



## ADDITIONAL RESOURCES

How does food get from the farmer to our table? In this collection, we look at the primary and secondary processing of wheat, fruit, vegetables and dairy. Each food type has its own needs for growing and harvesting, transportation and storage, and processing techniques used to turn the harvested product into primary products ready for the consumer, or into secondary processed goods.

Duration of resource: 23 Minutes

Year of Production: 2014

Stock code: RLC13118000



### **Wheat Processing**

1. Which naturally occurring nutrients are in whole wheat?

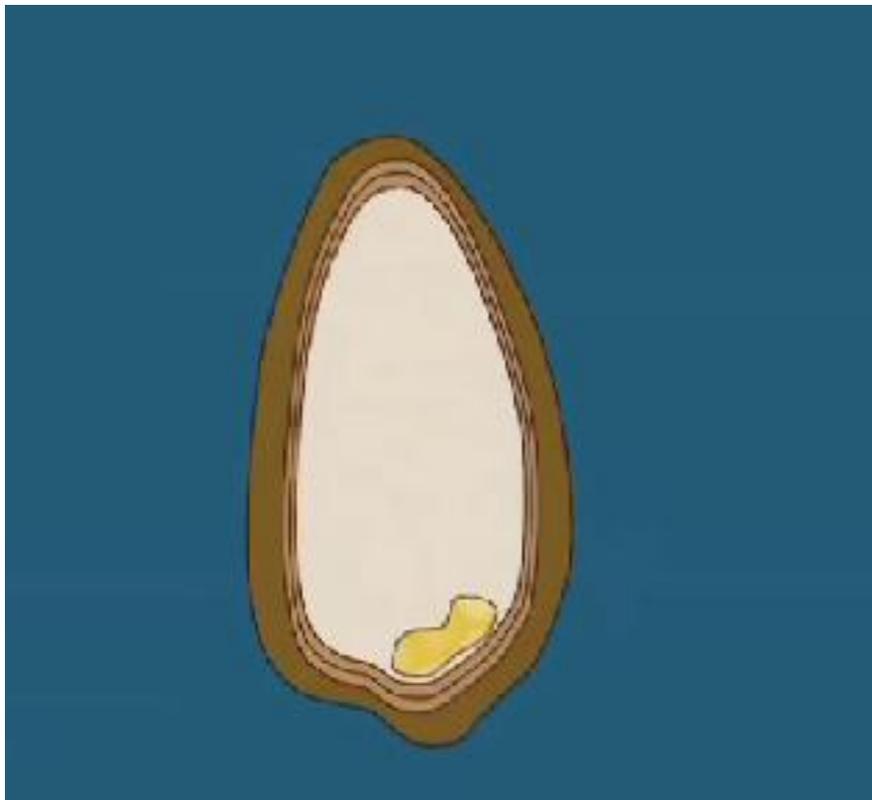
---

2. What is 'threshing'?

---

---

3. Label the following parts of the grain: bran, endosperm, and germ.



## Farm to Fork: Primary and Secondary Processing

---

4. Why is water added during processing?

---

---

5. Why does white flour have a limited shelf life?

---

---

6. What does 'leaven' mean? What are two leavening agents?

---

---

For further study:

1. How are gluten free breads made?
2. What is the difference between radiation, convection and conducting cooking techniques?

## Farm to Fork: Primary and Secondary Processing

### **Fruit Processing**

1. Fill in the blanks using the word provided in the box below. You may complete this during or after viewing the clip.

Strawberries have been part of the human diet for more than 2000 years, although the first known use of the wild fruit was by the ancient Romans for \_\_\_\_\_. Cultivated strawberries became more widespread in \_\_\_\_\_ from the sixteenth century onwards, and in \_\_\_\_\_ during the 17<sup>th</sup> century.

A popular cultivation method for strawberries involves \_\_\_\_\_ - where the beds are covered with plastic to limit weed growth and soil erosion. \_\_\_\_\_ is placed underneath the plastic cover, which facilitates better water absorption.

The berries are picked with their \_\_\_\_\_ and \_\_\_\_\_ still attached. They need to remain on their stem to \_\_\_\_\_ after being picked.

The ripening of fruit is a process where \_\_\_\_\_ turn the unripe fruit - containing \_\_\_\_\_ - into a ripe fruit - which contains \_\_\_\_\_, a soluble fibre that is easily processed by the human digestive system.

\_\_\_\_\_ give fruit their colour. They also contain \_\_\_\_\_, which are highly beneficial to health, and strawberries have a particularly \_\_\_\_\_ of antioxidants.

Strawberries are mostly \_\_\_\_\_, although \_\_\_\_\_ have been developed to increase productivity.

After picking, it's vital that strawberries aren't exposed to \_\_\_\_\_.

Their shelf life can be extended through the use of \_\_\_\_\_ in refrigerated storage. Packing berries in containers of \_\_\_\_\_ or in pallets covered with \_\_\_\_\_ also helps preserve the product.

<b>enzymes</b>	<b>green caps</b>	<b>protopectin</b>	<b>irrigation tubing</b>
<b>pigments</b>	<b>direct sunlight</b>	<b>carbon dioxide</b>	<b>picked by hand</b>
<b>thin plastic film</b>	<b>North America</b>	<b>medicinal purposes</b>	<b>fully ripen</b>
<b>plasti-culture</b>	<b>robotic pickers</b>	<b>high concentration</b>	<b>Europe</b>
<b>antioxidants</b>	<b>dry ice</b>	<b>part of the stem</b>	<b>pectin</b>

## Farm to Fork: Primary and Secondary Processing

---

2. Number each step (1-8) in the secondary processing of strawberries to be in the correct sequence.

\_\_\_\_\_ The mixture is chilled to freezing point.

\_\_\_\_\_ A lid is placed on top and containers are labelled.

\_\_\_\_\_ The strawberries are loaded into a hopper, which carries them into pipes for cleaning and crushing.

\_\_\_\_\_ The mixture travels on a conveyor belt above the empty containers, which are then filled.

\_\_\_\_\_ This process is generally repeated three times.

\_\_\_\_\_ The mixture is pushed through small holes by giant paddles, leaving stems and unwanted debris behind.

\_\_\_\_\_ The mixture is pumped to filling machines.

\_\_\_\_\_ The mixture is cooked in giant vats at close to boiling point.

### Vegetable Processing

After viewing the clip, research one or more of the following topics:

1. Think about what the area you currently live in was like 100 years ago. Research what foods would have been grown locally. Construct a typical menu plan for 1 week based on the most readily available foods.
2. It's easy to take for granted where our food comes from. Imagine you are preparing a vegetarian stir fry with the following plants or plant based ingredients:  
Snow peas, carrots, broccoli, baby corn, red capsicum, mushrooms, bean sprouts, long red chilli, ginger, garlic, soy sauce, sesame oil, tofu and rice.  
Visit a local grocery store and check the labels for each of these ingredients. Construct a map that shows where each food item came from.  
Did you have difficulty finding out the origin of each item? If so, why do you think that was the case?
3. Research what vegetables are most commonly grown in each of the following countries: Japan, Germany, Mexico, India, Argentina, Egypt, New Zealand. After you find the answers, select one country and find a recipe that incorporates at least 2 of the vegetables they commonly produce. If the ingredients are available here, cook the dish!
4. Vegetables can be preserved in a variety of ways to extend their shelf life. Research each of the following methods: frozen, canned, pickled, and refrigerated. Determine the pros and cons of each. Think broadly about what pros and cons to include such as costs to process, impact on nutrients, impact on taste, shelf life, etc.

## Farm to Fork: Primary and Secondary Processing

---

### **Dairy Processing**

1. Is casein a protein, carbohydrate or fat? \_\_\_\_\_

2. Is lactose a protein, carbohydrate or fat? \_\_\_\_\_

3. Why do the trucks that transport milk have special stainless steel insulated tanks?

---

---

4. What is pasteurisation and why does milk need to be pasteurised?

---

---

---

5. Label each description with the proper word from the list below:

\_\_\_\_\_ clumps created by chymosin

\_\_\_\_\_ allows lactic acid to build up and create a firmer, more elastic texture

\_\_\_\_\_ salty water that provides flavour and kills unwanted bacteria

\_\_\_\_\_ lactic acid or rennet is added

\_\_\_\_\_ an enzyme that helps with the formation of clumps

\_\_\_\_\_ found in the fourth stomach lining

\_\_\_\_\_ liquid that remains after curdling

Coagulation	Chymosin	Rennet	Curds
Whey	Heating	Brine bath	

## Farm to Fork: Primary and Secondary Processing

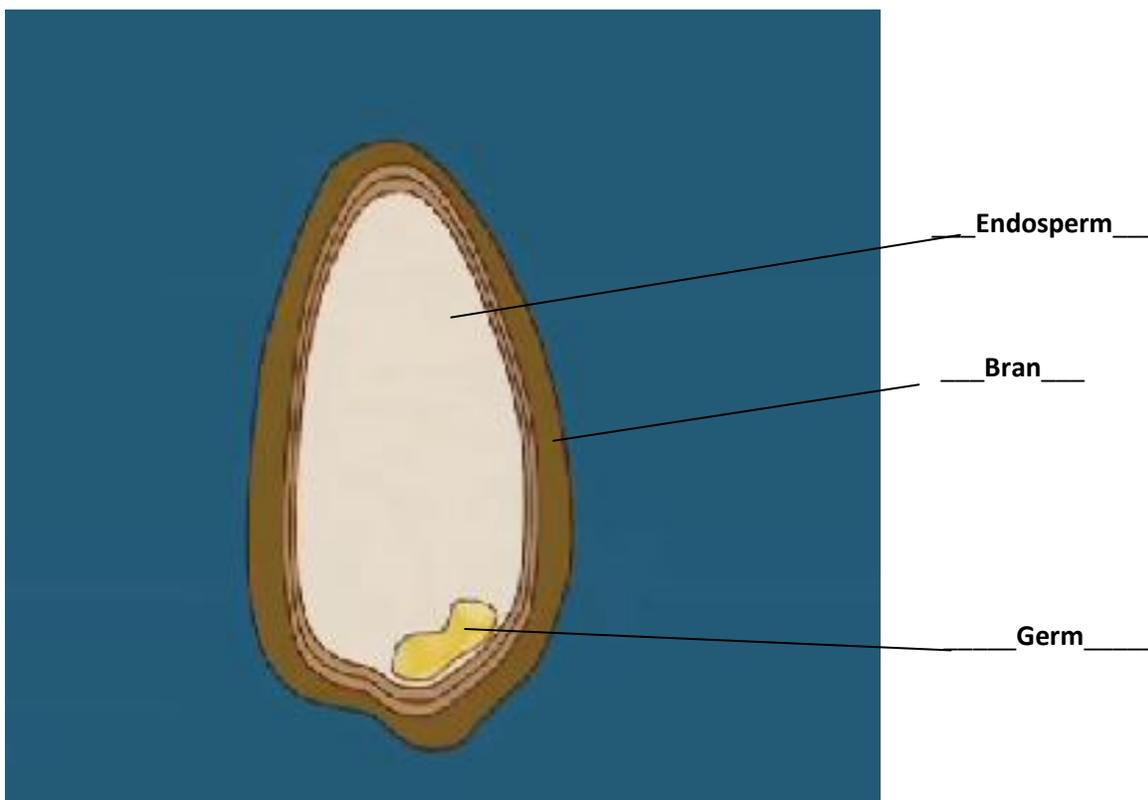
6. Complete the chart on characteristics of different cheeses.

Level of ripening	Maturation	Characteristics	Example cheeses
Unripened cheese	Matured around _____ weeks	_____ moisture level _____ fat content _____ texture	Feta
Ripened cheese	_____ -mature to mature	_____ flavoured _____ or crumbly texture	Cheddar
_____ cheese	Matured	_____ moisture level _____ flavour _____ texture	Pecorino _____ _____

## ***Suggested Student Responses***

### **Wheat Processing**

1. Which naturally occurring nutrients are in whole wheat?  
**Vitamins B and E, calcium, iron and omega-3 fatty acids**
2. What is 'threshing'?  
**Threshing removes the grains from the head when wheat is harvested.**
3. Label the following parts of the grain: bran, endosperm, and germ.



## Farm to Fork: Primary and Secondary Processing

---

4. Why is water added during processing?  
**It toughens the outer bran and softens the inner endosperm, allowing easier separation.**
5. Why does white flour have a limited shelf life?  
**White flour has a limited shelf life because the fatty acids in the germ react as soon as they are exposed to oxygen.**
6. What does 'leaven' mean? What are two leavening agents?  
**Leaven means to rise. Yeast and baking soda are leavening agents.**

For further study:

1. How are gluten free breads made?
2. What is the difference between radiation, convection and conducting cooking techniques?

### **Fruit Processing**

1. Fill in the blanks using the word provided in the box below. You may complete this during or after viewing the clip.

Strawberries have been part of the human diet for more than 2000 years, although the first known use of the wild fruit was by the ancient Romans for **medicinal purposes**. Cultivated strawberries became more widespread in **Europe** from the sixteenth century onwards, and in **North America** during the 17<sup>th</sup> century.

A popular cultivation method for strawberries involves **plasti-culture** - where the beds are covered with plastic to limit weed growth and soil erosion. **Irrigation tubing** is placed underneath the plastic cover, which facilitates better water absorption.

The berries are picked with their **green caps** and **part of the stem** still attached. They need to remain on their stem to **fully ripen** after being picked.

The ripening of fruit is a process where **enzymes** turn the unripe fruit - containing **protopectin** - into a ripe fruit - which contains **pectin** a soluble fibre that is easily processed by the human digestive system.

**Pigments** give fruit their colour. They also contain **antioxidants** which are highly beneficial to health, and strawberries have a particularly **high concentration** of antioxidants.

Strawberries are mostly **picked by hand** although **robotic pickers** have been developed to increase productivity.

After picking, it's vital that strawberries aren't exposed to **direct sunlight**. Their shelf life can be extended through the use of **carbon dioxide** in refrigerated storage. Packing berries in containers of **dry ice** or in pallets covered with **thin plastic film** also helps preserve the product.

enzymes	green caps	protopectin	irrigation tubing
pigments	direct sunlight	carbon dioxide	picked by hand
thin plastic film	North America	medicinal purposes	fully ripen
plasti-culture	robotic pickers	high concentration	Europe
antioxidants	dry ice	part of the stem	pectin

## Farm to Fork: Primary and Secondary Processing

---

2. Number each step (1-8) in the secondary processing of strawberries to be in the correct sequence.
- 4 The mixture is chilled to freezing point.
  - 8 A lid is placed on top and containers are labelled.
  - 1 The strawberries are loaded into a hopper, which carries them into pipes for cleaning and crushing.
  - 7 The mixture travels on a conveyor belt above the empty containers, which are then filled.
  - 5 This process is generally repeated three times.
  - 2 The mixture is pushed through small holes by giant paddles, leaving stems and unwanted debris behind.
  - 6 The mixture is pumped to filling machines.
  - 3 The mixture is cooked in giant vats at close to boiling point.

### Vegetable Processing

After viewing the clip, research one or more of the following topics:

1. Think about what the area you currently live in was like 100 years ago. Research what foods would have been grown locally. Construct a typical menu plan for 1 week based on the most readily available foods.
2. It's easy to take for granted where our food comes from. Imagine you are preparing a vegetarian stir fry with the following plants or plant based ingredients:  
Snow peas, carrots, broccoli, baby corn, red capsicum, mushrooms, bean sprouts, long red chilli, ginger, garlic, soy sauce, sesame oil, tofu and rice.  
Visit a local grocery store and check the labels for each of these ingredients. Construct a map that shows where each food item came from.  
Did you have difficulty finding out the origin of each item? If so, why do you think that was the case?
3. Research what vegetables are most commonly grown in each of the following countries: Japan, Germany, Mexico, India, Argentina, Egypt, New Zealand. After you find the answers, select one country and find a recipe that incorporates at least 2 of the vegetables they commonly produce. If the ingredients are available here, cook the dish!
4. Vegetables can be preserved in a variety of ways to extend their shelf life. Research each of the following methods: frozen, canned, pickled, and refrigerated. Determine the pros and cons of each. Think broadly about what pros and cons to include such as costs to process, impact on nutrients, impact on taste, shelf life, etc.

**These are all research based, therefore no answers have been provided**

### **Dairy Processing**

1. Is casein a protein, carbohydrate or fat? **Protein**
2. Is lactose a protein, carbohydrate or fat? **Carbohydrate**
3. Why do the trucks that transport milk have special stainless steel insulated tanks?  
**It ensures the milk is kept cool during transportation.**
4. What is pasteurisation and why does milk need to be pasteurised?  
**Because milk spoils very quickly, it must undergo pasteurisation, which is a heating process that destroys disease carrying pathogens.**
5. Label each description with the proper word from the list below:

<b>Curds</b>	clumps created by chymosin
<b>Heating</b>	allows lactic acid to build up and create a firmer, more elastic texture
<b>Brine bath</b>	salty water that provides flavour and kills unwanted bacteria
<b>Coagulation</b>	lactic acid or rennet is added
<b>Chymosin</b>	an enzyme that helps with the formation of clumps
<b>Rennet</b>	found in the fourth stomach lining
<b>Whey</b>	liquid that remains after curdling

Coagulation	Chymosin	Rennet	Curds
Whey	Heating	Brine bath	

## Farm to Fork: Primary and Secondary Processing

---

6. Complete the chart on characteristics of different cheeses.

Level of ripening	Maturation	Characteristics	Example cheeses
Unripened cheese	Matured around <b>2</b> weeks	<b>High</b> moisture level <b>Low</b> fat content <b>Soft</b> texture	Feta
Ripened cheese	<b>Semi</b> mature to mature	<b>Mild</b> flavoured <b>Smooth</b> or crumbly texture	Cheddar
<b>Ripened</b> cheese	Matured	<b>Low</b> moisture level <b>Strong</b> flavour <b>Hard</b> texture	Pecorino <b>Parmesan</b> <b>Provolone</b>