



# Dairy

Where do we get our marvellous milk, yummy yoghurt, chewable cheese, beautiful butter and exciting ice-cream?

The answer may surprise you.....cows of course!

Not just any cows though, all dairy products start life as milk, and milk starts off in the stomach of a *dairy* cow. There are lots of different types of dairy cows, which will we discover a little later.

What is so special about dairy cows that allow them to make milk just by eating grass?

Dairy cows have four stomachs!

Each of a cow's four stomachs has a very special job to do in order to digest the grass the cow eats and turn it into milk.

The four stomachs are called:

The rumen, the reticulum, the omasum and the abomasum.

Cows swallow their food when it is only half chewed, then it travels to the **rumen** where it is mixed with water and sent to the **reticulum**. The job of the reticulum is to turn the food into small balls, called **cud**, it then sends the cud back to the mouth to be chewed again.

Sounds like a lot of work doesn't it?

After the cud is chewed for a second time, it goes to the **omasum** where the water is squeezed out of the cud.

The food is finally digested in the **abomasum**, and sent on its way to the small intestine.

The small intestine takes the **nutrients** out of the digested food and sends them back to the cow's blood. Some of this blood then travels to the cow's **udder**, where the secretory glands turn the nutrients into milk.

**The cow's job is now done!**

But how do we get milk from the cow?

In the past, dairy farmers would milk their cows by hand, by squeezing the teats on the cow's udder and collecting the milk in a bucket underneath. These days milking is done by computerised machines at the farm.

Twice a day, cows make their way to the milking area where the dairy farmer places a suction cup on each teat of the cow's udder. These cups are connected to rubber hoses. When the machine is turned on, the machine's pumps gently suck the milk from the cow's udder and into the hoses.

The milk then moves through the hoses into stainless steel pipes that take the milk to large refrigerated tanks on the farm, where the milk is cooled quickly to make sure no germs get into the milk.

The milk then needs to be checked for freshness and then it is sent away to be **processed**.

The milk is transported to the processing plant in stainless steel tankers that are refrigerated to keep the milk cold, clean and fresh. When the milk arrives at the plant it is tested again, this time the milk is also tested to find out its **protein** content. If the milk is good quality it is pumped into large refrigerated tanks, called **vats**.

The milk is then gently heated and cooled again to make sure it is free from germs, this process is called **pasteurisation**.

The milk is then pushed through a fine sieve. This breaks down the cream and spreads it through the milk, making the milk smooth and creamy. This process is called **homogenisation**.

The milk is now ready to drink but must first be packaged into bottles and cartons. Some milk is made into other dairy products like cheese, yoghurt, butter and ice-cream.

The packaged milk is then taken by refrigerated trucks to the shops where we can buy it and take it home.



## Where are dairy farms?

There are dairy farms in every state in Australia but most of our milk is produced in the south eastern areas of Australia, where the climate is cooler and where most of our population lives.

Dairy cattle like to live in cooler areas where there is plenty of rain and water to grow the grass that they eat. Some dairy farms rely on **irrigation** and this allows them to be in areas where the rainfall is not as high.

Dairy farms are usually found quite close to towns and cities. This is because milk needs to be very fresh when it gets to the shops for us to buy it. Being close to where it is sold also helps to keep the price of milk lower, as transportation of milk is a big part of its cost.

## Are all dairy cattle the same?

There are many different breeds of dairy cattle, but in Australia most of our milk is produced by Holstein cows. Holsteins are very large, black and white animals who produce large amounts of milk everyday.

Some other breeds that are very popular in Australia include: Jersey, Aussie Red and Illawarra.

## For you to think about!

*What do cows need to make good milk?*

*Why do you think milk is carried in stainless steel?*

*Why is it important for dairy farms to be close to towns and cities?*

## To research:

*How is milk made into other dairy products?*

*What are the benefits of each breed of dairy cattle?*

*How do dairy farmers know where each of their cattle is and how much milk she is producing?*

*How do dairy farmers use technology in milk production?*

## Glossary

**Cattle** – large animals kept for milking and meat production

**Rumen** – the first of a cow's four stomachs

**Reticulum** – the second of a cow's four stomachs

**Omasum** - the third of a cow's four stomachs

**Abomasum** - the last of a cow's four stomachs

**Cud** – partly digested food

**Nutrients** – substances that provide nourishment like vitamins and minerals

**Intestine** – part of the digestive system that digests and absorbs food

**Udder** – Part of the cow where milk is stored until milking

**Process** – to change something through a series of actions or operations

**Suction** – pressure that causes a pulling or sucking action

**Tankers** – a large truck that has a container that carries liquid or gas

**Transported** –when something is carried from one place to another

**Vats** – a large container used to store liquids

**Protein** – a substance that in food that humans need to build strength

**Pasteurisation** – heating a food to kill germs in order to make it safe

**Homogenisation** – blending of particles in a liquid to make it smoother

**Sieve** – a flat utensil with a series of small holes, used to push food through

**Irrigation** – water brought by pipes



# Eggs

## Where do we get our exceptional eggs?

Most of the eggs we eat in Australia are chicken eggs but other poultry **species**, such as ducks and quail, also produce eggs that are good to eat.

It is the job of the female birds, called hens, to lay the eggs.

Let's take a look at chicken eggs!

## What is so special about hens that allow them to make eggs?

An egg starts in the **ovary** of a hen where yolks are produced. The yolk is released from the ovary and into a long tube inside the hen, called the **oviduct**. In the oviduct the white part of the egg, called the **albumen**, is formed over the yolk.

Next, the inner and outer shell **membranes** are formed. These keep germs out of the egg.

When the shell is complete the egg travels down the oviduct and out of the hen's body.

This process takes a little more than 24 hours and starts again about 30 minutes after the egg is laid.

A hen does not need the help of a **rooster** to lay eggs!

The hen's job is now done!

## But how do we get eggs from the hens?

On most **commercial** egg farms, **conveyor belts** are used to collect the eggs from inside the sheds where the hens lay them. Then the eggs are placed in large trays and delivered by refrigerated trucks to a packing centre.

At the packing centre, the eggs are sorted for size and graded for quality and packed into cartons to be sent to the shops for us to buy.

## Where are egg farms?

Egg farms are in every state and territory in Australia and are usually close to cities and towns.

## For you to think about!

*Why do you think eggs are packed in cardboard boxes?*

*Why is it important for egg farms to be close to towns and cities?*

## To research:

*How are eggs used in other products?*

*What are the health benefits of eggs?*

*What do the terms caged, free range and barn laid mean?*

*How do farmers use technology in egg production?*

## Glossary

**Species** - a kind, sort, or variety of something

**Ovary** - reproductive organ that produce eggs

**Oviduct**- tube in the hen's body that transports eggs

**Albumen** – the clear protein that surrounds the yolk of an egg

**Protein** – a nutrient that builds body cells

**Commercial** – buying and selling of goods

**Rooster** – a male chicken

**Conveyor belt**



# Grains

## What are grains?

Grains are the nutritious **edible** seeds of cereal **crops** like wheat, corn, oats and barley; and of legume crops such as chickpeas, lentils, peas and kidney beans.

## Where do we get our grains?

In Australia, we eat many different types of grains but they all have one thing in common; they all started life on a grain farm!

Grain farms are in every state of Australia, growing grains in summer and winter.

## What is so special about grains?

Grains can be used in many different ways and are a very important part of our diet. They can be eaten whole or they can be milled and used as flour or **processed** further and added as **starch** or **glucose** to many different foods.

## How do the wheat grains end up on our plates?

When the weather is just right, grain farmers plant the seeds for their crop. This is a very busy time for farmers, as the seeds must be planted quickly before the weather changes.

Over the next few months, farmers must watch their crop very carefully to make sure the grains have enough water and **nutrients** to grow well. They must also guard the crop from pests and diseases; and control weeds that could ruin their crop.

When the crop is fully grown; a large machine, called a harvester, cuts the heads off the plants and separates the grains from the waste products.

The grain is then weighed and checked for quality. The quality of the grain will affect what it will be used for.

If the grain is high quality it will be sent to a mill, where it will be ground into flour. This flour will then be sent to bakeries and other factories to be processed into bread, pasta, biscuits or other foods that are then packaged and sent to the shops for us to buy.

Many grains, like corn and rice, are sent to factories to be puffed or flaked to be used in breakfast cereals; and some grains are used to feed farm animals.

Legume grains can be cooked and tinned; or dried and packaged; they are then sent to **market**.

Because Australian farmers grow more grain than we need here, most Australian wheat is **exported**.

## For you to think about!

*What do grains need to grow well?*

*Which cereal and legume grains have you eaten in the last 24 hours?*

*Why is grain sent to a mill?*

## To research:

*How many other grains can you name?*

*What other crops or animals can be farmed in areas where wheat grows well?*

*How do grain farmers use technology in grain production?*

*Where does Australian wheat get exported to?*

## Glossary

**Edible** – suitable for eating

**Crop** - a group of plants grown by people for food or other use

**Nutrients** - substances that provide nourishment like vitamins and minerals

**Starch** – a substance used as a thickener

**Glucose** – sweet syrup that is found in starch

**Processed** – changed through a series of actions or operations

**Market** – a place where goods are bought and sold

**Exported** – sent for sale in other countries



# Orange Juice

## Where do we get our orange juice?

Well yes, it is from oranges, but where do oranges come from?

Let's take a look!

Oranges are one of a family of fruits called citrus. **Citrus** fruits grow on trees and include oranges, limes, lemons and grapefruits.

Oranges and other citrus fruit are usually grown on farms that have hundreds of fruit trees, these farms are called **orchards**.

Oranges are grown in most states in Australia, except Tasmania. Oranges need lots of water and sunshine to grow well and to ripen.

There are many different varieties of oranges but the most common in Australia are **Navel** and **Valencia**.

Navels are dark orange in colour, are seedless and have a **bulb** type part at one end, a little like a belly button!

Navels are at their best from June to August.

Valencias are a lighter orange colour and often have a green tinge or patch on their skin. Some people think that these are not ripe or ready to eat, but actually the green colour is a very clever sunscreen that the orange develops to protect itself from the sun while it is growing on the tree.

Even oranges need sunscreen!

Valencias are best eaten from November to February.

## How do oranges grow?

Orange trees can take several years until they are strong enough to produce oranges. When they are mature, small white flowers appear on the tree; these flowers then turn into small fruit, which grows with the help of good soil, sunshine and lots of water. Oranges need to stay on the tree until they are ripe to develop their sweet taste. This can take up to 18 months.

## How do oranges get to us?

When the oranges are ripe, they are picked by hand, by twisting and breaking the stalk.

The oranges are then sorted for size and **quality**.

The fruit is then packed into cardboard lined boxes and is taken to market.

The best oranges are packed for eating and others are sent to factories to be made into juice, cordials and other products.

When buying oranges choose those that are firm, bright in colour and heavy.

## What about the juice?

Some oranges, usually valencias, are taken from the farm to a factory to be made into juice. The oranges are washed, rinsed and dried and then put through large machines that squeeze the oranges until all the juice is removed. The fruit solids, like skin and seeds, are taken away through a tube and the juice is sent through tiny holes in the tube wall. The juice is then pasteurised and sometimes sugar and **preservatives** are added.



The juice is then bottled and sent by large refrigerated trucks to the shops ready for us to buy and take home.

Oranges with thin skins usually contain more juice than thick skinned fruit.

### For you to think about!

*Why are the oranges sorted before they are packed?*

*Why are oranges picked by hand?*

*Why aren't oranges grown in Tasmania?*

*Why are heavy oranges best?*

*Why are valencias the main orange used for juicing?*

### To research:

*What are some other varieties of oranges that are grown in Australia?*

*What are some of the characteristics of each variety?*

*How do farmers know when the oranges are ready to be picked?*

*How do farmers use technology on the orchard?*

*Are juice factories close to the orchards?*

### Glossary

**Citrus** – acidic fruits that grown on trees

**Orchard** – a farm or area of land where fruit or nut trees are grown

**Bulb** – a rounded part of something, often from which a plant grows

**Ripen** – to become fully developed or ready to eat

**Mature** – fully grown

**Variety** – a specific kind or type of something

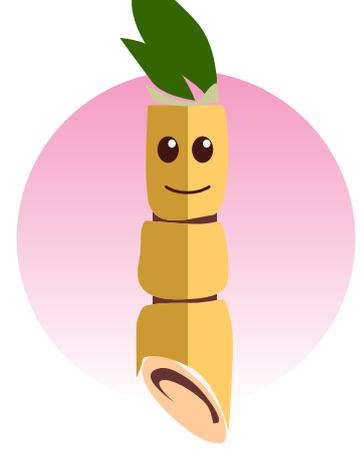
**Pasteurised** – when food is heated to kill germs in order to make it safe

**Preservatives** – an additive that provides protection from spoiling or decay

[http://www.freshforkids.com.au/fruit\\_pages/orange/orange.html](http://www.freshforkids.com.au/fruit_pages/orange/orange.html)

<http://www.madehow.com/Volume-4/Orange-Juice.html>

<http://www.oranges.com.au/>



# Sugar

## Where do we get our sugar that is in so many of our sweet treats?

The answer may surprise you.....a plant!

Sugar comes from a plant called sugar cane. Sugar cane is a **tropical** plant that grows tall and thin and looks quite a lot like bamboo. To grow well, sugar cane likes hot weather and lots of rain, so Queensland and Northern NSW are the perfect places for farmers to plant and grow this amazing **crop**.

## What is so special about sugar cane?

Sugar cane uses the rainfall and sunshine to make sugar in its leaves. Sugar is a form of **energy** and what the cane doesn't need to grow, it stores as juice in its long stalks.

## How does the sugar end up in our sugar bowl?

After the sugar cane is planted, farmers look after it for at least 16 months, until it has grown tall and ripened. When the sugar cane stalks are ripe they are cut down by a very large machine, called a harvester. The machine then chops the cane into smaller pieces, about as long as your ruler, and sends them through a large metal tray and into a truck that drives along beside the harvester.

When all the cane has been harvested and chopped, it is sent by train or truck to a mill. This must be done immediately so that the juice doesn't **evaporate**.

At the mill the cane is crushed to remove the sugary juice.

This juice is cleaned and then boiled and made into raw sugar crystals. A thick brown syrup is left over, this is called **molasses**.

The raw sugar has to be cleaned again and **processed** further to make the white sugar most of us use at home.

Some of the sugar is packaged and sent to shops for us to buy and take home and some of it is sent to factories to be added to many things we eat; including lollies, ice-cream, soft drinks, tinned fruit and vegetables and sometimes even bread!

## For you to think about!

*What does sugar need to grow well?*

*What do you think molasses would taste like?*

*Why is it important for cane farms to be close to a mill?*

## To research:

*How many other types of sugar can you name?*

*Why do the different types of sugar taste different?*

*How do cane farmers use technology in sugar production?*

## Glossary

**Tropical** – from a climate that has temperatures and rainfall high enough to support year-round plant growth

**Crop** – a group of plants grown by people for food or other use

**Energy** – a supply of power

**Ripe** – mature and ready to eat

**Evaporate** – when moisture is heated and turns into vapour or steam

**Harvester** - a machine that gathers crops from the fields

**Molasses** - thick dark syrup produced in the sugar refining process

**Processed** - changed through a series of actions or operations