

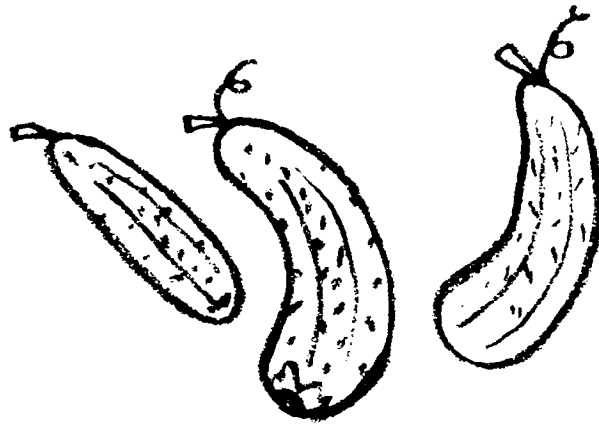


Preserving the Harvest

A Unit on Canning, Freezing & Jelly Making

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Summer Institute for Educators 2008

This document is the result of the author's participation in the BC Agriculture in the Classroom Foundation's Summer Institute for Educators in 2008. This third year level course in curriculum design (CUST 396) is offered every other year through the University of British Columbia's Faculty of Education's Office of External Programs.

In the summer of 2008 the Foundation partnered with the Teachers of Home Economics Specialist Association – THESA – and the Office of External Programs to make the Summer Institute a part of the Home Economics Education Diploma Program. This program consisted of 10 three credit courses that closely examined the Home Economics Curriculum IRP's and explored creative ways to address the learning outcomes.

Participants (30 educators from a variety of secondary disciplines and from many regions of the province) were based at Clarence Fulton Secondary in Vernon BC. As a result of visits to local farms and through intensive classroom work they developed a number of teaching strategies drawn from the agricultural, environmental, economic and nutritional concepts featured in the IRP's.

Participants taking the course for credit created teaching modules such as this to share with other educators around the province.

The BC Agriculture in the Classroom Foundation is supported by the BC Ministry of Agriculture and Lands as well as the agricultural community. Participants were sponsored for their farm tours as well as their meals (prepared by our Summer Institute chef using fresh and delicious local products).

Visit the BC Agriculture in the Classroom website at www.atic.ca/bc for further information on this and our many other exciting programs or to order additional resources for your classroom.

Thank you for bringing agriculture to your classroom. We hope that you too will find it a great teaching tool to enhance your lessons.

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Project Synopsis

This project is a unit that focuses on connecting students with their food. The purpose of this unit is to engage students in activities that help them understand where food comes from. For centuries people have used varying methods for processing and preserving food. In focusing on food preservation, the primary goal of this unit is to help students to understand the complex food systems of agriculture that have evolved, primarily over the last few centuries. Understanding 'how and why' food evolves through a food system and ends up in their mouths is not only a key component in their personal food choices but necessary to developing longer range sustainable food production for all.

Through various preservation projects and activities students will become immersed in these food systems from seed to mouth. Hands on activities including harvesting will directly connect students to what they grow. Hands on involvement in different methods of preservation will engage students in aspects of the food system in which they have had little or no experience. More specifically students will learn why and how people preserve food at home. Students will be involved in food preservation, preparation and lab work that helps provide a detailed understanding of the food system. Students will learn why food goes bad or deteriorates and what we can do to preserve it for out of season use. Students will look at different methods of preserving so the least amount of nutrients is lost. Students will analyze and summarize specific costs and economic considerations in growing, harvesting, preserving and preparing their own food at home. Throughout the unit's activities and experiments students will be analyzing and journaling the implications of the numerous aspects of the food system that they are directly involved with.

The target audience for this project is grade ten Food and Nutrition students. Many of these activities can also be used to meet the objectives of the grade 9 IRP's.

Rationale For the Project

Many changes that have occurred in our society indicate a significant historical difference. For decades parents have been the primary educator of healthy nutrition for their own children. With most families being dual income, the education of our youth has shifted more and more into the hands educators. Right or wrong, this is a reality and we need to do what we can to ensure youth understand not only the how to cook and eat but also the way to make educated choices about what and how to eat. Kirschenmann suggests, "We need to bring the next generation of Americans into this intimate, reciprocal relationship with eating and the production of food, as part of their early education in our public schools. (Kirschenmann, n.d.) It is important to understand how to eat healthy and prepare healthy meals, but the curriculum needs to go one step further and see how those choices impact our environment. Riley uses the term "socially responsible" which is an excellent way to shift understanding from what is good for us to what is good for everyone. (Riley 2005, p. 2)

Eating fruits and vegetables is both healthy and inexpensive, especially when they are in season. Our Home Economics programs need to explore progressive activities that require student involvement so they are engaged in the process of producing and preserving. One way to get students involved directly, is to have the students grow their own food (Flett & Geissman, 2005). Growing herbs on a window sill or being involved in community gardens are two methods of directly involving our students.

The idea of covering nutrition and saving the planet might seem daunting, but in fact, methods for addressing one quite often helps another. “Interestingly, the path to reducing the energy intensity of the food system dovetails nicely with the path to a healthy and nutritious diet” (Starrs, n.d.). Two goals often overlap.

Blending the how and why we grow and preserve food is key to understanding food systems. It is important to include the cost of foods in season. For example, the cost of strawberries in June versus the cost in December and why we would freeze them to use them later in the year. It is important that we compare seasonal grocery store prices as well as total costs. Total cost refers to such things as, the environment and global consequences for our actions. This unit intertwines the theory of social responsibility with hands on skills. The goal is to enrich the student experience by providing an understanding of how these preserved locally grown June strawberries used in the month of December have many global benefits. Our current trend of the transportation of the “imported strawberries” alternative in December is having lasting negative effects on our global community. The environmental cost of packaging and transporting these strawberries is a cost that has been escalating for years. We as educators must help address these issues.

A child’s understanding of the importance of fruit and vegetable consumption has been a challenge for many parents for decades. How, when, and where student’s learn about nutrition has taken a step backward from the family farm to the media. Children at one time gained understanding through knowledge of the farm and at the very least an understanding that food came from farms and not the store as television commercials and trips to the giant supermarket suggest. Flett and Geissman (2005) point out, “The duration of television viewing is inversely correlated with vegetable and fruit consumption in adolescents” (p. 25). Student hands on participation in a community garden or harvesting their own food for preservation not only enhances understanding of nutrition but creates a greater appreciation of the student’s own role in creating a sustainable ecosystem. These are both key goals of the Foods and Nutrition IRPs. Student’s sense of purpose and feeling valued as a part of a group effort are definite outcomes of their participation in a community garden, herb garden or group harvesting field trip.

Food studies have always provided students with a good base of nutritional information. Riley (2005) agrees that this corner stone of food studies is key, but we must take it further to provide our students with information to make their “food choices in a socially responsible way” (p. 1). Linking dietary guidelines to food systems must be viewed with sustainability as the goal. Our traditional focus on nutrition has often overlooked long range sustainability.

The environmental impact of food production needs to be calculated into our lessons on nutrition. Nutrition can no longer be viewed as an individual’s responsibility to ones self, but it must be viewed as an individual’s responsibility as part of a global community.

The rationale can best be summarized with a quote from Alice Waters. “We must teach the children that taking care of the land and learning to feed yourself are just as important as reading, writing, and arithmetic” (Waters, n.d.).

Related Learning Outcomes from the Home Economics IRP

Grade 10 Foods and Nutrition

- A1 identify sources of food contamination and demonstrate appropriate preventative measures, including
- A2 demonstrate a knowledge of precautionary measures and emergency response associated with food preparation, including
- A3 demonstrate safe use of equipment needed to prepare food items use equipment safely
- A4 demonstrate the ability to follow a recipe, including
- A6 demonstrate co-operation in partner and group work
- A7 identify basic functions of common ingredients used in food preparation
- B1 use recipes to prepare dishes follow a recipe to produce a successful product within a specified time period
- B2 use a variety of cooking methods to prepare food-use procedures and techniques for food preservation methods such as freezing, canning, jelly-making, drying
- C3 use product labels to identify and compare the nutritional value of a variety of food products
- D1 describe factors that influence personal food choices

Activity 1

Understanding a Food System and how Preservation Relates to the Food System

Objective of the lesson: *students will be able to...*

- Define and describe a food system
- Illustrate the difference between a simple food system and a complex food system
- Explain all of the components involved in the food system

Materials required:

- Hand out for students Food System Components Guide Template
- Whiteboard and markers
- Paper/pencils/colour markers
- Large sheets of paper

The teaching activity:

1. Ask students questions such as “where does our food come from?”, “what does it take to produce food?”, “in what forms do we get our food, e.g., fresh, frozen?”
2. Ask “if food production starts with the farmer what steps are taken to get it from the farmer to the table.” Record these on the board, overhead or flip chart.
3. Explain to students that what they are describing are the parts of a food system. Give students the Food System Handout. Explain that each step involves many processes and considerations. And each process may involve many people, such as bankers, agriculture suppliers, extension workers, farm workers, truck drivers, food handlers, millers, bakers, as well as different conditions, such as weather, roads and economic and political stability. It is this complexity that makes our food supply vulnerable. The number of steps involved and the processes in each step depend on the specific situation for each community and family. Local food systems, including home gardening and small farms, may decrease the complexity of the processes involved, or even eliminate steps such as moving, processing or selling. Home gardens can increase family security by providing sufficient food for the family, as well as income from garden surplus. Discuss how this food system could be simple or complex using examples. Simple would be “home-made” jam and complex would be “strawberry short cake from a bakery”. Discuss with the class how politics, economics, society, culture, technology, and research can all influence, and control the food system.
4. Give students the definition of food preservation:
Food preservation is the science that deals with the process of prevention of decay or spoilage of food thus allowing it to be stored in a fit condition for future use. Discuss some of the key words in the definition, particularly “decay” and “spoilage”.
 1. Ask what might cause decay and spoilage? (explain that the most common causes are: the growth and activity of microorganisms such as bacteria, yeast and moulds; activities of food enzymes and other chemical reactions within the food; inappropriate storage; and insects or rodents.)
 2. Have student brain storm what types of food preservation might occur or be involved throughout the food system. Record responses onto the board and have them fill in the

- chart on their hand-out as the steps are explained. Is there any part of the food system that encourages organic material like food peeling to decay and break down?
3. Place students into groups of 3 or 4 and have them select a specific food product that you eat everyday (e.g., a bowl of cereal, granola bar, an apple, cheese, etc) and try to trace it through the food system. What happens at each stage in the food system? What is done at each stage to preserve the food and keep it safe to eat? (Try and list all possible people and processes that have been involved in growing, producing, shipping and marketing the food before it reaches your stomach. Record information onto large paper. Share what they came up with, with the class.
 4. Discuss: What are some ideas you have to improve this system from an economic point of view? Environmental point of view? What do you think we as a society can learn from studying these food systems?

Possible follow-up activities:

- Choose an article on food systems and security and have students do a written reflection (a few articles are listed in the reference section that could be used)

Teaching references:

- The meaning of food
<http://www.ecoliteracy.org/publications/rsl/claire-cummings.html>
- Food Security it takes a community
<http://www.ecoliteracy.org/publications/rsl/mark-winne.html>
- Where does food come from?
<http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=8&DocID=376>
- How major human activities shape our environment and lives
[http://www.project2061.org/publications/sfaa/online/chap8.htm#2Farming the futures](http://www.project2061.org/publications/sfaa/online/chap8.htm#2Farming%20the%20futures)
http://www.ecoliteracy.org/publications/rsl/kenny_ausubel.html
- Food Security-It takes a community
<http://www.ecoliteracy.org/publications/rsl/mark-winne.html>

Name _____

Food System Handout - Preserving Food Throughout the Food System

Around each component of the Food System create a web of actions that are taken to preserve food and to keep it from decaying or spoiling.

Food Production

Human and Natural Resources - Inputs

Food Distribution

Outputs

Food Access

Food Consumption

Activity 2

Exploring Food Decay and Spoilage and the types of Food preservation

Objective of the lesson: *students will be able to...*

- observe and document food decay and spoilage
- explain the processes of food preservation

Pre-preparation:

Three days before teaching this lesson, it will be necessary for you to cut a peach in half and place one of the halves in plastic wrap in the refrigerator and the other half on a plate left out at room temperature. Make sure the peach that is left out is in a safe place and out of reach of students.

Materials required:

- Whiteboard and markers
- Paper/pencils and paper
- Two peaches
- Two tomatoes
- Knife
- Small plates
- Plastic wrap
- Access to refrigeration
- Bag of frozen peas

The teaching activity:

1. Review with students their Food System Handout - Preserving Food Throughout the Food System from last day. Discuss the hazards that food encounters from the time it is a seed until it reaches the kitchen.
2. Do a demonstration-take out a peach, a knife, and a plate. Cut the peach in half and put one half on the plate. Then eat the other half. Tell students that you are full and want to save the other half of the peach for tomorrow. Then ask: If I want to eat this peach tomorrow, is there anything I should do with it now? Why or why not?
3. Students will likely suggest wrapping the peach in plastic wrap and put it in the refrigerator. Ask them: What does refrigerating do for the peach? What does the plastic wrap do? What happens when a peach is not refrigerated? Not wrapped? What might happen if I left it here on this table and ate it in a few days?
4. Students will likely assert that the peach may spoil when left at room temperature. Bring out the peach that you have prepared in advance ask students to describe what had happened.
5. To further reinforce how foods can spoil and ultimately rot when left out over time take out two tomatoes and cut them in half (purchase organic tomatoes if possible as they will deteriorate much quicker than non-organic) and place them on two plates. Explain that one will be placed into a refrigerator and the other left out in the classroom at room temperature. Give students the Tomato Observation Sheet and explain that over the next week they will observe both pieces

of fruit to see what happens. Have students observe each fruit on a daily basis and note any changes in the appearance or edibility of the fruits they are observing. Students should use the handout attached and record their observations by writing down an explanation of what they see and by drawing pictures of what the tomatoes look like

6. Discuss what might cause the spoilage (e.g., microorganisms such as mold, yeast, and bacteria; insects such as house flies, fruit flies; natural ripening enzymes in the fruit, air has caused oxidation and turned the cut edge brown, etc.). Reinforce that this spoilage is a waste of food (it is estimated that at least 50% of food in North America is wasted) and may cause illness. So what can be done to reduce the waste and prevent food born illnesses? As they give suggestions tease out the basic principles of food preservation:
7. Explain that refrigeration is one principle of food preservation – applying cold temperatures. Wrapping food to exclude the air is another. Explain the basic principles of food preservation:
 - a) modifying the temperature (cold – refrigeration, freezing; high heat – cooking, canning)
 - b) controlling the pH (adding an acid – pickling)
 - c) controlling the water (drying, adding sugar or salt)
 - d) removing oxygen (canning)
1. Ask students how many of their great grandparents or grand-parents were farmers. Compare this to how many of their parents are farmers. Discuss with students how for many centuries, most food was consumed or marketed within a few dozen miles of where it was grown. People were “seasonal eaters”, eating food when it was fresh. Their food system was based on what was produced locally. For some foods they were able to develop home preservation methods that saved the food for the winter months. Discuss some of the methods: canning, pickling, jelly and jam making, drying, freezing, cold storage (root cellars), salting/curing.
2. Discuss how many improvements in land productivity have led to availability of far more food in some areas than is needed for the local population. Thus many food transformation and preservation processes have been developed commercially and with improved transportation food is now often consumed thousands of miles from where it is produced. Have students create a T chart listing the pros and cons of this global food system.

Possible follow-up activities:

- Do additional experiments to show the effects of different solutions, like salt or vinegar on a food item over- Use five test tubes A - H and use tongs to put three frozen peas in each tube. Then put tube A in a fridge and leave tube B at room temperature, place 5 cm of each of the following solutions in tubes C - H (a different solution in each tube)
 - a. dilute salt solution
 - b. concentrated salt solution
 - c. alcohol
 - d. sugar solution
 - e. vinegar

Take each test tube B-E and plug it with cotton wool and leave them at room temperature for at least three days. Have students record their observations each day. Source: www.awhc.org/docs/Education/HarvestTime/LessonPlans/Food%20Preservation%20Station%20Lesson%20Plans.pdf

- Students could look at different foods at home or in the grocery store to see which have the longest and shortest sell-by dates. They can record what the food is and how they think it has been preserved.

Have students complete the web-based research lesson at : <http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=8&DocID=396>

- It uses a number of online resources, for students to learn how Chilean fruit and lettuce for salad are carefully harvested, treated, packaged, and transported in refrigerated vessels to maintain their freshness.

Preserving Community culture- Invite students to visit ethnic groceries, 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. Which preservation methods or products are unique to different ethnic or cultural groups? If students also interview seniors and conduct research, they can explore how food preservation has changed over time. Which types of foods comprised the diet of your community 100 or 200 years ago? How were the foods preserved? Did peoples' diets change with the seasons? Using recipes gathered through their interviews and research, the class might design and create its own "preserving the harvest" cookbook. Source: <http://www.kidsgardening.com/growingideas/projects/july02/pg2.html>

Teacher Resources:

- Food spoilage and additives: <http://www.bitopics.co.uk/pot/foodsp.html>
- National Center for Home Preservation
<http://www.uga.edu/nchfp/multimedia/tutorials>

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Tomato Observation Sheet

Over the next week you will observe what happens to a tomato kept at room temperature compared to one stored in the fridge. Use the chart below to describe your observations and to comment on what you have observed.

Day	
Write	Tomato in Refrigerator Tomato at Room Temperature
Draw	

Activity 3

Apple Taste Test Experiment

Objective of the lesson: *students will be able to...*

- Distinguish varieties of apples
- Choose the best apple for making applesauce

Materials required:

- Copies of Apple Tasting Chart
- 6 or more varieties of apples (one for each group of 4)
- knives, cutting boards, and plates

The teaching activity:

1. Display the apples so that students can examine their shape and colour. Have them fill in the first column of their Apple Tasting Chart drawing a picture of the shape of the apple and noting the colouring.
2. Distribute the apples to the various kitchen groups and have students wash and slice up apples. Demonstrate the proper techniques for doing this (i.e., knife handling safety, cutting board, cutting the apple into quarters, removing the core, then slicing each quarter into enough pieces so that there is one piece for each member of the class). Direct students to place slices on plates, one place for each group in the class, and to make a small name tag with the name of the apple to go on each plate. Then distribute the plates of apple slices to each group.
3. Direct students to sample each of the apples and complete the Apple Tasting Chart. Remind them to use descriptive vocabulary (e.g., nice, good are not appropriate – crisp, juicy, sweet, tart, pear like, etc. acceptable).
4. Direct students to complete the questions at the end of the Apple Tasting Chart.
5. Take a class vote to decide what apples might be most appropriate for apple sauce.

Possible follow-up activities:

If possible arrange to go on a field trip to pick the apples at an orchard [some orchards have specific activities for school groups, for example, at Davidson Orchards in Vernon BC, field trips include: fruit picking experience (apple bag with approx. 2 lbs apples); a walk through fruit packing, storage and processing facilities; and an educational talk focusing on apples (pruning, pollination, harvesting and handling) http://www.davisonorchards.ca/tours/school_tours.htm

Have students research where and which varieties of apples are grown in BC. They could begin by reading p. 74 & 75 in Grow BC A Guide to BC's Agriculture Resources available from BC Agriculture in the Classroom <http://www.aitc.ca/bc/resources/resource-order-form>. They could also visit the following websites: <http://www.bctree.com/products/apples/index.php>; <http://www.allaboutapples.com/orchard/bc.htm>

Have students research the history of a particular apple variety. Students could create a poster with the information they find.

Take a field trip to the local grocery store and explore apple products available. Take note of the fresh apples and where they are from. Take note of products made from apples and where they are produced. Do a graph analyzing the % of these products that are local vs. imported or calculate the "food miles" and determine which one caused the least environmental impact due to transportation and which one the most.

Do a blind taste test to see if students can recognize the different apples from the flavour.

Give students a couple of apples per group. Leave one apple out on the windowsill. With the rest of the apples, have them sliced in thin round slices (not wedges). Have students use thread and needle to string them up so they can hang and dry. Let the apples dry. As a class, observe each apple to see which one lasts longer before going bad, the apple on the windowsill or the dried apples. Discuss that this process is the same that families may have followed in the time of our great grandparents. Families would have to preserve food on the farm from the summer months so that they could have food in the winter months. Families would preserve their food with the following methods: drying, bottling, smoking meat, and/or using the root cellar.

Teacher Resources:

- <http://www.bctree.com/products/apples/index.php> Information about BC apples.
- <http://www.allaboutapples.com/orchard/bc.htm> Shows all the varieties grown in BC and has a listing of BC orchards.
- See ABC's of Apples in BC available from <http://www.aitc.ca/bc/resources/resource-order-form>.
- <http://www.recipegoldmine.com/kitchart/kitchart71.html> Has information on apple varieties.
- <http://www.davisonorchards.ca/produce/apples.html> Has information on apples grown at this orchard in Vernon BC.

Name: _____

Apple Tasting Chart

Name of the apple	Size, shape, color and stem	Flesh-White, creamy, yellow? Peel-smooth, thick leathery?	Smell-does it have a particular aroma?	Taste-sweet, sour, tart Texture-crisp, juicy, mealy, hard

Apple Tasting Questions

Which apples had you tasted before?

Which apple had the most flavour?

Which apple had the strongest aroma?

What happens to the color of the flesh as it is exposed to air? What is this called?

Does the flesh of some varieties stay white longer than others?

Which variety would you think would be best for salads or fruit cups? Why?

Which variety would be best to eat fresh, out of your hand? Why?

Which varieties (do you think would be best to use for applesauce? Why?

Activity 4

Canning Apple sauce

Objective of the lesson: *students will be able to...*

- demonstrate the process of preservation for acid foods using water bath canning

Materials required:

- apples – enough so that each pair of students can make enough applesauce to fill a small canning jar.
- Equipment needed for each kitchen group:
- Canner (can be shared-7 jars will fit into each canner)
- Large pot
- Cutting board and paring knife
- Shallow pan for softening the sealing compound on the lids
- Apple corer (if available)
- Sieve, food mill or potato masher to crush cooked apples
- Tongs (for lifting lids out of hot water)
- Lid lifter- to help pick up jars out of hot water
- Jars, lids and rings (you can only use the lids once, but the jars and rings can be re-used year after year) – enough so there is one for each pair or group of 3
- Canning jar funnel or ladle to pour sauce into jars
- Oven mitts

The teaching activity:

1. Introduce Water Bath Canning as a form of preservation

Explain the basic process of Water Bath Canning and the equipment required.

Equipment: You need a large canner or a kettle style pot with a rack so that when the jars are placed in the canner they do not touch the bottom and there is enough room so that water can cover the jars by at least 2 cm. You need canning jars (also called mason jars) that are of heavier glass than most jars and can withstand high heat processing. You also need new lids which have a sealing compound that will bond with the jar edge to create a vacuum so no air can get into the jar. You need a ring to secure the lid to the jar. Other tools are jar lifters, lid lifters, and a funnel.

The Process of Water Bath Canning: Fill the canner about half full of boiling water. If using a cold pack process then the water cannot be preheated by if the food is going into the jar hot (like our applesauce) then the water can be brought to a boil. Prepare the food (note: only high acid foods like fruits, tomatoes and pickles can be processed safely in a water bath canner. Low acid foods require a pressure canner.) Pour boiling water over the lids in a shallow pan in a shallow pan. Fill your jars allowing headspace. Clean the rim of the jar. Add the lid and then the ring and place in the canner. Add additional water to the canner if necessary. Processing time once the water in the canner is boiling. When jars have been processed remove from canner and place in a draft free environment to cool.

2. Demonstrate how to make applesauce:

- a) Apple selection- Using the information gathered from your taste test, choose an apple that are sweet like Red Delicious, Gala, Fuji, Golden Delicious, Honey crisp and/or Pink Lady. By choosing a sweet apple you will not need to add sugar. It is also best if you can combine a variety of apples in a batch of sauce!
- b) Wash, core and cut apples into quarters. If you are using a food mill or sieve you can leave the peel on the apple. If you are going to use a potato masher to crush the apples once they are cooked then you will need to peel the apple.
- c) Place the apples into a large pot with 1-2 cm of water on the bottom (apple juice can also be used). Place the lid on the pot, and turn the temperature to high. Once the liquid has come to a boil, turn the heat down to a medium-low heat and continue to cook until the apples are completely cooked-they should be soft all the way through. You can test with a fork. Stir the mixture frequently and reduce the heat if necessary to prevent scorching.
- d) Strain applesauce through a sieve or food mill removing the peel OR mash apples with a potato masher.
- e) You may add sugar to taste at this stage but with sweet apples no sugar should be necessary. You may also add cinnamon.
- f) The applesauce is ready to eat OR to put into canning jar to preserve for later.

3. Demonstrate how to prepare and process jars of food for canning:

- a) Prepare your jars-One of the best ways to prepare your jars is to run them through the dishwasher and leave the jars in the dishwasher on "heated dry" until you are ready to use them. If you don't have a dishwasher, you can wash the jars in hot, soapy water and rinse them, then sterilize the jars by boiling them for 10 minutes. Keep the jars in hot water until they are used. Keeping them hot will prevent the jars from breaking when you fill them with the hot applesauce.
- b) Prepare your lids by putting them into a pan of very hot water for approximately 5 minutes or whatever the manufacturer recommends, and use tongs or a wand with a magnet on the end to pull them out.
- c) Fill the jars to within 1-2 cm from the top (this is called headspace and is required to create the vacuum seal), wipe any spilled applesauce off the rim of the jar and be sure the edge is clean and clear of any food or material (it will not seal if anything is on the rim). With tongs remove a lid from the hot water and place it (seal down) onto the top of the jar. Tighten the ring around the lid and the jar to "finger tip tight".
- d) Place the jars into the canner and lower them into the boiling water. The jars should be covered in at least 2 cm. of boiling water. Process the sauce for 15 minutes.
- e) Remove the jars from the canner using jar lifters. Place in a draft free environment to cool.
- f) When cool, check the seal, wash, label and store in a cool dark place.

4. Have students complete the Applesauce Canning Lab.

Possible follow-up activities:

Have students also dry apple slices using a dehydrator and then later make an apple pie using the dried apples-process is outlined at <http://farmgal.tripod.com/Dehydrate.html>

Discuss why many people are not likely to preserve today (e.g., improved technology, decreased costs of home freezer units, mass production, less gardening, not time, etc..) You could also discuss the pros and cons of different forms of preservation in terms of cost – e.g., canning requires jars so is very expensive the first time, but the jars can be reused so over time can save money; a freezer is very expensive to purchase but again over time can save if it is used effectively (i.e., keep fairly full); drying if using dehydrator can be expensive at the beginning too but sun drying can be very inexpensive etc.

Set up the class like a canning factory and make another batch of applesauce but run the lab like an assembly line. Have students' journal their observations and feelings about the experience and what it would be like to have this as a job.

Purchase canned applesauce and do a taste comparison and cost comparison on the home made product vs. the purchased product.

Create a name and logo for the canned applesauce and a marketing plan. Simulate having a stall at a farmer's market.

Use some of the applesauce to make Apple Butter (recipe in Appendix)

Teacher Resources:

- applesauce directions and information at:
www.pickyourown.org/applesauce.htm
- preservation information and other harvest products and gifts at:
<http://www.kidsgardening.com/growingideas/projects/july02/pg2.html>
- Successful home preserving
<http://housewares.about.com/od/canningpreserving/a/successpreserv.htm>
- Bernardin site on home canning
www.homecanning.com/can/

Activity 5

Using Food that has been Preserved - Applesauce Bread/Muffins

Objective of the lesson: *students will be able to...*

- demonstrate the use of preserved food by making a simple quickbread

Materials required:

- Oven mitts
- Measuring equipment
- Small loaf pan or muffin pans
- Mixing bowls, dry and liquid measures, measuring spoons
- Wooden spoon, rubber spatula
- Wax paper
- Ingredients for the recipe – determine the amount needed for your class
- Copies of the recipe for students

The teaching activity:

1. Review the muffin method: combine dry ingredients, make a well, add wet ingredients, stir lightly.
2. Demonstrate the Applesauce Bread/Muffin Recipe if required.
3. Have students make the recipe.

Possible follow-up activities:

- Have students find their own recipes using applesauce. Each group makes a different recipe and then bring them back to the whole class to be taste tested
- Have students research other recipes that use applesauce and create an applesauce cookbook (e.g., applesauce cake, applesauce soufflé, applesauce pancakes, etc.)
- Research the way applesauce has been used to reduce fat content in baked good. Have students do a product analysis comparing a recipe made with oil and one made with apple sauce.

Teacher Resources:

- Low Fat Apple sauce muffins
<http://www.bigoven.com/107591-Low-Fat-Applesauce-Muffins-recipe.html>
- How to reduce fat in recipes
http://www.ehow.com/how_2288797_reduce-fat-calories-recipes.html

Name _____

Applesauce bread or muffins

(makes 1 small loaf or 6-8 medium muffins)

125 ml all purpose flour
125 ml whole wheat flour
2 ml baking soda
1 ml baking powder
1 ml cinnamon
.5 ml nutmeg
.5 ml salt
150 ml applesauce
125 ml sugar
60 ml oil
1 egg
25 ml milk
30 ml chopped walnuts or raisins (optional)

1. Preheat the oven to 180°C or 350°F. Line the loaf pan with waxed paper or put paper liners in the muffin pan.
2. Measure then sift together into a large bowl the dry ingredients (flour, soda, baking powder, cinnamon, nutmeg, allspice and salt).
3. In a small bowl, combine the applesauce, sugar, oil, eggs and milk, mix well.
4. Make a well in the dry ingredients. Pour the wet into the dry, with the walnuts or raisins. Stir just until mixed. [Do not overmix.]
5. Spoon the batter into the loaf tin or muffin pan and bake for 20 to 30 minutes or until a toothpick comes out clean.

Activity 6

Role Of Pectin And Sugar And Acid In Creating The Conditions For Jelly Making An Experiment

Objective of the lesson: *students will be able to...*

- describe the basic functions of pectin, sugar and when making jelly
- evaluate various methods of making jelly

Materials required:

- copies of The Role of Pectin in Jelly Experiment
- several packages of powdered commercial pectin
- frozen apple juice concentrate, thawed
- saucepans
- white bread
- glass jelly jars or other heat-resistant glass
- large metal cooking spoons
- self-sticking labels
- small paper plates
- pens or markers
- liquid measuring cups
- dry measuring cups
- measuring spoons
- rubber scraper spatula
- small spoons
- knives

The teaching activity:

1. Using a lecturette format review the basic information about making jams and jellies:
 - The difference between jelly and jam is that jam is made with the whole fruit whereas jelly is made from the fruit juice. You can make jelly from commercial fruit juice or you can make your own fruit juice by cooking the fruit (much like the applesauce lab) then straining it through a jelly bag so you get a clear juice.
 - Four basic ingredients are needed to make good jelly: fruit juice, pectin, acid and sugar. They must be put together in proper proportion for the jelly to set.
 - Fruit juice gives jelly its flavour and colour. The juice of almost any fruit can be used. Flavourful fruits are best because the large amount of sugar in jelly dilutes the flavour of the fruit. Fruit also contributes some or all of two of the other ingredients – pectin and acid.
 - Pectin is needed to make the fruit juices jell. It is a carbohydrate found in all fruits. Some fruits have more pectin than others. Unripe fruits have more pectin than mature, ripe fruits. Unripe figs, bananas and pears, as well as sweet apples, are rich in pectin. But these foods are low in acid, another ingredient of jelly.

- Acid works along with pectin to make fruit juices jell. It also adds flavour to jelly. Acids are found in varying amounts in all fruits. Unripe fruits have more acid than ripe fruits. Apricots and strawberries are high in acid content, but have little pectin.
 - Although the ripeness of fruits has a great effect on pectin and acid contents, the following fruits are generally considered rich in both pectin and acid: tart apples, blackberries, cranberries, sour plums and grapes. Most peaches are low in both pectin and acid.
 - If the fruit you are using is low in pectin, in acid or in both, you can correct it. Pectin can be bought in either powdered or liquid form. Either kind can be used with any fruit. However, they are not interchangeable. Follow your recipe, and use the form and amount it suggests.
 - Commercial pectin is an aid in making jelly. When it is added, fully ripe fruit can be used, the cooking time is shortened and more jelly can be made from the same amount of fruit. There are also forms of commercial pectin where less sugar can be used. Commercial pectin is often preferred for home made jams and jellies because a) it is faster (you boil just 1 minute, saves energy), b) you get greater yield (less evaporation), c) better colour (the longer you cook the more the sugar caramelizes and this darkens the product), d) better flavour (not cooked so long so retains more of the original flavour), e) you can use any fruits regardless of its natural pectin content.
 - Lemon juice or citric acid can be added to fruits low in acid. They are interchangeable. The equivalent of 15 ml (1 tablespoon) lemon juice is 0.5 ml (1/8 teaspoon) crystalline citric acid.
 - Sugar helps the jelly become firm. It also adds flavour and helps preserve the jelly.
2. Have students work in their kitchen groups and do the experiment
Hand out The Role of Pectin in Jelly Experiment and review the directions with students.
 3. Answer the question and discuss the results with the class

Teacher Resources:

- the Science of Cooking – information about jelly making
http://www.exploratorium.edu/cooking/icooks/article_6-03.html
- About Pectin <http://www.pickyourown.org/pectin.htm>
- Facts About Jams, Jellies and Preserves
<http://www.howstuffworks.com/framed.htm?parent=question84.htm&url=http://www.jelly.org/facts.html>

This lesson was modified from the lesson in Food for Today-student work book

The Role of Pectin in Jelly Experiment

Background information

- Jelly is an example of a gel. A gel is a semi-rigid, elastic mass. It is a special combination of solid and liquid. The solid particles are linked together into a network, and the liquid is trapped in the spaces between.
- Pectin is a carbohydrate that occurs naturally in the cell walls of most plants, but especially in fruit. When pectin is cooked with sugar and acid, it forms a network that traps water, making a spreadable jelly.
- The right amounts of acid and sugar are needed to help pectin do its work. The correct level of acid changes the nature of the pectin so it will gel. Sugar molecules attach themselves to the water that is present, freeing the pectin molecules so they can bind with each other.

Procedure

In this experiment, our class will prepare three variations of a basic jelly, one version is made without pectin, but with 250 ml (1 cup) sugar. Another is made with pectin and 250 ml (1 cup) sugar, and the third with pectin and 500 ml (2 cups) sugar.

You will observe how these differences in ingredients affect the finished products.

If your group has been assigned A – No Pectin follow these directions

1. Put 90 ml of thawed frozen apple juice concentrate into a medium sized saucepan. Add 250 ml of cold water and 500 ml of sugar. Stir until mixed well.
2. Bring to a boil over high heat, stirring constantly.
3. Continue to cook over medium heat stirring constantly. Use a candy thermometer to determine whether it is set (it should reach 220°F/105°C) or the sheeting test Dip a cool metal spoon into the boiling jelly mixture. Raise the spoon about 12 inches above the pan (out of steam). Turn the spoon so the liquid runs off the side. When the mixture first starts to boil, the drops will be light and syrupy. As the syrup continues to boil, the drops will become heavier and will drop off the spoon two at a time. The jelly is done when the syrup forms two drops that flow together and sheet or hang off the edge of the spoon.) Remove from the heat, skim off any foam with a large metal cooking spoon.
6. Pour into a jelly jar that has been labelled "C".
7. Cool.
8. Place your jelly where it can be observed and tasted by all class members.

If your group has been assigned B – Pectin + 250 ml sugar follow these directions

1. Put 90 ml of thawed frozen apple juice concentrate into a medium sized saucepan. Add 250 ml of cold water.
2. Add 40 ml of powdered powdered pectin. Stir until mixed well.
3. Bring to a boil over high heat, stirring constantly.
4. Add 250 ml sugar all at once and bring to a full rolling boil stirring constantly for 1 minute. [A full rolling boil is one that no matter how hard you stir the boiling won't slow down.]
5. Remove from the heat, skim off any foam with a large metal cooking spoon.
6. Pour into a jelly jar that has been labelled "C".
7. Cool.
8. Place your jelly where it can be observed and tasted by all class members.

If your group has been assigned C – Pectin + 500 ml of sugar follow these directions.

1. Put 90 ml of thawed frozen apple juice concentrate into a medium sized saucepan. Add 250 ml of cold water.
2. Add 40 ml of powdered powdered pectin. Stir until mixed well.
3. Bring to a boil over high heat, stirring constantly.
4. Add 500 ml sugar all at once and bring to a full rolling boil stirring constantly for 1 minute. [A full rolling boil is one that no matter how hard you stir the boiling won't slow down.]
5. Remove from the heat, skim off any foam with a large metal cooking spoon.
6. Pour into a jelly jar that has been labelled "C".
7. Cool.
8. Place your jelly where it can be observed and tasted by all class members.

Observations

Spoon a small portion of each sample of jelly onto the appropriate paper plate, using a separate spoon for each sample. Observe the consistency of each sample. Record your observations in the appropriate blanks on the Observation Chart. Circle the letter of the variation you prepared.

Break the slice of bread into 3 pieces. Spread one piece with sample "A – No Pectin" and note how well the jelly spreads on the bread. Record your observations in the proper blank on the Observation Chart. Taste sample "A" with the bread and then taste a small amount directly from the spoon. Record your observations in the proper blank on the Observation Chart. Do the same with sample "B" and "C".

Name _____

The Role of Pectin in Jelly Experiment – Observation Chart

Observation Chart			
Characteristics	A No Pectin 250 ml (1 cup) Sugar	B Pectin and 250 ml (1 cup) Sugar	C Pectin and 500 ml (2 cups) Sugar
Consistency			
Spread ability			
Flavour			

Conclusions

What jelly had the best colour? _____

What jelly had the best flavour? _____

What jelly had the best consistency? _____

Explain the differences in quality in relation to the amount of pectin and sugar used.

What conclusions about jelly making can you make from conducting this experiment?

Activity 7

Making Fruit Jelly

Objective of the lesson: *students will be able to...*

- Demonstrate the principles of jelly making by preparing jelly from fruit that is readily available

Materials required:

Ingredients	Equipment
<ul style="list-style-type: none">• Fruits – e.g., cooking apples or crab apples, blackberries, blueberries• Bernardin No Sugar Needed Fruit Pectin• Sugar	<ul style="list-style-type: none">• Cheese cloths or jelly bags• Canner (can be shared-7 jars will fit into each canner)• Large saucepan<ul style="list-style-type: none">* Sieve, colander or funnel strainer• Cutting board and paring knife• Shallow pan for lids• Tongs and/or Jar lifter• Jars, lids and rings• Canning jar funnel or ladle to pour jelly into jars• Potato masher• Oven mitts

The teaching activity:

1. Discuss the term Gleaning with your student- Gleaning is an ancient tradition still practiced today. After farmers or fruit growers have harvested their crop, they allow people into their fields or orchards to gather the fruit they did not harvest. Discuss some of the benefits of gleaning
 - To bring farmers and consumers closer together
 - To provide a mechanism for people living on lower incomes to obtain fresh produce
 - To promote locally grown produce
 - To connect nutrition education and physical activity
 - Avoid wasting food.
2. Have students check with members of their community to see if any one has fruit that they will not be harvesting and would be will to donate to the class (people with crab apple trees often do not use the fruit) or whether there are wild blackberries in your neighbourhood. Participate in gleaning-walk to pick fruit and bring it back to the class to be made into jelly. If fruit is not available in the community then purchase apples or whatever is available and in season (concord grapes, , blueberries, blackberries) and continue with the rest of the lesson.
3. Demonstrate the Jelly Recipe if necessary.
4. Have students participate in a Jelly lab.

Possible Follow up activities

- if apples or crabapples were used put the remaining pulp through a food mill and use the resulting thick apples sauce to make Apple Butter (recipe in Appendix)
- Relating to the concept of food gleaning explore, research, and present issues of food security.
- create labels for the jelly as if it was going to be sold at the farmer's market

Have students research companies or small businesses in their community where "value added" products are made in order for families to have better economic gain for the food products they produce.

Teacher Resources:

- Jams and Jelly Basics
<http://extension.missouri.edu/explore/hesguide/foodnut/gh1461.htm>
- Gleaning
<http://www.usda.gov/news/pubs/gleaning/content.htm>
- Urban fruit gleaning-video clip
<http://www.youtube.com/watch?v=xnYSzsuLlek>

Fruit Jelly Recipe

(yield-1- 250ml jar and some for tasting)

Ingredients

Fruit (5-6 apples OR 18-20 crabapples OR 1 L blackberries, raspberries, or blueberries)
26 ml Bernardin No Sugar Needed Fruit Pectin
[note: this pectin is for no sugar or low sugar jellies. This recipe uses some sugar.]
250 ml sugar

Directions

1. Prepare juice:
 - a) if using apples or crabapples - Sort, wash, and remove stem and blossom ends of the apples; do not pare or core. Cut apples into small pieces. Add 400 ml water, cover and bring to boil on high heat. Reduce heat and simmer for 10 minutes covered. Crush and then simmer 5 minutes longer.
 - b) if using berries – Wash, place in saucepan and crush. Bring to a boil, cover and simmer 5 minutes.
2. Extract juice
Place a wet jelly bag or cheese cloth into a sieve or strainer. Place the strainer over a mixing bowl. Carefully ladle the hot fruit and juice into the jelly bag and allow the juice to drip through into the mixing bowl. This may take awhile try not to squeeze the bag as it make cause the jelly to be cloudy. Pour the juice into a measuring cup. You need 330 ml of juice to continue. [note – You can do this and refrigerate the juice to make the jelly the next day.]
3. Prepare the jars and lids
Wash the jars and rings. Place the jars in the canner, cover with water and bring to a boil. Keep the water simmering until you are ready to use the jars. The new lids should be place in hot water to soften the sealing compound.
4. Make jelly
Put the measured juice into a deep saucepan. Add Bernardin No Sugar Need Pectin and stir until dissolved. Over high heat bring the mixture to a full rolling boil [this means if you stir it, it will not stop or slow down the boiling]. Add all the sugar and stirring constantly boil hard for 1 minute. Remove from heat, skim off foam quickly.
5. Fill jars
Pour jelly immediately into sterilized hot jar leave 6 mm headspace. Clean the rim of the jar. Add lid and ring. Put excess jam into a custard cup for sampling.
6. Process Jars
Put the jars into the rack in the canner. Make sure there is at least 2.5 cm of water above the jars. Cover the canner and bring to a boil. Once boiling process for 10 minutes. Remove from canner and cool for 24 hours. Check seal, label and store.

Activity 8

Preserving herbs from the garden

Objective of the lesson:

- To have students involved in the process of preserving herbs
- Materials required:
- Ice-cube trays or small containers
- Freezer bags
- Blenders
- Cutting boards
- Knives
- Measuring equipment
- Ingredients for the Pesto Recipe

The teaching activity:

1. Brainstorm with students -all the ways they can think of preserving herbs, such as basil as that is the herb they will preserving.
2. Review the following information about preserving herbs.
 - a) Herbs can be Frozen
 - You can blanch the leaves by plunging them in boiling water for 15 seconds and then into ice water and drying on paper towels. The leaves are then laid out flat on a cookie sheet and frozen. Once frozen, they are transferred to a freezer container.
 - You can simply place 125 ml of packed leaves into a blender with a bit of olive oil and whirl them into a paste. Pour into ice cube trays and freeze. When frozen transfer to a freezer bag so that the ice cube trays can be used again. To thaw, you simply drop a few in a strainer and let the ice melt away or even just drop them frozen into a sauce or soups.
 - You can make pesto and freeze also ice cube trays. Pesto is a mixture ingredients crushed or blended to be used as seasoning in sauces. One of the most common ingredients is basil

b) Herbs can be used in Flavoured Oil.

In this method the herbs are steeped in oil in an oven for a long period of time (up to 3 hours). The long heating time is necessary to prevent botulism toxin from developing in the oil. This can cause a deadly food borne illness and therefore is not recommended for schools.

c) Herbs can be preserving in sea Salt.

- Using a 500 ml plastic container with a tight fitting lid pour a layer of kosher salt to cover the bottom. Add a single layer of basil leaves-not overlapping- and cover them with salt. Continue this process until the container was full. The salt doesn't take on any notable flavour so it recycled it back into everyday use once the basil is used.

d) Herbs can be preserved by Drying

Harvest the leaves and arrange them on a screen, to provide air circulation, or bunch them together and hang your bouquet upside down in a dry, airy place. Make sure the herbs are completely dry (otherwise the leaves will mold) before crumbling into a spice jar.

3. Demonstrate the Pesto recipe if necessary. Teach the safe use of a blender.
4. Have students make pesto and freeze it. Using the following recipe:

Possible Follow up activities

- Divide the class into groups. Have each group try a different preservation method and then compare results to decide the most desirable method for this product
- Field trip to an Herb farm
- Make flavoured vinegars
- Assign each student a different herb to research and report on.

Teacher Resources:

- How to preserve the harvest
<http://www.apinchof.com/preservebasil1106.htm>
- Preserving and drying herbs
http://www.gardenherbs.org/preserving_herbs.htm
- Bounty of Basil: How to Preserve the Harvest By Sandra BOWENS <http://www.apinchof.com/preservebasil1106.htm>

Pesto Recipe

(makes approximately 250 ml)

250 ml (1c.)	fresh basil leaves
1-2	garlic cloves
30 ml (1/8 c.)	pine nuts or walnuts
75 ml (1/3 c.)	grated Parmesan or Romano cheese (or a combination of both)
60 ml (1/4 c.)	olive oil
Salt & pepper	

1. Place the basil leaves in a blender or food processor on low to chop.
2. Add the garlic and nuts and blend on a medium setting until the nuts are minced.
3. Add the cheese and blend on low while adding the olive oil.
4. Continue to process, stopping to scrape down the sides of the container until the pesto forms a smooth paste.
5. Pour into an ice cube tray and freeze. This recipe makes approximately 2 – 4 ice cubes depending on the size of the tray. If you do not have ice cube trays, freeze in small containers the size of a single sized yogurt container.
6. If using ice cube trays, once the pesto is frozen loosen from the ice cube tray and place in freezer bags.

Activity 10

Making a recipe with frozen pesto

Objective of the lesson:

- To have students involved in the process of creating a recipe using frozen pesto from previous lab

Materials required:

- Large pot of water for pasta
- Sauce pan
- Whisk
- Colander
- Measuring equipment
- Ingredients for Creamy AI Pesto Sauce

1. Demonstrate the recipe for Creamy AI pesto Sauce if necessary
Emphasize the correct procedures for cooking pasta (i.e., rapidly boiling water, large pot, no lid, until "al dente". Also review the procedures for making a simple white sauce (e.g., combining the flour with the fat to make a roux, the fat coats the flour so that when it gelatinizes it keeps the starch grains from forming lumps, etc.)
2. Have students prepare Pasta with Creamy AI Pesto Sauce

Possible follow-up activities:

- Have students find other recipes using pesto and create a pesto cook book.
- Have students create their own recipe using this pasta recipe as a base- (e.g., for example, what "add on" ingredients could they include – left over cooked meat or chicken; sautéed vegetables OR what "toppings" e.g., grated cheese; toasted sesame seeds or almonds; etc.)
- Students could choose a side dish that could be served with pesto pasta that is made with local ingredients.

Teacher Resources:

- Recipes using pesto
http://www.cookingdebauchery.com/cooking_debauchery/2006/05/asparagus_pesto.html
http://fishcooking.about.com/od/smokebrine/r/sm_pesto_pasta.htm
<http://www.fabulousfoods.com/recipes/salads/pasta/pestopasta.html>
- the history of pesto http://parco-basilico.provincia.genova.it/eng/Pesto_PBP.html
- pasta information http://www.canadianliving.com/food/cooking_school/all_about_pasta.php

Pasta with Creamy Al Pesto Sauce for 2

250 gm pasta*
25 ml butter
25 ml flour
1 ml salt
Pinch pepper
250 ml milk
1-2 ice-cube blocks of pesto, defrosted

1. Cook the pasta. Fill a large pot three quarters full of water and bring to a boil (add in 5 ml of salt and 5 ml of oil). Once the water comes to a boil add in the pasta and cook it for the length of time outlines on the outside of the box. Drain in a colander.
2. Make the sauce.
 - Make a roux by melting the butter in saucepan over medium heat.
 - Blend in the flour with a whisk, add the salt and pepper.
 - Over whisk in milk and cook and stir until the mixture is smooth (lump free) and has thickened.
 - Add in the defrosted pesto and blend with a wire whisk.
3. Combine sauce and cooked pasta and serve immediately

[Hint: Try to time it so that the pasta is finished cooking the same time that the sauce is ready so that the dish can be served hot.]

*Almost any pasta will do but long smooth pastas like spaghetti, vermicelli, spaghettini, linguine or fettuccine are good with smooth sauces like this one that will cling to them.

Appendix

Apple/Crab-apple Butter

(yield – 2 250ml jars)

500 ml	sieved apple/crabapple pulp (or a combination of pulp and apple sauce)
25 ml	orange juice
5 ml	grated orange rind
165 ml	sugar
1 ml	cinnamon
f.g.	cloves
f.g.	nutmeg

1. Prepare the jars and lids

Wash the jars and rings. Place the jars in the canner, cover with water and bring to a boil. Keep the water simmering until you are ready to use the jars. The new lids should be placed in hot water to soften the sealing compound.

2. Prepare the Apple/Crabapple Butter

a) Combine pulp with orange peel and juice in a large saucepan.

b) Place over high heat and bring to a boil, stirring constantly.

c) Reduce heat to medium and boil gently, stirring frequently to prevent scorching, until mixture thickens to desired consistency.

d) Stir in sugar and spices and return mixture to a boil, stirring constantly.

3. Fill the Jars

a) Ladle into hot sterilized half-pint (250 mL) jars, leaving ¼ inch (6 mm) headspace.

Remove air bubbles with a narrow rubber spatula or plastic knife. Add additional crab-apple butter, if necessary, to maintain headspace.

b) Wipe jar rims thoroughly with a clean damp cloth.

4. Process the Jars

Put the jars into the rack in the canner. Make sure there is at least 2.5 cm of water above the jars. Cover the canner and bring to a boil. Once boiling process for 15 minutes. Remove from canner and cool for 24 hours. Check seal, label and store.

(Recipe is modified from ATCO Blue Flame Kitchen – www.atcoblueflamekitchen.com)

Growing herbs

If you don't have an herb plot in your schoolyard or a community garden, raise herbs indoors using containers or window boxes

Materials required:

- Herb seeds
- Pots or containers
- Soil less Potting Mix
- Fertilizer

The teaching activity:

NOTE: Make sure you have a sunny windowsill where your herbs will survive. A south or southeast window would be perfect if it gets at least 5 hours of sun per day and is away from drafts. Some herbs will definitely grow better in the house than others. Lavender, Cilantro, Sage, Oregano, Parsley, Chives, Tarragon, Basil and Mint are smart choices if you plan to start your indoor garden from seed. Since space will likely be a limiting factor you need to be sure to consider what you will be doing with the herbs you want to grow

- Select a narrow container that will look good on your window-sill, one that has holes in the bottom or one where holes can be made. This is absolutely necessary for drainage or your plants will die. Fill it with a soil less mix, growing medium (get this from a garden center) and plant the seeds you have chosen. Water well.
- You will want to put all of this into a plastic bag until you get these little plants growing well, because if they were to dry out when they are tiny they will die. Do not seal the bag; the plants want some air too. Remove the plastic bag once the plants have their first leaves.
- Snip and use your plants often to encourage them to grow full and bushy BUT never trim more than 1/3 of the plants foliage.

Possible Follow up activities

- Students can explore another preserving activity by drying herbs. Use the herbs for dry soup mixes.
- Students could transplant these herbs to their own gardens at home in the spring.
- Invite an elementary school class to do a herb growing buddy project. This works well about 6 weeks before something like Mother's Day when the elementary students can take their herb gardens home to mom with a little recipe book of suggested uses.

Teacher Resources:

- Creating herb gardens
<http://www.kidsgardening.com/growingideas/projects/may04/pg1.html>
- How to grow herbs on your window sill
http://gardening.about.com/od/vegetablepatch/ht/window_herbs.htm?p=1
<http://ezinearticles.com/?Grow-Organic-Herbs-On-A-Window-Sill---Easily&id=1107428>

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- Apple varieties and descriptions <http://www.allaboutapples.com/varieties/index.htm>
- How to make apple jelly <http://www.pickyourown.org/applejelly.htm>
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