BC Agriculture in the Classroom

"How cam'st thou in this pickle?"

(Alonso to Trinculo in The Tempest, Act V sc i)

Pickling as Food Preservation

Delia Downing

Agriculture in the Classroom, Summer Institute July 2008
Edited by Gale Smith

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.aitc.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.

www.atic.ca/bc

Table of Contents

Synopsis 4
Rationale 4
Unit Overview 6
Activity 1 9
- P.I. (Pickle Investigators) Webquest 9
- P.I. (Pickle Investigators) Answer Key 9
- Pickle Matching Answer Key 12
- PI (Pickle Investigators) Case Cards 13
- Pickle Review 15

Activity 2 16
- Preserving by Pickling – Water Bath Canning 16
- Pickled Beans and Carrots Recipe 16

Activity 3 18
- Preserving by Pickling – Refrigerator Pickles 18
- Bucket Refrigerator Pickles 18
- Refrigerator Pickled Carrots 18

Activity 4 19
- Preserving by Pickling – Freezer Pickles 19
- Bread and Butter Style Freezer Pickles 19
- Freezer Pickled Mixed Vegetables 19

Activity 5 20
- Preserving by Pickling – Other Pickle Products 20
- Piccalilli 20
- Salsa 20

References 21
Appendix 22
- Oral presentation rubric 22
- Pickles Wordsearch 23
- Pickles Word Search Solution 25

Synopsis

This unit will expand on the idea of pickling as food preservation. The students will be introduced to the history of pickling; will review the safety requirements when doing food preservation; will compare the nutritive value of pickled foods to fresh foods; will study the science behind using pickling as a food preservation technique; and will study the vast array of foods that can be preserved by pickling. The unit will culminate with the students participating in various pickling labs.

This unit has cross-curricular possibilities in the study of the history of pickles and how without them many explorers would have succumbed to scurvy before making their discoveries. As a topic in English, Shakespeare is attributed with the first use of the word "pickle" in the figurative sense of a "sorry plight". The etymology of the word can also be researched and documented.

For science, students will learn how a combination of salt and an acid can preserve food and why. The comparative nutrition of the pickles can also be discussed which is suitable for Foods and Nutrition as well as how to preserve food using pickling. Students will also be encouraged to use locally harvested foods for the pickles that are made in class. This unit will include an emphasis on the need to "put food by" as a way to keep local products through the non-productive months of the year.

Rationale

The authors of The Joy of Cooking state: "It is a thrill to possess shelves well stocked with home-canned food. In fact, you will find their inspection…and the pleasure of serving the fruits of your labor comparable only to a clear conscience or a very becoming hat." (pp 746) Having never owned a "very becoming hat" I can't relate so much to that, but the pride of having a well stocked canning room is something to which I can relate. My conscience is clear as I put by food from my garden, or local produce purchased from farmers' markets and fruit stands

When I was young, I helped my mum canning tomatoes and peaches, freezing beans and peas, and making jams and jellies. As I grew more accomplished I took on the role of making pickled beans and carrots and canning homemade salsa from the bounty of tomatoes that we grew. I have always enjoyed homemade pickles but I have never known the science of pickles as food preservation, nor was I aware of the history of pickles and what could be seen as the pivotal role pickles played in the exploration of the new world.

For me I have always enjoyed eating pickles, but I have only ever made pickles from the beans and carrots I grew in my garden. This recipe does not require the fermentation of the pickle, but produces a tasty, crunchy pickle. In this unit it is hoped the students would gain a better understanding of why food is preserved. Food preservation is a precise science and the importance of following safety requirements will be emphasized. Different technologies such as pressure canners versus water baths will be discussed as will any new technologies on the market today.

The Foods and Nutrition IRP 8-12 includes food preservation in grades 9-12. This unit is intended for a Grade 10 Foods class. In Grade 10 science students are asked to research food preservation as a chemical reaction (IRP Science Grade 10, pp81) which adds to the cross curricular possibilities of the unit. Students in Grade 10 are also studying the impact of explorers on the aboriginal populations of Canada in the early 1800s. The discussion of smoking and salting as food preservation can include a discussion on early settlers and traditional food preservation techniques.

By the end of the unit it is hoped students will have a greater understanding of pickling techniques as well as the why behind the existence of this beloved food. The art of food preservation needs to go hand in hand with the push to buy and consume locally grown foods. If one is capable of preserving the food from the local farms and gardens, it is possible to eat local year round.

> Scientifically, a pickle is any perishable ingredient that has been preserved in brine. But pickling isn't only about science it's about tradition, community, economy, responsibility, and family. Our ancestors - no matter what part of the globe they hailed from - pickled to preserve fruits, vegetables, meat, and fish. They pickled to save money. They pickled, together with family and friends, to assure safety and make the most out of their foods. Harsh winters, humid tropical climates, short growing seasons, poor soil, fast-spoiling staples (such as fish), even summer abundance and gardening pride - all have spawned the arts of pickling and food preservation.
>
> ~www.nyfoodmuseum.org

Unit Overview

Subject: Foods and Nutrition

Unit Topic: Food Preservation: Pickling

Grade: 10

IRP Reference pages: Home Economics: Foods and Nutrition pp. 40

General goals/learning outcomes:

A2: apply appropriate precautionary measures and emergency response associated with food preparation, including – handling equipment and hot foods safely (e.g., to prevent fires, electrical shocks, cuts, steam scalds, burns)

A3: demonstrate the ability to accurately evaluate and follow recipes using a wide variety of food preparation techniques and equipment

B2: choose and demonstrate appropriate cooking methods for particular products: use a variety of cooking methods to preserve food

Activity Title	Specific Objectives TLWBAT	Method	Resources	Evaluation Strategies	
1.	PI - Pickle Investigation	- demonstrate an understanding of the history and the whys behind pickling. - describe concepts associated with food preservation and pickling.	- PI webquest activity -Students are put into pairs or small groups and are given a "case" to research - Each group will then present their findings to the rest of the class.	- PI webquest case cards - book computer lab time - poster paper - coloured pens - Pickle Review Matching	- assessment according to a rubric for oral presentation, included. - Pickle Review Matching
2.	Preserving by Pickling – Water Bath Canning	- see how the vegetables are prepared and how to process the product - prepare and process Pickled Beans & Carrots	- Teacher demonstration - Lab activity	- Recipe sheet (included) - recipe ingredients and equipment	- regular lab assessment
3.	Pickling without canning – refrigerator pickles	- prepare Refrigerator Pickled Carrots Or Bucket Pickles	- Lab activity	- Recipe sheet - equipment and ingredients	- regular lab assessment
4.	Pickling with out canning – freezer pickles	- prepare	- Lab activity	- Recipe sheet - equipment and ingredients	- regular lab assessment
5.	Pickling – Other products in the pickle family	- prepare	- Lab activity	- Recipe sheet - equipment and ingredients	- regular lab assessment

Other Possibilities for a Pickling Unit

- • If there is a local pick your own vegetable farm you could take students on a field trip to pick the vegetables required for their pickles.
- • If there is a local farmers' market you could go on a field trip to purchase fresh local ingredients for your pickles.
- • Be prepared to modify the recipes based on local availability. Instead of beans in the Pickled Beans and Carrot recipe you could use zucchini wedges. In the winter, Pickled Beets might be more appropriate.
- • Have a vinegar tasting. So many recipes for pickles call for vinegar (e.g., regular white vinegar, cider vinegar, rice vinegar, wine vinegar, balsamic vinegar). Students could learn to discriminate among the various kinds.
- • Have students interview elders in their community to find out how and what was used for pickle making in the past.
- • If there is a heritage site or agricultural museum in your area, see if they have information on early pickle making.

Extended or Related Activities

- • Take a field trip to the local farmers' market to see if there are any local producers of pickle products.
- • Have student make flavoured vinegars, develop labels and a marketing plan as an example of the way farm families produce "value added" products.
- • Have students plant vegetables and herbs in a school garden that could be used for pickling.

Activity 1

P.I. (Pickle Investigators) Webquest

- This activity requires access to a computer lab. In advance of the lesson photocopy the case cards.
- Divide the class according to table groups or into groups of three to five
- Explain that they are P.I.'s (Pickle Investigators) and each of them has to solve a case and then report on their case at the next P.I. (Pickle Investigators) Conference to be held next class. They have to solve their case decide how to present their "findings" and they can be creative in their presentations.
- Each group is given one of the following cases. Remind groups that they are operating as a team and they should divide up the tasks and use their time efficiently.
- Each group presents their "findings" to the rest of the class. [Use the presentation scoring rubric in the Appendix]
- Have students complete the Pickle Matching sheet as a way to check their knowledge.

Note: Exploratorium.edu posted use policy says: "Unless otherwise stated, you may print or download Exploratorium digital assets for informational, educational and other noncommercial purposes provided you include the following copyright notice adjacent to the resource, with the URL as a live link in digital environments." If you are unable to book a computer lab you could consider downloading the information for each group.

P.I. (Pickle Investigators) Answer Key

Case 1

- Pickles are foods soaked in solutions that help prevent spoilage.
- There are two basic categories of pickles. 1) pickles preserved in vinegar, a strong acid in which few bacteria can survive 2) pickles soaked in a salt brine to encourages fermentation—the growth of "good" bacteria that make a food less vulnerable to "bad" spoilage-causing bacteria.
- Could include: a) change taste and texture of the food b) preserve food so that it can be eaten later c) support local agriculture d) cultural experience e) makes food more nutritious and easier to digest. [During fermentation, bacteria produce vitamins as they digest vegetable matter. If the salt causes a vegetable to lose water, the fat-soluble vitamins will become more concentrated.] f) fermentation can also transform inedible—even poisonous—foods into delicious, healthful ones. [Many communities across Africa and South America wash, grind, and ferment the toxic, cyanide-containing cassava tuber to produce flour. Neolithic peoples in Europe fermented nettles, cardoons, and new growths of willow trees to make sour soups.] g) avoid wasting food.
- It was originally pickle juice. Hundreds of years ago, the Chinese and Malaysians used the brine from pickled fish as dipping sauces. Known as kachiap, the sauce had a savory taste, flavored by the brine spices and fish.

Bonus: There are variation but this one is most common:

Peter Piper picked a peck of pickled peppers,
A peck of pickled peppers Peter Piper picked.
If Peter Piper picked a peck of pickled peppers,
Where's the pickled peppers Peter Piper picked?

Case 2

- Yes. Special conditions are created pickle crock allow "good" bacteria, called lactic acid bacteria, to grow. They digest sugars in the cucumbers and produce lactic acid. This acid controls the spread of spoilage microbes because as they digest the sugars, they remove a potential food source for bad bacteria.
- At a certain salt concentration, lactic acid bacteria grow more quickly than other microbes, and have a competitive advantage. Below this "right" concentration, bad bacteria may survive and spread more easily, possibly out-competing lactic acid bacteria and spoiling your pickles
- Oxygen encourages the spread of spoilage microbes which can spread to spoil the entire batch of pickles. So keep your pickle crock covered. The ideal temperature range for lactic acid bacteria—and successful fermentation—is 70° F–75° F. If it's too chilly or too toasty in the room, other microbes may gain a competitive advantage over lactic acid bacteria. Additionally, temperature influences the speed of fermentation: The lower the temperature, the slower the pickles will ferment. By slowing fermentation, you can gain more control over the process.
- The acid in the vinegar creates the right pH to prevent the growth of microorganisms.

Bonus: When you put vegetables in salty brine, the water inside the vegetables flows out into the brine, making the pickles crunchier. This passage of water, known as osmosis, occurs because of the tendency of substances to move through a membrane—like a cucumber skin—from an area of high concentration to an area of low concentration. In this case, the salty brine solution has a lower water concentration than the water inside fresh vegetables, so water will flow out of the vegetables.

Case 3

- Ireland – corned beef; Scandinavia – pickled herring.
- Korea – kimchi; Japan - miso pickles, nukamiso, Shoyuzuke, Fukujinzuke, Senmaizuke ; China - salted duck eggs , Zha Cai
- India – chutneys, achar a pickle with fish as the major ingredient
- Lebanon - Pickled Eggplant Stuffed with Garlic

Bonus: Southern United States. The pickles are sliced and breaded and deep fried.

Case 4

- No one knows for sure. It is said that pickles played an important role in Colombus' discovery of America in 1492. The sailors on Columbus did not suffer from scurvy. It has been speculated that this is because Colombus' ship stocker, a man named Amerigo Vespucci, stored ample quantities of vitamin C-rich pickles on the Niña, Pinta, and Santa Maria, that helped to prevent scurvy outbreaks on the historic voyage across the Atlantic. However other historians have pointed out that Columbus' voyages were often shorter than some of the other explorers and perhaps this accounted for the fewer cases of scurvy. It wasn't until Cook's voyages in the 1700's that ships began carrying fresh fruit, in particular citrus fruits, and sauerkraut deliberately to prevent scurvy.
- 1858. John Mason designed and patented the first Mason jar. Made out of heavier weight glass than normal jars, these were developed to withstand the high temperatures necessary for processing pickles. When the patent expired in 1879, manufacturers of such jars continued to use the term "Mason" on their product.
- Heinz, a new company that wanted to promote its "57 varieties" of pickles, preserves, and other jarred foods, introduces the pickle pin at the Chicago World's Fair in 1893. The pickle pin resurfaces at world fairs and expositions to this day, marking it one of the most successful marketing efforts in American History.
- Many communities across Africa and South America wash, grind, and ferment the toxic, cyanide-containing cassava tuber to produce flour.

Bonus: New York City?

Case 5

- Too little or too much salt, over cooking or over processing
- Garlic contains sulfur compounds which may react with copper to form copper sulfate, a blue or blue-green compound. The amount of copper needed for this reaction is very small and is frequently found in normal water supplies. Use the pickles but discard the garlic. Also, garlic bulbs that have not been properly cured before marketing or bulbs that have been refrigerated will turn green or blue-green. Storing garlic bulbs for 32 days at or above 70-80 degrees F. before use will prevent formation of green or blue-green pigments.
- Table salt was used instead of pickling salt. Table salt contains iodine, a chemical that can darken pickles. Anti-caking agents in table salt cause cloudiness in your brine.
- If pickles are shriveled either the vinegar or salt solution too strong or the pickles were overcooked or over processed.

Bonus: Yes you can make a pickle battery. For directions see: http://www.exploratorium.edu/cooking/pickles/activity-kosher_dill.html

Pickles contain salt water, which is rich in charged particles called ions. The aluminum and the graphite react with these ions, setting off an electrical tug-of-war between the two materials. The material with the stronger pull—aluminum—takes electrons away from the graphite, triggering a flow of electrons around the circuit. This current powers the buzzer. Most common batteries work on the same principle as a pickle battery works. They use two metals suspended in an ion-rich liquid or paste to separate electric charge, and create an electrical current around a circuit.

Case 6

- High acid. The preserving method is water bath canning and the process is called “heat processing”.
- The correct term is "heat processing". The heat and acid kills any microorganisms in the food. The vacuum seal prevents microorganisms and air from entering and contaminating the food. As the filled jar is heated, its contents expand and internal pressure changes take place. These changes allow gasses or air to be "vented" from the jar. After processing, the atmospheric pressure outside the jar is greater than inside due to "venting". This pressure difference causes the lid to be pulled down onto the jar causing a vacuum seal to be formed.
- Once the jars are cool, you can test for vacuum seals a) by tapping the top of the jar with a spoon. You should hear a bell-like tone, not a “clunk”; b) by checking the lid. It should be concave; a convex lid is a sign of a bad seal; and c) the lids should not move when you press on them with your finger.
- Store the jars of canned pickles in a cool, dark place, such as a cupboard or a basement. Eat them within 1 year. Once the jar has been opened, keep it in the refrigerator.

Bonus: Yes you can make pickles by freezing. The recipes have more sugar and the pickles have a shorter shelf life when removed from the freezer. They are crispest immediately after they are thawed, so it is recommended that small containers be used.

Pickle Matching Answer Key

_13____Acetic acid
__8___Bacteria
__5___Brine
__10___Canning
__11___Chutney
__14___Fermentation
__3___Headspace
___2__Ketchup
__12___Kimchi
___15__Lactic Acid
__4___Pickle
__6___Preservation
___7__Relish
___2__Salt
___9__Vinegar

PI (Pickle Investigators) Case Cards

Case 1 - Don't Get in a Pickle Because You Don't Know What It Is

- Find a definition of a pickle.
- Describe the two basic categories of pickles.
- Find as many reasons to pickle as you can.
- How is ketchup related to pickles?

Bonus: Find the famous tongue twister about pickled peppers?

Start your investigation at: http://www.exploratorium.edu/cooking/pickles/index.html

Case 2 - How Do You Win the Race Against Micro-organisms When You Make Pickles?

- In fermented pickles, is it true that good bacteria can fight the bad guys? How?
- In fermented pickles, how does salt help out?
- In fermented pickles, what do we need to know about oxygen and temperature?
- How do we win the race against micro-organisms in pickles preserved in vinegar?

Bonus: What gives a pickle its crunch?

Start your investigation at: http://www.exploratorium.edu/cooking/pickles/index.html

Case 3 - How to be Cool on a Case

- Your case takes to you Ireland and Scandinavia name foods you might find pickled there.
- Your case takes to you Korea, Japan and China name some popular pickles you might order in a restaurant there.
- Your case takes to you India name and describe some pickles you might find there.
- Your case takes to you to Lebanon name and describe a picklesyou might find there.

Bonus: Your case had someone eating deep fried dill pickles where would you be?

Start your investigation at: http://www.exploratorium.edu/cooking/pickles/index.html

Case 4 – Sorting Through the Evidence

- You've been hired to settle an argument about prevention of scurvy. Was it limes or pickles that came first?
- Who designed the canning jar that allowed the preservation of pickles by canning? When?
- What company produced a pin that had a pickle on it for the Chicago World's Fair?
- What toxic vegetable when pickled by the fermentation method becomes edible?

Bonus: What city celebrates International Pickle Day?

Start your investigation at: http://www.exploratorium.edu/cooking/pickles/history.html and

http://www.nyfoodmuseum.org/_ptime.htm

Case 5 – Troubleshooting

- Why do some pickles lose their crunchy texture?
- Why does some garlic turn blue green in pickling?
- Why did the pickle brine turn dark and cloudy?
- Why are the pickles shriveled?

Bonus: Your client has been accused of using a dill pickle to create a battery. Is this possible?

Start your investigation at: http://www.exploratorium.edu/cooking/pickles/tips.html

http://www.fourh.purdue.edu/foods/Pickles%20and%20relishes%20frame1.htm

Case 6 - Don't Get in a Pickle Over Canning

- Are pickles considered high or low acid? What canning method is used?
- What is the correct term to describe what happens in canning? What two things does this accomplish?
- How can you prove a jar of canned pickles has sealed?
- How should you store your canned pickles?

Bonus: Can you make pickles by freezing? What is the difference in the recipes?

Start your investigation at: http://www.exploratorium.edu/cooking/pickles/index.html

www.homecanning.com

http://www.four-h.purdue.edu/foods/Pickles%20and%20relishes%20frame1.htm

Pickle Review

Name _____

Match the Definition with its Term

_____Acetic acid	1. a thick sauce, made with tomatoes, that started out as pickle juice
_____Bacteria	2. don't use the table kind of this ingredient or you pickles may be dark and cloudy
_____Brine	3. the space left at the top of a canning jar to create a vacuum seal
_____Canning	4. a food soaked in solutions to help prevent spoilage
_____Chutney	5. a solution containing a significant amount of salt, used for curing, preserving, and developing flavour in food
_____Fermentation	6. to prepare food for future use
_____Headspace	7. a spiced side dish considered to be a variation of a pickle
_____Ketchup	8. a microorganism that can be "good" or "bad"
_____Kimchi	9. a sour-tasting liquid that is a key ingredient in one type of pickling
_____Lactic Acid	10. a heat process used to preserve food in jars or cans
_____Pickle	11. a sweet and spicy relish made from fruit, spices, sugar, and vinegar often common in Indian cooking
_____Preservation	12. a pickle that is regarded as the national dish of Korea
_____Relish	13. a colorless acid with a pungent odour that is the main component of vinegar
_____Salt	14. a method of making pickles that involves the growth of "good" bacteria to make a food less vulnerable to "bad" spoilage-causing bacteria
_____Vinegar	15. a bi-product of fermentation process which turns cucumbers into pickles.

Activity 2

Name _____

Preserving by Pickling – Water Bath Canning

Pickled Beans and Carrots Recipe

Equipment:	Ingredients:
1. 2-250 ml canning jars with screw bands and lids 2. paring knife 3. three dish towels 4. canning jar lifter 5. tongs 6. rack for water bath canners 7. water bath canner	250 g fresh, green beans 250 g small, fresh, carrots 1 clove of garlic 1 sprigs of fresh dill (or 5 ml dried) 1 ml cayenne pepper 15 ml pickling salt 125 ml white vinegar (5%) 125 ml water [note: if fresh beans are not available just use all carrots]

Method:

Step one: Preparing the jars and the canner.

1. Examine jars; they must be free of nicks, cracks, sharp edges or any other flaw.
2. Wash jars and screw bands in hot soapy water and rinse or put through the dishwasher. Invert the jars on clean folded towels until ready to use.
3. The jar lids must be scalded to soften the sealing compound. Follow manufacturers directions (usually this involves putting the lids into a small pan and covering with boiling water).
4. Fill the canner with about 12 cm of water so that it will cover the jars. Put the canner on the stove and bring to a boil.

Step two: Preparing the vegetables

1. Using a paring knife, trim about 1cm from the top and bottom of each bean. Trim the beans so that they will fit into the jar standing up.
2. Peel the carrots if necessary, otherwise just scrub them well using a plastic vegetable scrubber. Trim the stem end off and trim so that they will fit in the jar standing up. If the carrots are quite large, slice them lengthwise in half or quarters.
3. Peel the garlic cloves and set aside.

Step three: Preparing the brine

1. In a medium, heavy saucepan combine the vinegar, water and salt. Let it come to a boil and let it simmer gently while the vegetables and jars are prepared.

Step four: Processing

1. Into each jar place one garlic clove, one sprig of dill, and 1ml of cayenne pepper
2. Place the beans and carrots into the jar standing up. Pack the jars tightly, lightly tapping or shaking the jar to create space. Trim if necessary.
3. Using a ladel, pour the simmering brine over the beans and carrots in the jars, leaving about 1.5 cm head space. Wipe the top edge of the clean.
4. Using clean, sterile tongs to lift the lids, place the scalded lid on the jar with the sealing composition next to the glass. Screw the bands **finger tip tight.** Do not over tighten and do not use bands which are rusty or which have dented edges. They may cause sealing failures.
5. Being careful to open the lid to the canner away from you, place the water bath rack onto the edge of the canner over the now boiling water, with the handles outside the canner**.** Using the canning jar lifter, or oven mitts, carefully place jars into the water bath rack. Using oven mitts slowly and carefully lower the rack into the canner and replace the lid.
6. When the canner returns to a boil, set a timer for 10 minutes, (or longer depending on the elevation of the kitchen). Keep the water at a rolling boil.
7. After processing, using oven mitts, remove the rack from the canner and hang it on the edge of the canner. Using the canning jar lifter or oven mitts, being careful not to tip the rack, remove the jars from the rack and place them, out of a draft, on a folded dish towel. Do not cover the jars. **Do not tighten the screw bands after processing or turn the jars upside down.**

Test for Seal and Store

1. When the jars are cooled you can test for the seal in three ways:
   - Feel the seal: Press the centre of the lid, if it is down and will not move the jar is sealed.
   - Hear the seal: Tap the top of the jar, a clear ringing sound means a seal. An unsealed jar sounds hollow or empty.
   - See the seal: If the lid is curved down, the jar is sealed.
2. If your jar has not sealed it can be kept in the fridge, but should be consumed at the earliest opportunity.
3. Label and date jars. Sealed jars will keep in a cool dark place for quite a long time. They taste better if you leave them at least one month. However once you taste these, you will be lucky if they last a day.

Activity 3

Name _____

Preserving by Pickling – Refrigerator Pickles

Bucket Refrigerator Pickles

(This recipe got it's name because it was designed to be made in an ice cream bucket. This is a smaller version for a 500 ml container like the ones used for yogurt or sour cream.)

Ingredients

1/8medium onion
1-3sliced cucumbers (enough to fill the container 1.5 cm (1/2 inch) from the top
125 ml (½ cup) sugar
125 ml (½ cup) vinegar
15 ml(1 Tbsp.) course salt (also called pickling salt)
1 ml (¼ tsp.) mustard seed
1 ml (¼ tsp.) tumeric

Method

1. Dice the onion and cube or slice the cucumbers and put them in the bucket.
2. Put all the rest of the ingredients into a saucepan and bring to a boil over medium heat. Boil for 1 minute then remove from heat and allow to cool.
3. When the mixture is cool, pour into the container. Cover and put in the refrigerator.
4. Stir once a day for 5 days.

Tips:

- Refrigeration, along with acidity, preserves the pickled products.
- Refrigerate prepared pickles within 1 hour of recipe completion. Do not let pickles stand at room temperature.
- Store in the refrigerator up to 3 months.

Refrigerator Pickled Carrots

(makes 1-500 ml jar or 1-250ml jars)

Ingredients

½ kg (1 lb.) Carrots
80 ml (1/3 c.)Pearl onions
2 sprigs Thyme
2 cloves Garlic
1 Dried hot chili peppers
1 Bay leaf
2 ml (1/2 tsp.) Mustard seeds
2 ml (1/2 tsp.) Peppercorns
200 ml White wine vinegar

Method

1. Wash, peel if necessary, and cut carrot into sticks the size that will stand up in the jar leaving about 1.5 cm (1/2 inch) from the top.
2. In a sauce pan of boiling salted water, cook carrots until tender crisp (about 5 minutes). Drain and rinse under cold water.
3. Put carrots, onion, thyme, garlic, chili peppers, bay leaf, mustard seeds and pepper corns into jar. (if you using two jars divide ingredients evenly between the 2 jars)
4. Cover with vinegar. Add lid. Refrigerate for 5 weeks before using.

Activity 4

Name _____

Preserving by Pickling – Freezer Pickles

Bread and Butter Style Freezer Pickles

(makes one 500 ml size freezer container)

Ingredients:

2-3 small field cucumbers
½ onion
7 ml pickling salt
95 ml sugar
6 ml pickling spice
1 ml celery seeds
f.g. hot pepper flakes

Method:

1. Scrub cucumbers and trim off ends.
2. Thinly slice cucumbers and onion. Place in a bowl. Sprinkle with salt and to coat. Let stand for 2 hours.
3. Drain vegetables but do not rinse. Pack into freezer container.
4. In saucepan, bring sugar, vinegar, pickling spice, celery seeds, and hot pepper flakes to boil. Reduce heat and simmer for 5 minutes. Strain and pour over vegetables to cover. Let cool.
5. Cover and freeze for up to 2 months.
6. Thaw in the refrigerator.

Freezer Pickled Mixed Vegetables

(makes one 500 ml size freezer container)

Ingredients:

180 ml	Sliced cucumbers
50 ml	Chopped celery
¼	Medium Onion, sliced
1/8	Green pepper, cut in strips
125 ml	Cauliflower, cut in-bite sized pieces
¼	Large Carrot, sliced
5 ml	Salt
60 ml	Sugar
90 ml	Vinegar

Method:

1. Prepare the vegetables and place in a bowl. Toss with salt to coat and let stand overnight. Drain.
2. Boil sugar and vinegar. Cool. Put vegetables into a freezer container. Pour sugar and vinegar over vegetables.
3. Freeze.
4. Thaw in the refrigerator to use.

Activity 5

Name_____

Preserving by Pickling – Other Pickle Products

Piccalilli

Makes 2 – 250 ml jars – 2 day lab
(This relish was made in late autumn to use up the bits of produce from family gardens..)

Ingredients:
350 ml finely chopped cabbage
250 ml finely chopped unpeeled green tomatoes
100 ml chopped onion
75 ml chopped green pepper
75 ml chopped red pepper
15 ml pickling salt
15 ml pickling spice
15 ml peeled, coarsely chopped fresh ginger root
7 ml mustard seed
75 ml sugar
1-2 ml turmeric
225 ml vinegar
125 ml water

Method:

1. In a glass or stainless steel bowl, combine cabbage, green tomatoes, onion, red and green pepper with pickling salt. Stir to mix well, cover and let stand overnight.

Preserving day

1. Stir vegetables then drain in a colander and rinse with cold water. Drain as much water as you can.
2. Place vegetables in a large saucepan,
3. Tie pickling spice, gingerroot and mustard seed in a a square of cheesecloth to create a spice bag. Add spice bag vegetables.
4. Add sugar, turmeric, vinegar and water to vegetables, cover and bring to a boil.
5. Remove the lid and boil 5 minutes.
6. Reduce heat. Simmer 20 more minutes. .
7. Remove spice bag.
8. Ladle relish into sterilized jars. Remove air bubbles by sliding a rubber spatula or table knife between the glass and the food. Wipe jar rim clean. Add prepared lid and ring. Tighten to finger tip tight.
9. Process in water bath canner 10 minutes.

Salsa

makes 2 – 250 ml jars
(Salsa means sauce. This a common version of tomato salsa. Be careful when handling hot peppers. Wash you hands well or use gloves and do not touch your eyes.)

Ingredients:
8 plum tomatoes (washed & coarsely chopped)
1 onion (chopped)
4 garlic cloves (minced)
½ green pepper (seeded & chopped)
1 – 2 japeneno or Serrano peppers (seeded & chopped)
50 ml vinegar
30 ml fresh cilantro leaves (chopped fine)
5 ml salt
5 ml sugar
30 ml tomato paste

Method:

1. Place all ingredients in a saucepan and bring to a boil. Reduce heat and simmer 15 minutes stirring occasionally.
2. Ladle into sterilized jars. Clean lip of jar. Add prepared lids and process in a water bath canner 10 minutes.
3. Remove from canner. Cool. Check seals. Label and store in a cool, dark place.

References

1. Rombauer, Irma S, and Rombauer Becker, Marion The Joy of Cooking, _November 1973
2. www.nyfoodmuseum.org/_ptime.htm
3. www.ianrpubs.unl.edu/sendIt/ec443.pdf
4. www.ilovepickles.org
5. www.saskschools.ca/curr_content/science10/unitc/preserv.html#assignment
6. www.hc-sc.gc.ca/fn-an/nutrition/fiche-nutri-data/nutrient_value-valeurs_nutritives-table18-eng.php
7. www.exploratorium.edu/cooking/pickles/index.html
8. www.chm.bris.ac.uk/webprojects2001/anderson/preservatives.htm
9. www.freshpreserving.com/filebin/pdf/howto/Pickles_Problem_Solver.pdf
10. www.uen.org/Lessonplan/preview.cgi?LPid=1169
11. http://oklahoma4h.okstate.edu/aitc/lessons/intermed/keeps.pdf
12. www.agclassroom.org/ok
13. www.canningpantry.com/canning-equipment.html
14. www.kidsgardening.com/growingideas/projects/july02/pg3.html
15. www.freshpreserving.com

Appendix

Oral presentation rubric

Rating	Criteria
Excellent	Entertaining and informative. Evidence of planning in terms of material, organization and language. Includes required elements and illustrates examples through content of speech or visual aids. Good group effort is evident.
Very Good	Interesting, informative, in logical sequence, and easy to understand. Includes required elements with some illustration of examples. Group effort is evident.
Good	Relatively easy to understand and follow. Information is presented clearly and with some detail. Includes adequate examples. Group effort is mostly evident.
Satisfactory	Presents information in some detail, but may occasionally be difficult to understand or follow. Little use of examples and little evidence of group effort. May be missing some of the required elements.
Minimally Acceptable	Presents information but may be difficult to understand or follow. Very little if any use of examples and required elements are absent. No evidence of group effort.
Unsatisfactory/In Progress	Little or no information. Appears unprepared. May decline to participate.

This is adapted from the IRP ELA 8-10 (1996)

Name _____

Pickles Wordsearch

E	E	M	S	C	M	Y	C	O	Q	Q	G	C	V	N	F	B	O	R	T
T	C	K	I	U	Y	Q	E	E	G	N	N	I	Z	E	N	J	Z	H	Z
H	A	I	P	C	Q	K	M	N	I	J	N	Z	R	C	I	L	R	A	G
P	P	M	X	U	R	V	R	N	T	E	E	M	K	O	S	H	E	R	H
U	S	C	C	M	A	O	N	E	G	U	E	B	N	I	K	R	E	H	G
H	D	H	A	B	L	A	O	A	J	N	H	T	A	L	D	U	N	I	K
C	A	I	R	E	C	N	R	R	T	V	L	C	P	C	A	N	I	D	Q
T	E	B	B	R	B	T	D	A	G	A	H	S	J	I	T	F	R	Z	U
E	H	D	O	G	Y	S	T	I	S	A	Z	X	U	D	C	E	B	G	R
K	W	V	H	H	C	I	L	W	C	D	N	X	J	E	H	K	R	E	U
G	N	O	Y	H	O	Z	D	I	C	A	C	I	T	E	C	A	L	I	V
N	U	M	D	N	U	N	L	U	H	V	C	O	S	E	K	I	G	E	A
Z	B	N	R	U	X	T	B	T	H	G	S	I	Q	M	S	N	T	R	S
R	K	P	A	G	M	G	A	S	I	D	Y	W	T	H	S	H	E	F	B
Y	S	C	T	G	E	B	V	O	O	N	J	L	L	C	I	V	R	J	B
N	M	Q	E	P	R	D	D	K	G	J	W	B	S	W	A	A	V	D	O
H	N	Y	S	E	S	A	L	I	N	I	T	Y	D	I	L	L	W	N	Q
J	P	O	T	T	N	Y	K	A	T	M	M	A	L	B	S	M	Y	W	Y
C	R	A	D	W	F	Q	M	F	I	M	W	T	C	O	E	C	J	I	I
E	W	U	D	U	J	X	F	M	Q	E	P	M	Q	F	X	J	J	O	B

1. _____ a colorless acid with a pungent odour that is the main component of vinegar
2. _____ a single-celled, often parasitic microorganism without distinct nuclei or organized cell structures
3. _____ water containing a significant amount of salt, used for curing, preserving, and developing flavour in food
4. _____ the process of preserving food in sealed jars
5. _____ a biological compound containing carbon, hydrogen, and oxygen that is an important source of food and energy
6. _____ a sweet and spicy relish made from fruit, spices, sugar, and vinegar
7. _____ a climbing or trailing annual plant of the gourd family that produces cucumbers. Latin name: Cucumis sativus
8. _____ an herb with fine feathery leaves and flat flower heads that produces dill. Latin name: Anethum graveolens
9. _____ the breakdown of carbohydrates by microorganisms.
10. _____ a bulb or clove with a pungent odor and flavor that is commonly used in cooking Latin name: name: Allium sativum
11. _____ a small cucumber, usually used in pickling.
12. _____ usually about 1cm space left at the top when filling a canning jar for processing.
13. _____ meat cut into thin strips and dried or smoked
14. _____ a thick sauce, made with tomatoes, that is served cold as a condiment
15. _____ a pickle made with vegetables such as cabbage and white radish seasoned with chili, garlic, and ginger, regarded as the national dish of Korea
16. _____ describes food that has been prepared so that it is fit and suitable under Jewish law
17. _____ a bi-product of fermentation process which turns cucumbers into pickles. Lactic acid also helps preserve the pickles.
18. _____ smoked salmon
19. _____ tiny organisms such as a virus, protozoan, or bacterium that can only be seen under a microscope
20. _____ a food soaked in solutions to help prevent spoilage
21. _____ a spiced side dish or accompaniment to food, e.g. pickled or fresh vegetables with chili
22. _____ containing or impregnated with salt
23. _____ small white tangy-tasting crystals consisting largely of sodium chloride.
24. _____ a sour-tasting liquid that is used to flavour and preserve foods. It is a dilute acetic acid made by fermenting beer, wine, or cider.
25. _____ the process of immersing canning jars in boiling water in a canner

Pickles Word Search Solution

+	E	M	+	C	+	Y	+	+	+	+	G	+	V	+	F	+	+	+	+
+	C	K	I	U	Y	+	E	+	+	N	+	I	+	E	+	+	+	+	+
+	A	I	+	C	+	K	+	N	I	+	N	+	R	C	I	L	R	A	G
P	P	M	+	U	R	+	R	N	T	E	+	M	K	O	S	H	E	R	+
U	S	C	C	M	+	O	N	E	G	U	E	B	N	I	K	R	E	H	G
H	D	H	A	B	+	A	O	A	J	N	H	T	A	+	+	+	N	+	+
C	A	I	R	E	C	+	R	R	T	+	L	C	P	C	+	+	I	+	+
T	E	+	B	R	+	+	D	A	G	A	+	+	+	I	T	+	R	+	+
E	H	+	O	+	+	+	T	I	S	A	+	+	+	+	C	E	B	+	R
K	+	+	H	+	+	I	+	+	C	+	N	+	+	+	+	K	R	E	+
+	+	+	Y	+	O	+	D	I	C	A	C	I	T	E	C	A	L	I	+
+	+	+	D	N	+	+	+	+	H	+	C	+	S	+	+	I	+	E	A
+	+	+	R	+	+	+	+	T	+	+	+	I	+	M	S	+	+	+	+
+	+	+	A	+	+	+	A	+	+	+	+	+	T	H	S	+	+	+	+
+	+	+	T	+	+	B	+	+	+	+	+	+	+	C	+	+	+	+	+
+	+	+	E	+	R	+	+	+	+	+	+	+	+	+	A	+	+	+	+
+	+	+	S	E	S	A	L	I	N	I	T	Y	D	I	L	L	+	+	+
+	+	+	T	+	+	+	+	+	+	+	+	+	L	+	+	+	+	+	+
+	+	A	+	+	+	+	+	+	+	+	+	+	+	O	+	+	+	+	+
+	W	+	+	+	+	+	+	+	+	+	+	+	+	+	X	+	+	+	+

(Over,Down,Direction)

1. ACETICACID(17,11,W)
2. BACTERIA(13,5,SE)
3. BRINE(18,9,N)
4. CANNING(6,7,NE)
5. CARBOHYDRATES(4,5,S)
6. CHUTNEY(13,7,NW)
7. CUCUMBER(5,1,S)
8. DILL(14,17,E)
9. FERMENTATION(16,1,SW)
10. GARLIC(20,3,W)
11. GHERKIN(20,5,W)
12. HEADSPACE(2,9,N)
13. JERKY(10,6,NW)
14. KETCHUP(1,10,N)
15. KIMCHI(3,2,S)
16. KOSHER(14,4,E)
17. LACTICACID(17,17,NW)
18. LOX(14,18,SE)
19. MICROORGANISMS(3,1,SE)
20. PICKLE(14,7,SE)
21. RELISH(20,9,SW)
22. SALINITY(6,17,E)
23. SALT(10,9,NE)
24. VINEGAR(14,1,SW)
25. WATERBATH(2,20,NE)