



## Puckery, Perfect, or Preserved: Exploring Persimmons Fresh & Dried

<p><b>Lesson Title:</b> Puckery, Perfect, or Preserved: Exploring Persimmons Fresh &amp; Dried</p> <p><b>Topic:</b> Learning about Asian and American persimmons, taste testing, and learning the Japanese stringing and drying method, <i>hoshigaki</i></p>	<p><b>Ages/Grade Level:</b> 6-12</p> <p><b>Subject Area:</b> Food Science; Foodways &amp; Traditions; Nutrition</p>
<p><b>Materials:</b></p> <ul style="list-style-type: none"> <li>- American persimmons</li> <li>- Asian persimmons (fuyu and hachiya)</li> <li>- Paper plates</li> <li>- Knife</li> <li>- Vegetables peelers (enough for each student or to share with partner or among small group)</li> <li>- Cutting board</li> <li>- Napkins</li> <li>- Hand sanitizer</li> <li>- Plastic gloves</li> <li>- String</li> <li>- Bamboo skewers</li> <li>- Clothing hangers</li> <li>- Dried hoshigaki persimmons (if you can find them, check Asian Grocery stores)</li> <li>- Projection screen/smartboard /computer or phone to share videos</li> <li>- <a href="#">POP persimmon info sheet 1-pager</a></li> <li>- <a href="#">POP hoshigaki persimmon drying visual guide 1-pager</a></li> </ul>	<p><b>Prep Time:</b> 10 minutes to wash and cut sample fruits, set up materials</p> <p><b>Lesson Time:</b> 60 minutes</p> <ul style="list-style-type: none"> <li>- 5 minute ice breaker: name circle and sharing of favorite fruit</li> <li>- 5 min taste-testing of persimmon varieties, and sharing of experiences / impressions / asking students what they might make with persimmons / what questions or curiosities they have about the persimmon</li> <li>- 10 minute group reading of <a href="#">POP persimmons info sheet 1-pager</a> with teacher pointing out key vocab</li> <li>- 5 min watch video on how-to-grow persimmon trees and answer student questions <a href="https://www.youtube.com/watch?v=UFa6qTQvmW8">https://www.youtube.com/watch?v=UFa6qTQvmW8</a></li> <li>- 5-10 min pass out <a href="#">POP hoshigaki persimmon drying visual guide 1-pager</a> and watch cultural context video footage of Japanese string-drying persimmons <a href="https://www.youtube.com/watch?v=vxYgLNXS2pc">https://www.youtube.com/watch?v=vxYgLNXS2pc</a></li> <li>- 20 min - discuss food safety, sanitize hands, pass out gloves, washed persimmons on plates, peelers, instruct students to peel outer skin of fruit (demo), and use bamboo skewer to create a stem to tie with string and attach to hanger for drying</li> <li>- 5 min rapid fire recap - students sharing one thing they learned from the lesson (creating connections between students' sharings)</li> </ul>

### DESIRED RESULTS

**Established Goals:**

- Students will observe and describe the taste, size, and shape of the native American and Asian persimmon and build bridges of connection to other vegetables, fruits they know.
- Students will learn about persimmon tree growth and care through collective group reading and a short introductory video and learn string-drying as one preservation method they might use to extend the harvest from their school orchard.
- Students will gain hands-on experience with culinary tools like vegetable peelers in peeling and preparing persimmons for string-drying through the Japanese method of *hoshigaki*.
- Students will observe scientific processes by eating and aging persimmons such as **enzymatic oxidation** (*browning of fruit when exposed to air*), **astringency**, **contraction**, **evaporation**, **diffusion** and **sugar** (and potentially, mould) **bloom**.



## Puckery, Perfect, or Preserved: Exploring Persimmons Fresh & Dried

### Standards:

- 4.1.6.F Describe relationships using inference and prediction.
- 4.1.8.F Identify questions and concepts that guide scientific investigations.
- 11.3.6.B Describe safe food handling techniques (e.g. storage, temperature control, food preparation, conditions that create a safe working environment for food production).
- 11.3.9G Analyze the application of physical and chemical changes that occur in food during preparation and preservation.
- 11.3.12G Analyze the relevance of scientific principles to food processing, preparation, and packaging.

### Understandings...

#### **Students will understand that...**

*What specific understandings about them are desired?  
What misunderstandings are predictable? What are the big ideas?*

- **Foodways** are the the eating habits and culinary practices of a people, region, or historical period and refers to the intersection of food in culture, traditions in history.
- Foodways can point to **identity, seasonality, availability** of foods, and the **customs** or **rituals** related to the preparing or eating of particular foods, or dishes. **Foodways can also span diverse regions and geographies.**
- **Persimmons (*Diospyros kaki*, *D. virginiana*) possess a rich and varied cultural history** both in **China** where they originated and have been grown for thousands of years and in **Japan**, where they are the national fruit, and in the indigenous land of the **eastern United States**, where the English word **persimmon derived its name from the Algonquian meaning “dry fruit.”**
- There are **several methods of food preservation** we can use for preserving or extending our seasonal harvest: *drying, refrigeration, canning, freezing, brining, pickling, and fermenting.*
- In the process of drying fruit, warm air that has little moisture will be used to pick up the moisture on the surface of the fruit. As the surface moisture evaporates, water from the center of the material is drawn to the surface in the process called **diffusion.**
- The rate of moisture loss slows over time, as

### Essential Questions:

*What provocative questions will foster inquiry, understanding, and transfer of learning?*

- What does persimmon taste like to you? What does it remind you of? What variety do you prefer? Why?
- Why might persimmon fruit be sweeter after a period of frost? *Explore the water cycle - rupturing of plant cell walls when frozen.*
- What is astringency? *Describe tannins.* Why might a plant develop characteristics like tannins? What does this enable the plant to do?
- How might astringent plants benefit the body? In what conditions might we use them in - internally or externally?
- What are some things we can make with persimmons to extend their enjoyment throughout the season?
- Name some food safety and hygiene practices we should employ before we process this fruit.
- What conditions should we provide to our drying fruit to ensure proper drying and lessen mould?
- What factors might affect persimmons' drying times?



## Puckery, Perfect, or Preserved: Exploring Persimmons Fresh & Dried

the moisture is being drained, **the cellular structure will begin to break down causing the persimmon to shrink.** The skin-like outer layer is called **case-hardening.**

### Students will know...

*What knowledge will students acquire as a result of this unit?*

- **Asian Persimmon (*Diospyros kaki*)** is native to China, where it has been cultivated for centuries. Trees **grow between 13-20 ft tall and wide** and are **self-fertile.**
  - Asian persimmons are usually divided into two categories -- **astrigent (Hachiya)** and **non astrigent (Fuyu).**
- **Native American Persimmon (*Diospyros virginiana*)** is a much larger tree, growing 30-50 ft tall, but with smaller fruit. **Except for a few self-fertile varieties, American Persimmons require a separate male and female tree for pollination (only female trees bear fruit).**
- POP favors planting non-astringent Fuyu and Jiro varieties in our community orchards because they are hardy and have few pest and disease concerns.
- Astringency is related to the presence of **tannins**, a group of **bitter phenolic compounds** that can cause a drying mouthfeel as they bind to proteins in saliva. **Plants have tannins to make themselves unpalatable.**
- **Hoshigaki** are persimmons (traditionally made with firm Hachiya persimmons) that are peeled and dried whole over a period of several weeks through **hanging and delicate hand-massaging**, producing tender, moist dried persimmons that have a characteristic white sugar bloom on the outer surface and an intense flavor.

### Students will be able to...

*What key skills will students acquire as a result of this unit?*

- Students will gain hands-on skills such as:
  - safe and effective knife use,
  - culinary literacy skills -- ability to follow and execute a recipe,
  - critical thinking skills (understanding and brainstorming potential complications / concerns when preparing preserved persimmons,
  - teamwork and dedication;
  - observation skills as students massage their drying persimmons every 4-5 days and check the progress & troubleshoot issues related of their drying fruit (should take 2-3 weeks).

## LEARNING PLAN

### Background Info

#### TREE INFO:

**Asian Persimmon (*Diospyros kaki*)** is native to China, where it has been cultivated for centuries. The Latin genus name "*Diospyros*" translates as meaning "**food of the gods**" for the fruits' divine, sweet flavor. Korea, and Japan, where it is the national fruit, have also been centers of its cultivation; it was introduced to California in the mid-1800's. **Asian Persimmons usually grow between 13-20 ft tall and wide** and are **self-fertile**, meaning that they can self-pollinate and don't require a second tree in order to bear fruit.



## Puckery, Perfect, or Preserved: Exploring Persimmons Fresh & Dried

Asian persimmons are usually divided into two categories -- **astrigent and non astrigent**. Astringency is related to the presence of **tannins**, a group of **bitter phenolic compounds** that can cause a drying mouthfeel as they bind to proteins in saliva. **Plants have tannins to make themselves unpalatable**. Tannins appear abundantly in nature in barks, leaves, nuts, fruits, and seeds **to deter animals from eating a plant's fruits or seeds before they're ripe**. Tannins are also found in plants like *oak*, *rhubarb*, *tea*, *walnut*, *cranberry*, *cacao* and *grapes*.

One of the most common **astrigent** variety of persimmons is '**Hachiya**', which is an **acorn-shaped** fruit, **bright, deep orange-red**, best eaten when jelly-soft or cooked. The **non-astrigent variety** '**Fuyu**' is **spherical, flat on the bottom, and pumpkin-shaped and light orange in color** - they can be eaten raw when firm or soft. At POP's community orchards, POP usually favors planting non-astrigent cultivars such as 'Fuyu' and 'Jiro'.

The **native American Persimmon** (*Diospyros virginiana*) is a much larger tree, growing 30-50 ft tall, but with smaller fruit. **Except for a few self-fertile varieties, American Persimmons require a separate male and female tree for pollination (only female trees bear fruit)**. Due to limitations of space required, POP generally only plants native persimmons in larger park settings and favors self-fertile cultivars like 'Meader' and 'Early Golden.' There are also a few hybrid Asian/American persimmons varieties, including 'Nikita's Gift.'

Persimmons belong to the **Ebenaceae botanical family**, valued for its wood and fruits. Persimmons are usually propagated by **grafting scionwood or buds to selected rootstock**; seed stratification is also possible. **Pollinators of this tree include wild bees, bumblebees, and honeybees.**

Persimmons are easy to grow with few ongoing care requirements. Asian Persimmons grow in hardiness zones 7-10 and do best in areas that have moderate winters and relatively mild summers. American Persimmons are hardier, adaptable to zones 5-9.

### **SEASONAL CARE:**

- **WINTER/SPRING:** Late-winter pruning is helpful for shape and rejuvenation, with modified central leader being the most common form. In the spring, non-blooming persimmons may require an application of bonemeal to boost phosphorus.
- **SUMMER:** Water young trees thoroughly once a week during their first year. Persimmons have few pest or disease problems in our region, thus requiring little other attention.
- **FALL:** Persimmons are one of the latest ripening fruits in our orchard spaces. Harvest and process the fruit from October to December depending on the variety. Harvest non-astrigent Asian varieties when they are hard, but fully colored (ranging from light yellow-orange to dark orange-red). American and astrigent Asian varieties should not be harvested until soft, as fruit picked too early will cause your mouth to feel dry and pucker from the astringency! Sweetness is often improved after the first frost.

### **NUTRITIONAL BENEFITS:**

Persimmon fruit is a very **good source of dietary fiber** with 100 g containing about 9.5% of recommended daily intake of soluble and insoluble fiber. Fresh and dried Persimmon fruit also contain healthy amounts of **minerals like potassium, manganese (15% of DRI), copper (12% of DRI), and phosphorus**. It is moderately high in calories (provides 70 calories/100 g) but very **low in fats**. A serving of half a medium persimmon provides an excellent source of **vitamin A, vitamin C**, and a source of many **antioxidants including beta-carotene, lutein, zeaxanthin and lycopene**. **Beta-carotene**, a class of more than 600 naturally occurring red, orange, yellow **fat-soluble pigments** (also found in leafy greens, carrots, sweet potatoes, squash, spinach, apricots, and green peppers) are pro-vitamins that can be converted into active vitamin A which helps **maintain good vision, fight infection, support cell growth, and keep skin healthy**. Persimmons can be eaten fresh, dried, and cooked. Dried persimmon fruits are popular in Japan and often used in cookies, cakes, muffins, puddings, salads and as a topping in breakfast cereal.

### **BACKGROUND ON HOSHIGAKI:**

**Hoshigaki** are persimmons (traditionally made with firm Hachiya persimmons) that are peeled and dried whole over a period of several weeks through **hanging and delicate hand-massaging**, producing tender, moist dried persimmons



## Puckery, Perfect, or Preserved: Exploring Persimmons Fresh & Dried

that have a characteristic white sugar bloom on the outer surface and an intense flavor. Although you can use sweet Japanese persimmon like Fuyu if you dry them quickly, there's a greater chance of attracting bugs or developing mold due the sweeter nature of this variety. This method is **traditional to Japan**, where it came to America with Japanese American farmers. Because of the labor-intensive nature of this preservation method, hoshigaki aren't available on a wide commercial scale and retail for up to \$40/lb. Massaging the fruit helps to develop the structure of the fruit -- driving off moisture and redistributing sugars to the exterior of the fruit.

### **RECIPE & PROCESS:**

- Instruct students on kitchen and knife safety. Wash and sanitize hands and all materials that will come in contact with food. Pre-wash persimmons. Distribute food-safe gloves.
- To each student, give a paper plate with a persimmon and a half-cut bamboo skewer. If the persimmon is lacking a stem, the bamboo skewer will be inserted into the cap of the fruit which can be tied later with string.
- Ask students to raise their hand if they've used a vegetable peeler before. Teacher can ask a student to share tips with their classmates. Demo, most importantly showcasing how to thinly peel the outer skin.
- Insert the bamboo skewer into the fruit's cap.
- Tie with string; attach to a clothing hanger; and hang to dry in a sunny well-circulated window. Make sure that the fruit doesn't touch each other and there's ample circulation.
- Instruct the students to massage the fruit every 4-5 days to encourage the sugar bloom. **If you see green mould developing other than the anticipated white sugar bloom, discard the affected Hoshigaki.** Fruit should be fully dried and ready to roll and store in 2-3 weeks. You can wrap hoshigaki individually with plastic wrap, place in a ziplock bag together and store in the refrigerator where they'll last for a month or so. Storing in freezer will push storage window to 2 months.

### **Intro (5 minutes):**

- Icebreaker: **name circle** and **students' sharing of favorite fruit.**
- **Teacher shares today we're going to explore a fruit that ripens in the late fall** (*and may or may not be grown in school's orchard*). Holds up persimmon, **does anyone recognize this fruit? What is it?**

### **Opening/Hook (5-10 minutes):**

- **Set up a sample plate** ahead of time with small pieces cut of Fuyu, Hachiya and American persimmons (whatever sampling you have). Pass around one of each to each student.
- **Guide the students in exploring each variety with all of their senses.** What do you notice of color, size, shape, smell - start with the potentially most astringent variety first so students' mouths can be rehydrated by the sweeter varieties.
- **Students share experiences / impressions.**
- **Teacher can ask:**
  - ***What might you make with this fruit?***
  - ***Which did you like most, least?***
  - ***What curiosities do you have about the persimmon now that you've tasted the different varieties?***

### **Lesson / Activity (20 -50 minutes):**

#### **The Plan/Procedure/Lesson Activities**

- ***Now, we're going to learn more about the persimmons that you tasted!***
- 10 minute **students take turns reading sections of POP persimmons info sheet 1-pager** with teacher stopping to point out/further expand upon key vocab
- (optional) 5 min watch video on how-to-grow persimmon trees and answer student questions  
<https://www.youtube.com/watch?v=UFa6qTQvmW8>
- 5-10 min pass out POP hoshigaki persimmon drying visual guide 1-pager
- (optional) watch cultural context video footage of Japanese string-drying persimmons  
<https://www.youtube.com/watch?v=vxYgLNXS2pc>



## Puckery, Perfect, or Preserved: Exploring Persimmons Fresh & Dried

- 20 min - Discuss **food safety, sanitize hands, pass out gloves, washed persimmons on plates, peelers, instruct students to peel outer skin of fruit (demo)**, and use bamboo skewer to create a stem to tie with string and attach to hanger for drying.

### Conclusion (5 minutes):

#### Wrap up and Reflection

- **Rapid fire recap:** Have students share one thing they learned, teacher using each students' sharing to build to review the larger concepts discussed during the lesson and activity.
- **Brainstorm other recipes that might be made from the persimmons.**
- **What questions remain? What else do you desire to learn about this topic?**

### ASSESSMENT EVIDENCE

#### **Performance Tasks:**

*Through what authentic performance tasks will students demonstrate the desired understandings? By what criteria will performances of understandings be judged?*

- Students can be actively involved in the process of peeling and stringing fruits.
- They will observe the transformation of the raw material into a dried, shelf-stable product by observing the loss of moisture, and shrinking of the fruit, and support the drying process and "sugar bloom" by massaging the fruit every 4-5 days.
- With teacher's permission, students might select locations for drying based on inferences and predictions. Data can be collected.
- Students will taste their product after the drying period is complete.

#### **Other Evidence:**

*Through what other evidence (e.g. quizzes, tests, academic prompts, will students demonstrate achievement of desired results? How will students reflect upon and self-assess their learning?*

- Classroom teacher can continue to engage with proposed lesson -- having students observe and track the process of drying, diffusion.
- Students can be quizzed on their knowledge retention related to the growing of persimmon trees.
- Students can set up controlled and experimental drying conditions to test other factors related to drying times: size of fruit, drying location in the school, in/out of light, warm or cold environment, etc.
- Students can be asked what fall fruits are significant to them and write a report including a recipe of what foods are significant to them, and how to prepare a dish with them.

### ADDITIONAL ACTIVITIES & RESOURCES

#### **Extensions/Adaptations/Game**

*What can the teacher do after the lesson to reinforce learning? Is there a complimentary extra activity if there is extra time?*

- Keep an observation log to track the changes witnessed in the persimmon fruit as it dried over the period of several weeks.
- Research and experiment culinary methods for lessening tannins in fruit -- freezing, soaking, etc.

#### **Lesson Resources and/or Credit for Adapting**

<https://www.youtube.com/watch?v=UFa6qTQvmW8>

<https://www.youtube.com/watch?v=vxYgLNXS2pc>

<https://en.wikipedia.org/wiki/Foodways>

[https://en.wikipedia.org/wiki/Dried\\_fruit](https://en.wikipedia.org/wiki/Dried_fruit)

[http://www.lbschools.net/Asset/Files/Nutrition\\_Services/HOT M-Educator-Persimmons-Web.pdf](http://www.lbschools.net/Asset/Files/Nutrition_Services/HOT_M-Educator-Persimmons-Web.pdf)



## **Puckery, Perfect, or Preserved: Exploring Persimmons Fresh & Dried**

- Have students design their own recipe using persimmons.
- Research ways food manufacturers keep dried fruits foods safe and fresh through innovations in food packaging.

<https://www.umami-insider.com/hoshigaki-japanese-dried-persimmon/>

<https://www.serious-eats.com/2009/04/hoshigaki-dried-persimmons-fruit-japanese.html>

<https://www.slowfoodusa.org/ark-item/japanese-massaged-dried-persimmon-hoshigaki>