

WELCOME TO THE  
**EXTRAORDINARY EGG** SERIES

# M

## **ICROORGANISMS & OUR FOOD SUPPLY**

*An exploration of:*

- the technology and handling procedures used, from the farm to the table, to control the growth of microorganisms in our egg supply
- how consumer handling practises effect micro-organism growth in food

### **SUGGESTED SUBJECT AREA & GRADE LEVEL**

Science: Microorganisms and Food Safety, Grade 7



### **CONTENTS:**

#### **UNIT PLAN**

Provides an overview of the lessons and identifies learner expectations.

#### **LESSON PLANS**

Objectives and suggestions for teaching activities are provided. The activities are designed to provide opportunities for students to:

- discover their own perceptions and predict solutions
- learn new concepts
- apply the concepts to practical situations/problems

#### **RESOURCES**

Masters for student worksheets and teacher reference materials that pertain to this unit.

This module is one in a series of five that has been developed by the Canadian Egg Marketing Agency and the Provincial Egg Boards.

- THE NUTRITIVE VALUE OF EGGS
- COOKING WITH EGGS
- TECHNOLOGY AND EGG PRODUCTION
- CHOLESTEROL PERCEPTIONS AND FACTS
- MICROORGANISMS AND OUR FOOD

For more information contact your Provincial Egg Board or visit our WEB site: [WWW.CanadaEgg.ca](http://WWW.CanadaEgg.ca)

# **M**ICROORGANISMS & OUR FOOD SUPPLY

## **UNIT PLAN**

Microorganisms are found everywhere in our environment – in soil, water, air, animals, and insects, so we cannot realistically eliminate all microorganisms, but we can take actions to control the growth of harmful microorganisms.

Perishable foods such as, meat, fish, eggs, milk and milk products are susceptible to microorganism growth. This is why sanitation must be practised continuously from the farm to the table.

This unit is divided into two lessons:

### **WAYS TECHNOLOGY IS USED TO KEEP OUR FOOD SUPPLY SAFE**

Students explore the production path of eggs from the farm to the table and identify ways technology is used throughout the process, to keep our food safe.

### **CONSUMER RESPONSIBILITY FOR FOOD SAFETY**

Students apply their knowledge of microorganism controlling practises to everyday food handling situations for consumers.

## **LEARNER EXPECTATIONS**

Students will:

- recognize that the safe processing and handling of food involves the cooperative effort of many people in many different roles
- identify the role of technology in maintaining egg quality throughout the production chain
- describe handling procedures consumers should follow to maintain safe food products

## WAYS TECHNOLOGY IS USED TO KEEP OUR FOOD SUPPLY SAFE

Everyone from the farm to the table has a role to play in keeping our food safe. Some of these actions are dependent on technology and others are dependent on human practices.

Through research, students identify the technologies and handling procedures used throughout the egg production chain (from farm to table) to control the growth of harmful microorganisms.

### RESOURCES REQUIRED:

**Student Worksheet:** The Production Chain

**Brochure:** The Extraordinary Egg

**Video:** The Extraordinary Egg

### ACTIVITIES:

Review the conditions in which microorganisms grow quickly.

- *food source*
- *temperature*
- *moisture*
- *absence of acid or other additives harmful to microorganisms*

Have students view “The Extraordinary Egg” video and use the accompanying brochure to identify where and how technology is used to control the growth of microorganisms in our food. Students should identify steps taken at each stage in the production chain (the condition being controlled and the technology being used) – at the farm, the grading station, during transportation, at the grocery store and in the home. Students record their findings using the “The Production Chain” worksheet.

## CONSUMER RESPONSIBILITY FOR FOOD SAFETY

Once food is brought into the home, the consumer needs to store and handle food correctly to maintain its quality. Students demonstrate their understanding of the microorganism controlling principles by recommending procedures for maintaining food quality in everyday situations.

### RESOURCES

**Student Worksheet:** Case Study – Consumer Responsibility For Food Safety

### ACTIVITIES

Have students pick one of the following situations: an after skating or skiing party, a summer picnic, or a lunch for a one day bus trip. Students plan a menu, identify possible food safety concerns and recommend appropriate actions/food handling practises to prevent the growth of microorganisms.

### ALTERNATE ACTIVITY:

Have students review the following scenario and recommend appropriate actions to control the growth of microorganisms.

#### Case Study:

It is the last game of the year for your soccer team and a picnic has been planned for after the game, at the local park. Everyone has signed up to bring either food or drink. From the time everyone leaves home until the picnic, almost two hours will have passed. Review the list of foods your teammates are bringing and recommend appropriate storage and serving practises to ensure the food is safe to eat.

*taco chips*

*soda pop*

*orange juice*

*cheese*

*crackers*

*pepperoni sticks*

*sandwiches – ham and cheese, egg salad*

*potato salad*

*chili*

*buns*

*brownies*

*coconut cream pie*

*rice crispy squares*

# THE PRODUCTION CHAIN

STAGE OF FOOD PRODUCTION	CONDITION CONTROLLED	TECHNOLOGY USED
In the barn		
Egg storage area		
During transportation		
Grading station		
At the store		
In the home		

**THE PRODUCTION CHAIN (CON'T)**

1. Name three practises that the producer (farmer) can follow to control the growth of microorganisms.
  1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_
2. How does the design of the hen's cage help to control microorganism growth?
3. Once the eggs are collected, how should they be stored?
4. What steps does the grading station take to ensure eggs that reach the consumer are of top quality?
5. Name three treatments commercial egg processing plants (egg breaking plants) use to preserve eggs.
  1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_
6. The main factor that the grocery store must monitor to maintain egg quality is \_\_\_\_\_.
7. Name three rules/practises consumers should follow to avoid cross-contamination of foods during food preparation in the home.
  1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_

## THE PRODUCTION CHAIN

STAGE OF FOOD PRODUCTION	CONDITION CONTROLLED	TECHNOLOGY USED
In the barn	<i>temperature moisture/food</i>	<i>air conditioning cage design allows hen wastes to drop away and allows egg to roll onto collector belts outside of cage, minimising the opportunity for contact with waste products</i>
Egg storage area	<i>temperature</i>	<i>refrigeration</i>
During transportation	<i>temperature</i>	<i>refrigeration/or insulated trucks</i>
Grading station	<i>temperature cleanliness/food &amp; moisture cracked eggs (food)</i>	<i>refrigeration washing and sanitizing machines candling</i>
At the store	<i>temperature</i>	<i>refrigeration</i>
In the home	<i>temperature cross contamination</i>	<i>refrigeration hot water and washing agents</i>

## THE PRODUCTION CHAIN (CONT)

1. Name three practises that the producer (farmer) can follow to control the growth of microorganisms.
  - *buying feed and supplements from a mill with a disease prevention program in effect*
  - *setting-up restricted zones generally the laying house, the egg collection room and the cooler where personnel movement is kept to a minimum and special clothing and cleaning procedures are established*
  - *pressure washing and sanitizing walls, ceilings, rafters, fans, heaters, cages, drinkers, and feeders;*
  - *removing manure regularly*
  - *monitoring and maintaining proper ventilation, air temperature and moisture levels*
  - *frequent egg collection and quick removal of dirty, cracked or broken eggs*
  - *storing of collected eggs in a cooler or cool room at 11<sup>o</sup> to 12<sup>o</sup> C*
  - *monitoring flock health by recording feed and water intake, rate of lay, egg quality, bird behaviour and appearance*
  
2. How does the design of the hen's cage help to control microorganism growth?
 

*The cage is designed so wastes fall out of the cage, and eggs roll out on to an automatic collection belt. This reduces the chance of the egg being in contact with wastes that provide food and moisture for microorganism growth.*
  
3. Once the eggs are collected, how should they be stored?
 

*In a cooler or cooled room. Temperatures should be maintained at 11<sup>o</sup> to 12<sup>o</sup> C.*
  
4. What steps does the grading station take to ensure eggs that reach the consumer are of top quality?
 

*Graders take great care to maintain optimum temperature and humidity levels for the eggs that reach their doors. They are also responsible for washing/sanitizing and inspecting the eggs for interior and exterior quality. Cracked eggs are automatically removed from the line.*
  
5. Name three treatments commercial egg processing plants (egg breaking plants) use to preserve eggs.
  1. *pasteurisation*
  2. *freezing*
  3. *drying*
  
6. The main factor that the grocery store must monitor to maintain egg quality is temperature . – *it is recommended that retailers refrigerate eggs at 4<sup>o</sup> to 5<sup>o</sup> C*
  
7. Name three rules/practises consumers should follow to avoid cross-contamination of foods during food preparation in the home.
  - *always wash your hands first*
  - *wash utensils used for raw eggs before reusing for other raw foods or cooked products – that includes knives and cutting boards*
  - *do not mix leftovers from the serving table with other food that is still on the stove or in the refrigerator; the difference in temperatures can stimulate microorganism growth*

## CASE STUDY – CONSUMER RESPONSIBILITY FOR FOOD SAFETY

It is the last game of the year for your soccer team and a picnic has been planned for after the game, at the local park. Everyone has signed up to bring either food or drink. From the time everyone leaves home until the picnic, almost two hours will have passed.

1. Review the list of foods your teammates are bringing and place a check mark beside the foods that are prone to spoilage from microorganism growth.

### FOODS PRONE TO SPOILAGE

- taco chips
- soda pop
- orange juice
- cheese
- crackers
- pepperoni sticks
- sandwiches – ham and cheese, egg salad
- potato salad
- chili
- buns
- brownies
- coconut cream pie
- rice crispy squares

2. Suggest three ways of storing and serving the foods you identified, to ensure the food is safe to eat.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

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- coconut cream pie
- rice crispy squares

2. Suggest three ways of storing and serving the foods you identified, to ensure the food is safe to eat.

- *pack cold foods in cooler or insulated bags*
- *put ice cubes on tray and place cold dishes on top*
- *store potato salad in insulated, wide mouth thermos*
- *freeze the cheese, pepperoni sticks, and ham and cheese sandwiches ahead of time so they will thaw while the game is being played*
- *store hot foods like chili in an insulated thermos*
- *have some one bring the chili straight to the picnic just before serving time in an insulated dish or thermos*
- *use a portable Coleman stove or barbecue to keep the chili hot*

## YOUR OPINION IS IMPORTANT TO US

We are interested learning about your experience in using the MICROORGANISMS AND OUR FOOD teaching module.

How did you hear about the module? Check all those which apply –

- Received Educating Egg Resource Guide and order form in the mail
- Received information at a Teacher’s Convention or workshop
- Received information while at a farm or consumer exhibit
- Received information through Agriculture in the Classroom
- Materials were recommended by a colleague

Please list other sources \_\_\_\_\_

How did you use the materials?

Grade(s): \_\_\_\_\_

Subject or Curriculum area: \_\_\_\_\_

If applicable, how did you modify or adapt any of the materials? \_\_\_\_\_

If applicable, how did you supplement the module? \_\_\_\_\_

What were your teaching objectives for using this material? \_\_\_\_\_

	unsuccessfully			successfully	
Module helped to meet objectives?	1	2	3	4	5

Please comment: \_\_\_\_\_  
 \_\_\_\_\_

The module lists the following learner expectations.

Students will

- recognize that the safe processing and handling of food involves the cooperative effort of many people in many different roles
- identify the role of technology in maintaining egg quality throughout the production chain
- describe handling procedures consumers should follow to maintain safe food products

	very appropriate			not appropriate	
Were the learning expectations appropriate?	1	2	3	4	5

What do you consider to be the key learning or messages from this module? \_\_\_\_\_

How were the materials received by students?

	poorly			extremely well received	
	1	2	3	4	5
The Production Chain (student worksheet)	1	2	3	4	5
Consumer Responsibility for Food (case study)	1	2	3	4	5
The Eggstraordinary Egg (brochure)	1	2	3	4	5
The Eggstraordinary Egg (video)	1	2	3	4	5

Did the module:	unsuccessfully			successfully	
Provide new information?	1	2	3	4	5
Provide new learning?	1	2	3	4	5
Reinforce previous knowledge?	1	2	3	4	5

Were there any controversial issues brought forward as a result of using this module? \_\_\_\_\_

What were the issues? \_\_\_\_\_

Was there sufficient information and support materials in the module to handle the issue?

Yes                       No                       Partially

If no, what would be sufficient to address this issue? \_\_\_\_\_

Which part(s) of the module will you continue to use? Check all that apply –

- Lesson A: Ways Technology Is Used To Keep Our Food Supply Safe
- Lesson B: Consumer Responsibility For Food Safety
- Student worksheet/Teacher worksheet: The Production Chain
- Case study: Consumer Responsibility For Food
- Brochure: The Extraordinary Egg
- Video: The Extraordinary Egg

Would you recommend this module to other teachers?     Yes     No

In producing these resource materials The Canadian Egg Marketing Agency has the following objectives. In your opinion did the materials meet these objectives:

	failed to meet			met objective entirely	
Provide materials which assist students to learn about how eggs are produced and marketed.	1	2	3	4	5
Develop positive attitudes towards eggs.	1	2	3	4	5
Provide materials which support curriculum objectives.	1	2	3	4	5
Provide materials which are credible	1	2	3	4	5
Provide materials which are accurate	1	2	3	4	5
Provide materials which are of excellent quality.	1	2	3	4	5

*Please return to:* Canadian Egg Marketing Agency

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