to club members what to do after their herbs are dry:

    a. Place the dried herbs in airtight containers.

    b. Store in a cool, dry, dark area to protect the color and fragrance.

Activity #4

DRYING HERBS

TIME: 15 MINUTES

1. Prepare parsley and cilantro for drying.

    a. Parsley: Wash thoroughly, separate clusters and discard long or tough stems. Dry parsley well and arrange in a single layer on the trays. Dry until brittle at a temperature of 100°F.

    b. Cilantro: Wash thoroughly, separate clusters, and discard long or tough stems. Dry cilantro well and arrange in a single layer on the trays. Dry until brittle at a temperature of 100°F.

Reflect

- Why is it important to rinse and dry herbs before we begin the drying process?
- Why is it important to let herbs have the chance to dry completely?

Apply

- In what other circumstances is it important to prepare food before we cook with it or eat it?
- What are some other instances where food can mold if it is not cared for properly?

4-H MISSION MANDATES

Citizenship

By participating in group activities, youth will learn how to be a part of a group and a good citizen.

Healthy Living

Youth will learn how to pretreat and dry herbs for using in recipes later.

ESSENTIAL ELEMENTS

Mastery

Youth will learn by doing in this club meeting as they complete the techniques of pretreating and drying herbs for storage.

References and Other Resources

Rachel Gates, 4-H Idaho Curriculum, *Food Press Drying*

Drying Meats - Jerky

Supplies

- Kitchen facility
- Ingredients for the recipe in Activity 2
- Ingredients for the recipe found in Activity 3
- Note: It is helpful to have two different types of dehydrators available (e.g., round stackable and oblong stackable or slide-in)

INTRODUCTION

Meat that has been dried into thin strips is called jerky. Usually any lean meat including pork, beef, or turkey breast can be made into jerky. Jerky is very beneficial because it does not need to be refrigerated, this makes it ideal for snacks when camping, hiking, etc., where there may not be an available refrigerator.

OBJECTIVES

- Youth will learn how to safely handle meat and poultry.
- Youth will learn how to marinate and make jerky.
- Club members will also learn how to store jerky.

SET-UP

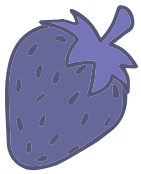
- Make sure you have all necessary equipment and supplies needed for making and storing jerky.

Activity #1

SAFETY GUIDELINES OF HANDLING MEAT AND POULTRY

TIME: 10 MINUTES

1. Discuss with club members the recommendations for safe handling of meat and poultry:
   a. Always wash hands thoroughly with soap and warm running water for at least 20 seconds before and after handling raw meats.
   b. Use clean equipment and utensils.



c. Keep meat and poultry refrigerated at 40ºF or below. Use ground beef and poultry within 2 days, red meats within 2 to 5 days or freeze for later use.

d. Thaw frozen meat in the refrigerator, not on the kitchen counter.

e. Marinate meat in the refrigerator. Do not save and re-use marinade.

2. Explain to club members why it is important to pretreat meat before it is dried:

   a. Foods such as meat and poultry can be harmful if not handled properly, therefore they need to be pretreated to kill contamination from any microorganisms that can cause disease.

   b. If working with wild game or pork, the meat should be treated to kill the Trichinella parasite before it is sliced and marinated.

      i. The Trichinella parasites cause the disease trichinosis.

      ii. To treat the meat, freeze a portion that is 6 inches or less thick at 0ºF or below for at least 30 days. Freezing will not eliminate bacteria from the meat.

3. Discuss with club members the suggested meat cuts and fat content:

   a. For consistency with the thickness of strips of jerky, ask a local butcher shop to slice the meat for you from a lean-cut roast.

   b. For ground meat jerky, use very lean meat (93% or above).

4. Share with club members tips for slicing the meat at home:

   a. A good tip to remember is to partially freeze the meat to make slicing easier.

   b. Slice meat no thicker than ¼ inch.

   c. Trim and discard all fat from meat because it becomes rancid quickly.

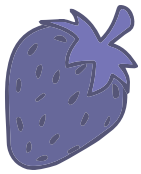
   d. If a chewy jerky is desired, slice with the grain. Slice across the grain if a more tender, brittle jerky is preferred.

   e. A tenderizer can be used according to package directions, if desired.

5. Share tips with club members for marinating:

   a. The meat can be marinated for flavor and tenderness.

   b. Marinade recipes may include oil, salt, spices and acid ingredients such as vinegar, lemon juice, teriyaki, or soy sauce.



MARINATING JERKY

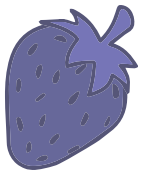
TIME: 1 HOUR PREP; 6-8 HOURS FOR MARINATING

Recipe for Jerky Marinade

1 1/2 - 2 pounds of lean meat (beef, pork or venison)
1/4 cup soy sauce
1 tablespoon Worcestershire sauce
1/4 teaspoon each of black pepper and garlic powder
1/2 teaspoon onion powder
1 teaspoon hickory smoke-flavored salt

NOTE: You could have one batch of jerky already in the dehydrator.

1. Combine all ingredients.
2. Place strips of meat in a shallow pan and cover with marinade.
3. Cover and refrigerate 1-2 hours or overnight.
4. Products marinated for several hours may be saltier than some people prefer.
5. Heating meat strips (not ground) prior to drying decreases the risk of foodborne illness. This option should take place at the end of the marinating time. To heat, bring strips and marinade to a boil and boil for 5 minutes before draining and drying.
6. If the strips are more than 1/4-inch thick, the length of time may need to be increased. If possible, check the temperature of several strips with a metal stem-type thermometer to determine that 160ºF has been reached.



MAKING JERKY FROM GROUND MEAT

TIME: 20 MINUTE PREP; AT LEAST 2 HOURS FOR MARINATING

Jerky can be made from ground meat using special presses to form or shape the product. Disease-causing microorganisms are more difficult to eliminate in ground meat than in whole meat strips. (If ground meat is used, follow the general tips for safe handling of meat and poultry, above.) At the end of the drying time, it is important to get the pressed jerky strips to an internal temperature of 160ºF to eliminate disease-causing bacteria such as E. coli O157:H7, if present. See Post Drying Heat Treatment directions below.

Recipe for Ground Beef (Meat) Jerky

1 lb. lean ground beef (93% or more)
½ C soy sauce
½ tsp onion powder
½ tsp garlic powder
1 tsp sea salt (canning salt or kosher salt)
¼ tsp coarse black pepper
1 tsp liquid smoke (optional)

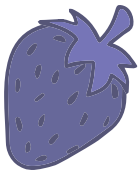
1. Combine all ingredients and let sit in the refrigerator for at least 2 hours.
2. Dry at 145°F until pliable.
3. Pre-heat oven to 275°F.
4. Remove jerky strips form dehydrator and place on baking sheets (lining with parchment paper will absorb some of the juice).
5. Bake for 10 minutes until strips are sizzling.
6. Test internal temperature of strips with a pong-type probe.
7. Cool when done.

Activity *#3*

POST-DRYING HEAT TREATMENT AND STORING JERKY

TIME: 15-20 MINUTES

1. Discuss with club members the post-drying process:
    a. Dry jerky 4-6 hours using an electric dehydrator- preferably one with a thermostat control so a temperature of 145-165º F can be maintained.
    b. Remove jerky from the dehydrator and place dried strips on a baking sheet, close together but not touching or overlapping (you might consider lining the baking sheet with parchment paper as sizzling juice and fat will be extracted during the heating process).
    c. Heat in a pre-heated 275º F oven for 10 minutes.
2. Discuss with club members the process of storing jerky:
    a. Properly dried jerky will keep at room temperature for two weeks in a sealed container.
    b. For best results, to increase shelf life and maintain best flavor and quality, refrigerate or freeze jerky.



Reflect

- Why is it always important to wash your hands with warm water and soap before and after handling meat and poultry?
- Why is the thickness of jerky important?
- What does it mean to marinate something?

Apply

- What other foods could you marinate?
- On what kinds of occasions/trips would jerky be a good snack to bring?

4-H MISSION MANDATES

Healthy Living

Club members will learn how to and participate in preparing the homemade, healthy snack, beef jerky.

Science

Youth will learn the science behind drying meat and making the popular snack beef jerky.

ESSENTIAL ELEMENTS

Independence

Learning new skills helps youth gain autonomy in their lives and become more confident in their ability to do tasks.

References and Other Resources

http://nchfp.uga.edu/how/dry/jerky.html

https://commonsensehome.com/ground-beef-jerky/

4-H Club Meeting 6

Storage of Dehydrated Foods

Supplies

- Tupperware and other storage equipment to show club members

Picture retrieved from:
https://www.21stcenturysimpleliving.com/packaging-storing-dried-foods/

INTRODUCTION

After the foods are dehydrated, it is important to package and store them correctly. Good packaging and storage techniques protect your dried food from oxygen, moisture, light, microorganisms, and pests. After you have checked foods and found them to be thoroughly dry and cool, pack them immediately for storage.

OBJECTIVES

- Youth will learn how to properly store food so it won't go bad.
- Youth will learn how to pick the correct storage container for storing food.
- Youth will learn how to properly label food.

SET-UP

- Make sure you have all necessary storage equipment to show youth as an example.

Activity #1

HOW TO STORE DEHYDRATED FOODS

TIME: 15 MINUTES

1. Discuss with club members the characteristics of quality packaging.
2. Tell club members that packaging and storage containers should be:
   a. Clean and dry
   b. Food grade or meant for use with food
   c. Sturdy

d. Protective against light

e. Airtight and moisture resistant

f. Easily disposable or recyclable

g. Easily opened and closed

h. Durable

i. Low-cost (preferably)

3. Share these tips on picking a storage container:

   a. Unfortunately, no single food container has these characteristics. Make your choice based on the type of dried food, your intended storage conditions, and storage time.

   b. Glass, plastic, and metal (never galvanized steel) are used for packaging most dried foods.

   c. Plastic bags are suitable if they are easily opened and closed.

4. Share the importance of labeling:

   a. Labeling is a big part of storing foods.

   b. Sometimes drying, along with time, causes the food to look differently than we are used to.

   c. Labeling can identify the food and when it was preserved. This can save much confusion in the future.

5. Discuss with club members the shelf life of different foods:

   a. Shelf life is the length of time you can store your dried foods, depending on the following conditions:

      i. The type of food

      ii. The storage location

      iii. Factors related to the drying process, such as pretreatment and final level of moisture in the dried food

      iv. Quality and proper use of packaging container

      v. Adequate moisture removed from food

   b. Tips when it comes to shelf life:

      i. An ideal place for storage of dried foods is a cool, dark, and dry area.

      ii. Dark areas are ideal because light fades fruits and vegetables, decreasing their vitamin A and C contents.

c. Reducing the risk of mold:

i. If stored at room temperature, the most common type of spoilage is mold growth.

ii. Molds can grow on foods that are not completely dry and in foods that absorb water when they are packaged or stored in moist conditions.

iii. DO NOT eat molded foods, because some toxic molds can grow at room temperature.

iv. Discard all of the contents of a package if you see mold.

Reflect

- What criteria do we use to make the best decision for the best way to store dehydrate food?
- What steps should we take to make sure our equipment and supplies are safe to use next time we wish to dehydrate food?

Apply

- What other occasions require us to make a decision about how we will store food?
- What other items require us to pay attention to the type of storage material or container we might select? (Important documents, old clothes, games, blankets, etc.)

4-H MISSION MANDATES

Science

Youth will learn the science behind storing food properly and why it is important.

ESSENTIAL ELEMENTS

Mastery

Youth will learn the techniques and practices of storing food.

References and Other Resources

Idaho 4-H Curriculum

More to Discover

Congratulations on completing your Discover 4-H club meetings! Continue with additional curriculum in your current project area, or discover other 4-H project areas. Check out the following links for additional 4-H curriculum.

1. www.discover4h.org
2. http://www.4-h.org/resource-library/curriculum/
3. http://utah4h.org/curriculum/

Become a 4-H Member or Volunteer

To **register** your Utah club or individuals in your club, visit and contact your county Extension office.

http://utah4h.org/about/

http://utah4h.org/join/index

For help registering in 4-H online, visit:

http://utah4h.org/staffresources/4honlinehelp

Non-Utah residents, please contact your local 4-H office:

http://www.4-h.org/get-involved/find-4-h-clubs-camps-programs/

Stay Connected

Visit Your County Extension Office

Stay connected with 4-H activities and news through your county Extension office. Ask about volunteer opportunities, and don't forget to register for your county newsletter. Find contact information for counties in Utah here:

https://extension.usu.edu/locations

Enjoy the Fair!

Enter your project or create a new project for the county fair. Learn about your county fair and fair judging here:

http://utah4h.org/events/index

Participate in Local or State 4-H Activities, Programs, Contests, or Camps

For Utah state events and programs, visit:

http://utah4h.org/events/index

http://utah4h.org/projects/

For local Utah 4-H events and programs, visit your county Extension office:

https://extension.usu.edu/locations

Non-Utah residents, please contact your local 4-H office:

http://www.4-h.org/get-involved/find-4-h-clubs-camps-programs/

Discover *Service*

Become a 4-H Volunteer!

http://www.youtube.com/watch?v=UBemO5VSyK0

http://www.youtube.com/watch?v=U8n4o9gHvAA

To become a 4-H volunteer in Utah, visit us at:

http://utah4h.org/join/becomevolunteer

Serve Together as a 4-H Club or as an Individual 4-H Member

Use your skills, passions, and 4-H to better your community and world. You are needed! Look for opportunities to help in your area or participate in service programs that reach places throughout the world (religious groups, Red Cross, etc.).

Hold a Club Service Project

USU Collegiate 4-H Club hosted "The Gift of Giving" as a club activity. Club members assembled Christmas stockings filled with needed items for CAPSA (Community Abuse Prevention Services Agency).

http://tinyurl.com/lu5n2nc

Donate 4-H Projects

Look for hospitals, nursing homes, or other nonprofit organizations that will benefit from 4-H projects. Such projects include making quilts for CAPSA or Primary Children's Hospital, or making beanies for newborns. During Utah 4-H State Contests, 40 "smile bags" were sewn and donated to Operation Smile.

Partner with Local Businesses

92,000 pounds of processed lamb, beef, and pork were donated to the Utah Food Bank in 2013 by multiple companies.

http://tinyurl.com/pu7lxyw

Donate Money

Clubs or individuals can donate money gained from a 4-H project to a worthy cause. A nine-year-old 4-H member from Davis County donated her project money to help a three-year-old battle cancer.

http://tinyurl.com/mqtfwxo

Give Us Your *Feedback*

Help us improve Discover 4-H curriculum. We would love feedback or suggestions on this guide. Please go to the following link to take a short survey: Click here to give your feedback or go to: https://goo.gl/iTfiJV