



PROGRAM SUPPORT NOTES

Food Preservation Techniques

Program Support Notes by:
Nicole Bath BEd

Produced by:
VEA Pty Ltd

Commissioning Editor:
Sandra Frerichs B.Ed, M.Ed.

Executive Producers:
Edwina Baden-Powell B.A, CVP.
Sandra Frerichs B.Ed, M.Ed.

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For Teachers

Introduction

In a society that is full of waste, food preservation is an important process. The aim of this program is to show how food preservation allows for food to undergo a change, which increases its shelf life. This allows seasonal food to be consumed throughout the year, as well as food being sold in areas where it would otherwise be unavailable. Interviews with Emmanuel Vella (from Carinya Kitchen) will demonstrate the practical side of preserving food and how it is done in his business.

Timeline

00:00:00	Reasons for preserving food
00:02:42	Causes of food spoilage
00:06:26	Preservatives: natural & chemical
00:11:57	Preservation techniques using temperature
00:16:12	Preservation techniques: water & oxygen removal
00:19:22	Credits
00:20:06	End program

Related Titles

All About Food Additives
Industrial and Sustainable Farming
The Cooking Process – How Food Changes
No Accounting for Taste – Why We Eat What We Eat
Food Planning for Special Occasions

Recommended Resources

<http://www.science.org.au/nova/030/030box02.htm>
<http://www.nonsuchkitchengardens.com/preserves.html>
<http://science.howstuffworks.com/innovation/edible-innovations/food-preservation.htm>
<http://healthyeatingclub.com/info/articles/food-proc/food-pres.htm>

Student Worksheet

Initiate Prior Learning

1. What would life be like without a fridge? Think about how food was stored before this modern convenience was available. In small groups, brainstorm possible methods that could be used to preserve food.
2. If you had a large amount of fruit, eg apricots, what options could you use to keep the food as long as possible?
3. Research the types of food that are suitable for preservation. Group similar ones together into categories (e.g. fruits) and find out the technique use for the preservation methods.
4. What might be considered the negative aspects of preserving food?
5. Strawberries are a seasonal food. List as many techniques that you can think of to preserve strawberries so they can be enjoyed out of season. Share your list with a partner.

Food Preservation Techniques

Active Viewing Guide

Reasons for preserving food

1 What does it mean when food perishes?

2 What is the aim of preserving food?

3 Name four different techniques used to preserve food.

4 True or false:

There can be a reduction of overall nutritive value of some preserved foods. _____

5 True or false:

Food preservation can ensure that nutrient levels are maintained. _____

6 a) Think about the food in your fridge at home. Describe 4 ways in which food can be considered 'spoiled'.

Food Preservation Techniques

b) Consider whether these are foods that could have been preserved. Justify your answer.

Causes of food spoilage

7 What are the 4 common sources of microorganisms which cause food to spoil?

8 a) Why should you avoid eating raw chicken?

b) How can this issue be avoided?

9. True or false:

Pigments, fats, proteins and vitamins can be damaged by light. _____

Preservatives – natural and chemical

10. Circle which of the following can be used as natural preservatives:

Salt tomato sauce sugar lemon juice oil parsley vinegar

11. Name two chemicals used to preserve food.

Food Preservation Techniques

12. Explain how fermentation is used as a preservation technique.

Preservation techniques using temperature

13.a) Match the preservation methods with the definitions, below.

Methods

Canning
Pasteurising
Freezing

Definitions

- a. To pass from the liquid to the solid state by loss of heat.
Method _____
- b. The act or process of heating a beverage or other food to a specific temperature for a specific period of time in order to kill microorganisms that could cause disease, spoilage, or undesired fermentation.
Method _____
- c. Packing and preserving of food in cans or jars subjected to sterilising temperatures.
Method _____

b) For each method described above, give an example of a type of food preserved using the technique.

Food Preservation Techniques

Preservation techniques: water and oxygen removal

14. Why is it important to keep dried foods in an airtight container?

15. Give two reasons why freeze dried food is good for camping and travelling in space?

16. Why is a 'best before' or 'use by' date still important, even for food that has been preserved?

Extension Activities

- 1 The primary reason for preserving food is safety, to protect consumers from food borne illness caused by fungi, bacteria or other microorganisms. Research two microorganisms that cause food borne illness and write a short report on each. Your report should include: the danger it poses to humans, the illness caused by eating food containing the microorganism and the treatment used to treat the illness, and the techniques used to remove (or reduce) the presence of the microorganism in foods.
- 2 Campylobacter is one of the most common causes of intestinal infections. Investigate the symptoms of campylobacter and whether there is treatment available to assist recovery. Present your findings as a brochure aimed at year 7 students who are learning to cook.
- 3 Investigate the temperature that different types of cold and frozen foods should be stored at and how long they will keep at that temperature. Design a poster for display in your local supermarket, to ensure customers are aware of the importance of temperature.
- 4 Salting is commonly used to preserve meat. Investigate the methods used to salt meat and the effect that high levels of salt can have on the body. Write a script for a dialogue between a person in support of salting techniques and a person against it for health reasons (perhaps a doctor). You might also want to present this script as a role play to the class.
- 5 Pasteurisation is necessary for milk to be safe. Investigate the process milk goes through from the cow to the carton. Present your findings as a timeline of the process, explaining what happens at each step and the rough time taken for each step. You could present your timeline as a poster or using free online software, such as Timetoast.
- 6 Have a class or small group taste testing, where you compare a product in a variety of forms eg. fresh, frozen and tinned berries (or another fruit). Consider the cost, taste, visual appeal. Present your results in visual form and write a short summary of your findings.

Suggested Student Responses

Initiate Prior Learning

1. What would life be like without a fridge? Think about how food was stored before this modern convenience was available. In small groups, brainstorm possible methods that could be used to preserve food.
Answers will vary but may include: It would be hard, not much variety available. They may suggest some common methods eg. Cans, bottles
2. If you had a large amount of fruit, eg apricots, what options could you use to keep the food as long as possible?
Answers will vary but may include putting it in the fridge, freezing it, making jams with it.
3. Research the types of food that are suitable for preservation. Group similar ones together into categories (e.g. fruits) and find out the technique used for the preservation methods.
Answers will vary.
4. What might be considered the negative aspects of preserving food?
Answers will vary but may include the addition of salt and sugar is not healthy.
5. Strawberries are a seasonal food. List as many techniques that you can think of to preserve strawberries so they can be enjoyed out of season. Share your list with a partner.
Answers will vary but may include: canned, bottled, frozen, made into jam, etc.

Active Viewing Guide

Reasons for preserving food

- 1 What does it mean when food perishes?
It goes off, becomes rotten, or deteriorates in some way.
- 2 What is the aim of preserving food?
To protect it against spoilage by oxidation, bacteria and fungi.
- 3 Name four different techniques used to preserve food.
Temperature control, removal of moisture and oxygen, and modifying the PH.
- 4 True or false:

There can be a reduction of overall nutritive value of some preserved foods. **True**
- 5 True or false:

Food preservation can ensure that nutrient levels are maintained. **True**
- 6 a) Think about the food in your fridge at home. Describe 4 ways in which food can be considered 'spoiled'.
Answers will vary but may include: Bread – mould, milk – goes off, butter – rancid, meat – slimy, fruit – brown/soft, cheese – mould

b) Consider whether these are foods that could have been preserved. Justify your answer.
Answers will vary but should include some discussion of relevant methods for preserving the foods mentioned in part 'a' of the question.

Causes of food spoilage

- 7 What are the 4 common sources of microorganisms which cause food to spoil?
Air, soil, sewage, animal waste.
- 8 a) Why should you avoid eating raw chicken?
Because it contains bacteria (campylobacter) that can make you sick.

b) How can this issue be avoided?
By cooking or otherwise preserving the meat before eating.

9. True or false:

Pigments, fats, proteins and vitamins can be damaged by light. **True**

Preservatives – natural and chemical

10. Circle which of the following can be used as natural preservatives:

Salt *tomato sauce* **sugar** **lemon juice** *oil* *parsley* **vinegar**

11. Name two chemicals used to preserve food.
Answers will vary but may include any two of: potassium metabisulphite, citric acid, acetic acid (more commonly known as vinegar), sulphur dioxide, nitrates, sodium benzoate, and potassium sorbate

Food Preservation Techniques

12. Explain how fermentation is used as a preservation technique.

Fermentation is the conversion of sugar or other carbohydrates into alcohol or acid. The yeast used in the fermentation process produces alcohol and the bacteria produces lactic acid. Both alcohol and acid inhibit the growth of microorganisms.

Preservation techniques using temperature

13.a) Match the preservation methods with the definitions, below.

Methods

Canning
Pasteurising
Freezing

Definitions

a. To pass from the liquid to the solid state by loss of heat.

Method **Freezing**

b. The act or process of heating a beverage or other food to a specific temperature for a specific period of time in order to kill microorganisms that could cause disease, spoilage, or undesired fermentation.

Method **Pasteurising**

c. Packing and preserving of food in cans or jars subjected to sterilising temperatures.

Method **Canning**

b) For each method described above, give an example of a type of food preserved using the technique.

Examples may vary but should be appropriate to the preservation technique

Canning – e.g. fruit, vegetables

Pasteurising – e.g. milk

Freezing – e.g. meat

Preservation techniques: water and oxygen removal

14. Why is it important to keep dried foods in an airtight container?

Dried food is best kept in an airtight container to avoid absorbing moisture from the air, which would encourage bacterial and fungal growth.

15. Give two reasons why freeze dried food is good for camping and travelling in space?

The food is lighter because the water has been removed, and the food will last longer without spoiling.

16. Why is a 'best before' or 'use by' date still important, even for food that has been preserved?

Because the food isn't preserved indefinitely; preservation is intended to extend the shelf-life of food not make it last forever. Once the food has been exposed to the air and moisture, it can start to grow bacteria and mould that was killed off or slowed down by the preservation technique.

Extension Activities

- 1 The primary reason for preserving food is safety, to protect consumers from food borne illness caused by fungi, bacteria or other microorganisms. Research two microorganisms that cause food borne illness and write a short report on each. Your report should include: the danger it poses to humans, the illness caused by eating food containing the microorganism and the treatment used to treat the illness, and the techniques used to remove (or reduce) the presence of the microorganism in foods.

Answers will vary, according to which ones are investigated.

- 2 Campylobacter is one of the most common causes of intestinal infections. Investigate the symptoms of campylobacter and whether there is treatment available to assist recovery. Present your findings as a brochure aimed at year 7 students who are learning to cook.

Campylobacter infection is a type of gastroenteritis (gastro) caused by a bacteria known as Campylobacter. Symptoms include diarrhoea, nausea, vomiting and stomach cramps. Infection is more common in children under five years of age and young adults. Children's sandpits can become contaminated with Campylobacter through animal faeces.

Undercooked meat, especially chicken, unpasteurised milk, infected water and unwashed hands contaminated with faeces (poo) from the toilet or nappies are also sources.

http://www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/Gastroenteritis_campylobacteriosis

- 3 Investigate the temperature that different types of cold and frozen foods should be stored at and how long they will keep at that temperature. Design a poster for display in your local supermarket, to ensure customers are aware of the importance of temperature.

Posters will vary, but information should reflect that:

You must ensure that the temperature of potentially hazardous food is either at 5°C or colder or at 60°C or hotter when it is received, displayed, transported or stored.

<http://www.foodstandards.gov.au/scienceandeducation/factsheets/foodsafetyfactsheets/foodsafetystandardst857.cfm>

- 4 Salting is commonly used to preserve meat. Investigate the methods used to salt meat and the effect that high levels of salt can have on the body. Write a script for a dialogue between a person in support of salting techniques and a person against it for health reasons (perhaps a doctor). You might also want to present this script as a role play to the class.

Answers will vary, but should include concerns regarding blood pressure should be the focus of the anti-salting person. Taste and the small quantities eaten of some salt-preserved foods (e.g. smallgoods) could be used as arguments in favour of salt preservation.

Other points on either side should demonstrate an understanding on reasons salting is used and the health issues attached to excess consumption

- 5 Pasteurisation is necessary for milk to be safe. Investigate the process milk goes through from the cow to the carton. Present your findings as a timeline of the process, explaining what happens at each step and the rough time taken for each step. You could present your timeline as a poster or using free online software, such as Timetoast.

Steps to be included are roughly: milking, milk storage by farmer, milk collected by a tanker from milk company, pasteurisation at the factory (this process should be explain in some detail), homogenisation, bottled (or other containers), transportation for distribution e.g. into supermarkets. Answers might also extend the process to include other processing: e.g. flavoured milk, yoghurt, UHT milk.

- 6 Have a class or small group taste testing, where you compare a product in a variety of forms eg fresh, frozen and tinned berries (or another fruit). Consider the cost, taste, visual appeal. Present your results in visual form and write a short summary of your findings.

Answers will vary