

Exploring Food Preservation

The following is adapted from a lesson printed in [Books in Bloom](#). Books in Bloom invites children on a special literary adventure to learn about science while also exploring the garden. Written by Valerie Bang-Jensen & Mark Lubkowitz, it includes 17 chapters, each profiling a popular children's book, with related garden-inspired activities to help you "dig" into the story in a fun way. [Learn more](#).

Overview: Bountiful summer and fall harvests provide the opportunity for students to explore the history and importance of food preservation. By exploring preservation methods, both ancient and modern, students can appreciate the climatic and survival challenges faced people in different places and eras.

Grade Level/Range: Grades 2-5

Objective: Students learn why and how fresh food can be preserved for later consumption.

Time: 2 or more hours

Materials:

- Ingredients for making jam (for making suggested recipe listed below: 3 cups of berries, 1 lemon, 5 cups of sugar, water and 1 package of fruit pectin)
- Cooking supplies including (for making suggested recipe listed below: bowls, spoons, measuring cups, strainer, potato masher, saucepan, and jars)

Background Information:

While humans need to eat year round, there are many factors impacting food availability that are beyond their control, including climate and the natural life cycles of plants. Finding ways to preserve foods for times when harvest is limited was an important survival skill for our species.

For more than 12,000 years humans have been preserving foods in various ways. In fact, humans' ability to produce and preserve food was a tremendous advance in the history of civilization. Our early ancestors were hunters and gatherers, moving from place to place in search of fruits, nuts, berries, and other plant parts and wild game. When times were good and food was plentiful, they feasted, but other times were lean. Once humans began growing, instead of simply gathering, plants for food, they stayed put in settled communities. But they still needed stored food to help them survive after the end of the growing season and during other times of scarcity.

The oldest method of food preservation is drying. The edible seeds of many plants (grasses, beans, and sunflowers, for instance) naturally dry as a part of their life cycle. Ancient peoples, through trial and error, discovered that other foods, when dried, remained edible for long periods. Though we now know that dehydration works because the microbes and enzymes that cause spoilage and decay can't thrive without adequate moisture, the basic requirements for drying are the same

as ever. It takes dry air passing over food to dehydrate it to the point where it will not spoil in storage.

Native Americans dried corn and beans in the sun, while early Chinese and Italians dried starchy noodles. Japanese families hung persimmons on lines to dry in the fall. Colonial Americans pushed apple slices onto broomsticks to dry for storage. Indigenous South Americans carried potatoes into the Andes Mountains, crushed them to a pulp, then left them to freeze on a rock overnight. The cold, dry air and high altitude (low pressure) produced one of the first freeze-dried foods!

Another method of preservation called fermentation relies on the action of beneficial organisms such as yeast. Fermented (alcoholic) beverages were consumed by the earliest civilizations of Mesopotamia and Egypt. Some early cultures preserved or "pickled" foods with a fermented product, vinegar.

In tropical areas, spices, many of which can kill bacteria, were often used (in curries, for instance) to keep foods from rotting.

Here is a list of the most common methods of food preservation:

Drying - This prevents meat and produce from rotting and prevents stored seeds from sprouting. It also inhibits the growth of microorganisms while the food is dry.

Heating - Heat can increase shelf life by temporarily sterilizing food.

Freezing - Frozen foods remain in edible condition almost indefinitely because the low temperatures prevent microbes from growing.

Fermentation - Fermentation is a gradual chemical change caused by enzymes produced by certain bacteria, molds, and yeasts. It is used to produce bread, vinegar, cheese, sauerkraut, alcoholic beverages, and yogurt.

Chemical preservation - Humans have used chemical preservatives for millennia. Salt was extremely precious in ancient times, in part because it was a great preservative for meat and other foods. Smoking is another ancient and common means of chemical food preservation. Many spices are rich in compounds that slow bacterial growth or even kill bacteria.

Irradiation - A more recent technology, irradiation, is used to destroy microorganisms on many spices and is increasingly used on fruits, vegetables, and berries. (Readers might want to investigate different sides of the controversy surrounding irradiated foods.)

Laying the Groundwork:

Ask students:

- Do the fresh fruits and vegetables available in our grocery stores grow in our area during the winter? If no, where do they come from? (Fruits and vegetables are shipped from all over the world. This is possible because of fast transportation and technology such as refrigeration.)

- Before refrigeration, how did people preserve food? (They used to preserve foods for later consumption using techniques like drying, smoking, and canning. People could eat fresh fruits and vegetables only when they were in season.)

-Before launching into the exploration, consider engaging your students in predicting and observing what happens to harvested garden produce over time. Leave different items out on a table in the garden or classroom, for instance, and make daily observations and drawings of changes that occur. Ask, What changes did you notice? Was there evidence of other organisms (e.g., mold or fruit flies)? Did some types of produce rot or dry out more quickly than others? What were the conditions (light, heat, and so on) where the produce sat? How might you explain your findings? Challenge the class to try to prolong a new item's freshness by choosing new location or conditions.

Exploration:

1) Make your own jam using fruit from a school garden, a local farmer's market, or a grocery store. If cooking in the classroom, send home a notice that includes the recipe you will make, and ask parents to alert you to any food allergies. Also make sure to review the following safety tips:

- Always wash your hands before preparing food.
- Wash fruits and vegetables in running water and dry them with a clean paper towel.
- Use clean utensils and clean all working surfaces before preparing food.
- Prepare fruits and vegetables separately from meat and poultry.
- Work in small groups so everyone has a chance to contribute.
- Enlist help from other teachers, parents, or community volunteers to guide and monitor the students, if necessary.
- Have enough ingredients on hand for the whole class to enjoy the results.

Here is an easy recipe to try:

Triple Berry Freezer Jam

Ingredients:

*½ cup blackberries
1 ½ cup strawberries
1 cup blueberries
Juice of half of a lemon
5 cups sugar
¾ cup water*
1 package of pectin**

**Pectin instructions may differ. Please refer to the instructions on your pectin package for specific water requirements.*

Directions:

1. Pour blackberries, blueberries, and strawberries into a large bowl and crush with a potato masher.
2. Stir sugar and lemon juice into crushed berries and cover. Allow berry mixture to sit at room temperature for 30 to 45 minutes or until majority of juice has been extracted from berry mixture.

3. Add pectin to the water in a small saucepan and stir to dissolve. Bring to a boil, stirring constantly. Boil for 1 minute.
4. Stir hot pectin into berry mixture. Continue stirring for several minutes or until sugar has dissolved.
5. Pour berry pectin mixture into clean, dry containers leaving about ½ inch of room at the top and cover tightly. You will have 7 to 8 cups of jam.
6. Leave at room temperature overnight or until jam sets.
7. Freeze jam until ready to eat (up to one year). Jam will keep in the refrigerator for up to 3 weeks.

Special Note: Do not alter or double the recipe as jam will not set properly.

Making Connections:

- Ask students to scope out their home kitchens and generate a list of foods they think have been preserved in some way (e.g., pickling, smoking, canning, chemical preservatives, fermenting, freezing.) Have them list how they think each type of food they've listed has been preserved. (A food may be preserved by multiple means. Vegetables, for example, may be canned and contain chemical preservatives.)

- Encourage students to visit grocery stores, conduct interviews, and do library and Internet research to explore food preservation in their communities. Students might generate questions and then interview families or community members to learn if and how they preserve foods. They might ask about canning (pickles, jams, chutneys, and so on), freezing, drying, making meat jerky, smoking, salting, root cellaring, or fermenting. If students also interview seniors and conduct research, they can explore how food preservation has changed over time. Through their research and interviews they can also gather recipes and create their own "preserving the harvest" cookbook.

Branching Out:

Science - Experiment with another method of food preservation. Simple projects include drying herbs or sunflowers (for the seeds) by hanging them in a dry, dark area. Another option is to construct a food dehydrator to dry fruits and vegetables like apples or tomatoes.