TEACHERS EDITION

Yakult Adventure

Yakult Adventure for Teachers

Yakult is committed to improving and providing a link between education and the food industry.

'Every Body' is welcome for a free factory tour of Yakult's facilities which can be individualised to your area of study and curriculum needs. Topics covered include food manufacturing and processing, scientific topics such as bacteria and quality control, health topics about digestion, probiotics and healthy eating and environmental studies including energy management and recycling.

School incursions can also be arranged for schools in Metropolitan Melbourne.

Our Primary Program includes the Yakult Adventure resource for students and this resource to support incorporating Yakult into your curriculum.

For more information about Yakult, visit **www.yakult.com.au** or call us on **1800 640 023**.

What is **Yakult** ?

Yakult is a fermented milk drink containing our unique probiotic bacteria, the *Lactobacillus casei* Shirota strain.

THE ORIGINS OF YAKULT

Dr Minoru Shirota devoted his life to the study of intestinal bacteria and preventative health.

In 1930, Dr Shirota discovered the probiotic bacteria *Lactobacillus casei* Shirota that reaches the intestines alive with the potential to contribute to human health. The Shirota strain was named in honour of his research.

Probiotic bacteria assist in creating 'digestive balance' by encouraging the growth of beneficial bacteria in the digestive system.

Dr Minoru Shirota
(1899 - 1982)

In 1935, the world's first commercial probiotic drink was launched as 'Yakult'. This probiotic milk-based drink ensures that the *Lactobacillus casei* Shirota strain survives the journey through the digestive system and assists in making a positive contribution to the intestinal microbiota.

Yakult was initially produced in Dr Shirota's clinic. Distribution and demand for Yakult grew which led to the establishment of Yakult Honsha Co. Ltd. in Tokyo, the founding company for Yakult worldwide.

Yakult in Australia

Yakult Australia produces Yakult Original and Yakult LIGHT fermented milk drinks in 65ml bottles containing 6.5 billion live *Lactobacillus casei* Shirota strain in every bottle.

Both Yakult Original and Yakult LIGHT have a similar taste. However, Yakult LIGHT has 75% less sugar and 40% less calories.

WHAT'S IN A NAME?

Lacto – relating to milk or in chemistry term, lactic acid

bacillus – distinctive rod-shape

casei – from casein, a protein found in dairy products

Shirota – strain discovered by our founder, Dr Minoru Shirota, and named in his honour

Facteria!

There are 100 million live *Lactobacillus casei* Shirota strain in every 1ml of Yakult.

Lactobacillus casei Shirota strain

The *Lactobacillus casei* Shirota strain:

- Is highly acid resistant, surviving the journey through the digestive system
- Arrives alive in the small intestine
- Helps maintain the balance between beneficial and potentially harmful bacteria present in our digestive system
- Encourages the growth of beneficial bacteria in the intestines such as Lactobacilli and Bifidobacteria
- Suppresses the growth of potentially harmful bacteria, that produce substances which are detrimental to our health

FOR STUDENTS:

1. Describe the taste of Yakult.
2. Draw the shape of the *Lactobacillus casei* Shirota strain.
3. How many zeros are in 6.5 billion?

CLASS ACTIVITY:

Brainstorm words which also mean beneficial.

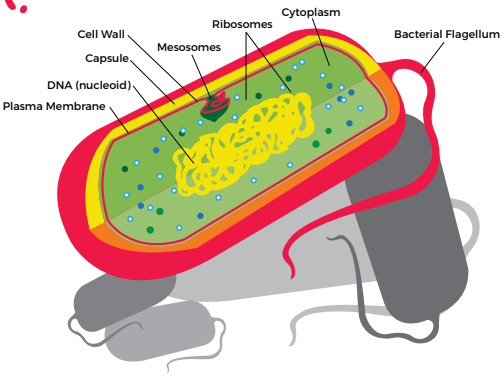
SMALL GROUP ACTIVITIES:

How many words can you make from the letters in the words 'Lactobacillus casei Shirota strain' ?

What are Bacteria?

Bacteria are microscopic living organisms, single-celled and can be found everywhere on Earth.

There are harmful bacteria which can be pathogenic, causing disease in some living organisms and beneficial bacteria which can help improve or maintain health in some living organisms, such as the bacteria used in Yakult. Bacteria can also play an important role in processes such as fermentation and decomposition.



Bacteria play a vital role in our digestive system. These bacteria are known as your intestinal microbiota – including beneficial and potentially harmful bacteria in your digestive system.

Facteria!

Did you know that you are able to see the live *Lactobacillus casei* Shirota strain from a bottle of Yakult under a microscope?

Facteria!

Probiotics are beneficial bacteria, that when taken in adequate amounts, can have a benefit for the host.

Bacteria are able to reproduce by dividing into two clone cells (known as daughter cells) and may consume sugars, starches, sunlight, sulphur and iron for energy. Bacteria can survive in a variety of conditions including the freezing Antarctic and volcanic lava.

FOR STUDENTS:

1. Research 5 interesting examples of food that are made using bacteria.

CLASS ACTIVITY:

Investigate the role that beneficial bacteria play in the digestive system.

SMALL GROUP ACTIVITY:

Using craft material, create an 3D artwork showing the general structure of a bacterium on an A4 paper.

Digesting the Facts

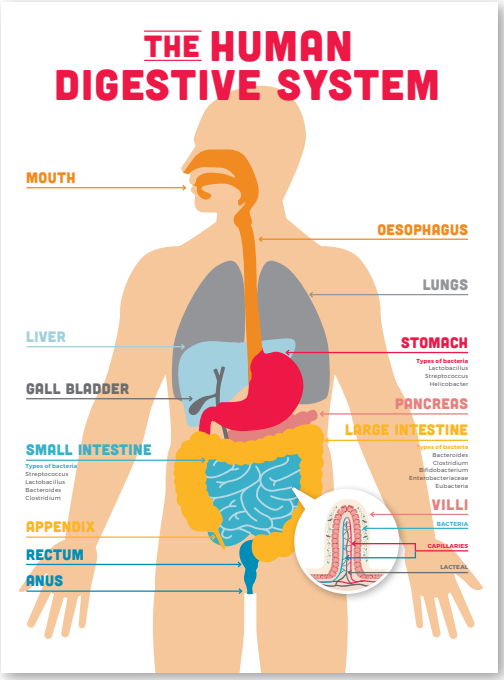
Digestion is a process in which the necessary nutrients within foods are made accessible to the body for growth and functioning.

Digestion of food begins in the mouth where food is masticated or chewed into smaller pieces. Chewed food is mixed with saliva to create a bolus. The bolus is then swallowed and travels down the oesophagus to the stomach via peristalsis. Peristalsis is the wave-like muscle contractions that moves food through our digestive system.

In the stomach, food is further broken down by stomach acids. The stomach acids also protect our body from any foreign bacteria entering our body. The partially digested food, also known as chyme, is released to the small intestine.

In the small intestine, our body secretes chemicals to digest food and release the nutrients and energy our body requires. The small intestine is where most of the nutrients are absorbed into the bloodstream to be taken to where the nutrient is required.

The undigested food then passes from the small intestines to the large intestines where water and salts are absorbed into the body and further processed into waste.



FOR STUDENTS:

1. Complete an interactive digestive system game, based on teachers choice.
2. Recreate a diagram of the human digestive system with labels and functions. For lower primary students, complete a digestive system colouring page and match the correct organs to the diagram.

CLASS ACTIVITY:

1. Conduct a digestive system simulation.
2. Create a questionnaire or trivia questions about the digestive system and test your classmates in a hotspot game such as “Who Wants to Be a Millionaire”.

SMALL GROUP ACTIVITIES:

1. Explore lunch in outer space!
2. Explore the digestive system in other animals.

Nourishing Foods

A focus on positive food experiences and reinforcement of healthy lifestyle messages is important when educating children about health eating and nutrition. Foods contain nutrients such as energy, vitamins, minerals and fibre.

Our bodies need the nutrients from food to function and grow. Eating a variety of foods means you are more likely to be getting all the different nutrients your body requires. This means eating foods from all five food groups.

Facteria!

THE FIVE FOOD GROUPS ARE:

1. Grains such as breads, cereals and rice
2. Vegetables and legumes
3. Fruits
4. Lean meats, poultry, fish, eggs, nuts, seeds, legumes and beans
5. Dairy foods including milk, yoghurt and cheese and dairy alternatives

FOR STUDENTS:

1. Design a healthy lunch box including the appropriate serves of food from all food groups. Aim for 5 different vegetables and 2 pieces of fruit daily.
2. Name as many fruits and vegetable as you can.

CLASS ACTIVITY:

1. Explore and discuss the Australian Guide to Healthy Eating pie-chart. Provide 5 examples from each food group.
2. List three different strategies to include more vegetables in your lunch. Compare your list with the rest of the class.

SMALL GROUP ACTIVITIES:

Create your own "Eat a Rainbow" chart by cutting images from magazines or supermarket catalogues, or by drawing and colouring the fruits and vegetables.

Source: National Health and Medical Research Council

How is Yakult Made?

1 INGREDIENTS USED ARE:

- Skim milk powder
- Sugars – sucrose and dextrose
- Flavouring
- Water
- 6.5 billion *Lactobacillus casei* Shirota strain

Yakult LIGHT contains the same ingredients as Yakult but also with maltitol, polydextrose and STEVIA, a plant-based sweetener to reduce the amount of sugar needed to give Yakult LIGHT its sweet taste.

2 DISSOLVING AND STERILISATION:

The skim milk powder and sugars are dissolved with sterile filtered water and sterilised with high temperature. The process of sterilisation kills all living microorganisms in the mixture, which is then transferred to a tank via a series of pipes and valves.

3 FERMENTATION:

The mixture is cooled to human body temperature. The beneficial *Lactobacillus casei* Shirota strain bacteria is cultured and ferments the milk mixture until high numbers of the bacteria are reached. Fermentation is the use of microorganisms to breakdown substances to produce energy required to grow, acids and other by-products. The fermentation of milk produces lactic acid which produces a sour taste and thickens the milk mixture.

4 HOMOGENISATION:

The thick fermented milk mixture is homogenised, a treatment where lumps are removed from a liquid by passing it through a machine which has tiny sieves to create a smooth consistency.

5 BLENDING, MIXING AND STORAGE:

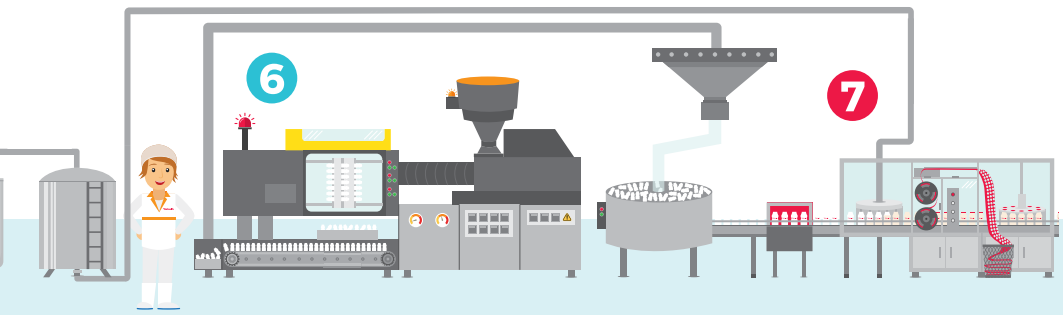
The milk is then blended with a unique flavour and sugar syrup and then stored chilled to slow the growth of the bacteria. This forms Yakult concentrate. The Yakult concentrate is blended with sterilised water and stored in a tank ready to be bottled.

6 THE PLASTIC BOTTLES ARE MADE USING 3 INJECTION BLOW MOULDING MACHINES:

The plastic bottles are made using an Injection Blow Moulding Machine. Triple food grade polystyrene code 6 recyclable beads are heated to melt the plastics. It is then moulded by filtered air pressure passing through a rod to create the shape of the bottle within the mould. Each machine can make 11,000 bottles an hour, which are then stored in large storage tanks.

7 BOTTLE PRINTING, FILLING, CAPPING AND SEALING:

The bottles pass through a selector machine that places the bottles upright on the automatic line to be printed with the quick drying, non-toxic red ink for the Yakult logo or the blue plastic film Yakult LIGHT label shrunk around the bottles. The labelling contains product information including ingredients and company details. The use-by date and batch code are printed on the waist of the bottle. Bottles are filled with 65ml of fresh Yakult, capped with either a red or blue foil lid and sealed. The bottles travel via conveyor belts to the packaging area.



How is Yakult Made?

8 PACKAGING:

Sealed bottles travel to one of two packaging lines, wrapped in polypropylene film which is then shrink wrapped to make either a 5 or 10 pack. Packages are then automatically grouped together to form a 'slab' of 50 bottles.

9 ROBOTIC ARM:

Three slabs are picked up and stacked onto a pallet by a robotic arm, wrapped in clear film to secure the pallet and then moved to the Cold Storage Room.

10 QUALITY CONTROL:

Quality Control tests are carried out throughout the production of Yakult. All bottles must pass the tests before they can be released to the stores. Tests include extensive microbiological, composition and taste testing on the samples collected from every batch and every stage of Yakult production. The bottles, caps and packaging are also inspected.

11 COLD CHAIN DELIVERY:

From our Cold Storage room Yakult is delivered to stores by:

- Refrigerated trucks to large supermarket warehouses.
- Sales consultants driving refrigerated vans to smaller independent supermarkets, international grocers and convenience stores.

FOR STUDENTS:

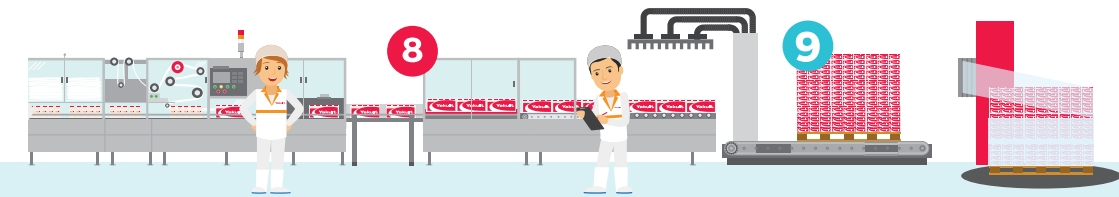
1. How many bottles are in a slab?
2. Calculate how many bottles are stacked onto a pallet if there are 168 slabs on each pallet.
3. Draw a Yakult worker with 5 items of protective clothing.
4. Put these steps in the correct order:
   a. Yakult is made.
   b. Bottles have their labels marked with quick drying red ink.
   c. Bottles are checked to make sure they are full.
   c. Yakult is put into bottles.

CLASS ACTIVITY:

1. Investigate Yakult products in countries around the world.
2. Research the unique shape of the Yakult bottle.

SMALL GROUP ACTIVITIES:

Draw and label a flow chart of how Yakult is made; naming each stage.



Energy management and recycling

Yakult makes a conscious effort to ensure the manufacturing process creates as little waste as possible and we endeavour to reduce the amount of energy our factory needs to run efficiently.

Some of the actions Yakult has taken to be environmentally friendly include:

- Effective waste management strategies contribute to a cleaner and less wasteful facility – approximately 99% of Yakult's raw ingredients end up in the bottle. There are no byproducts.
- Cleaning waste is processed in the on-site water treatment facility.
- Recycling of packaging materials occurs where it is economically and environmentally viable, for example:
  - > Paper products such as skim milk powder bags are recycled.
  - > Bottles are collected for recycling. They are crushed and mixed with other resin to be repurposed into products such as plastic chairs and tables.
- Keeping equipment well maintained
- Heating liquids with heat exchange plates so that energy is not lost or wasted
- Not using chlorofluorocarbons (CFC) in cooling or refrigeration
- Using off peak rates for utilities where possible
- Using a natural gas boiler for short periods which does not pollute the air
- Using LED lights

FOR STUDENTS:

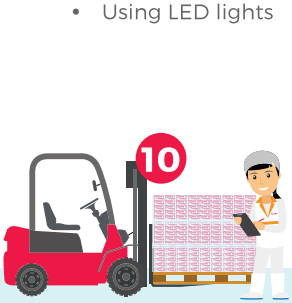
1. What types of packaging material does Yakult use?

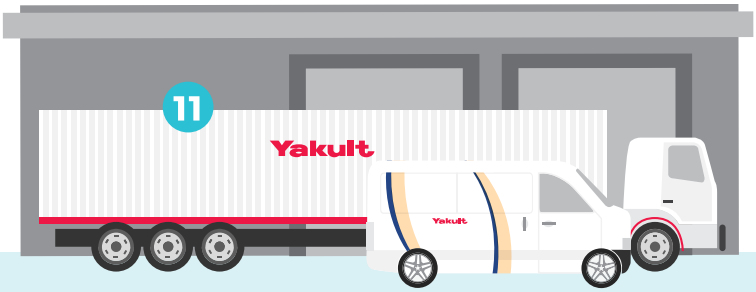
CLASS ACTIVITY:

Brainstorm ways to reduce packaging materials.

SMALL GROUP ACTIVITIES:

Identify any materials which can be reused or recycled in your classroom.





Facteria!

DID YOU KNOW?

Yakult Original is made from at least 99% Australian ingredients.

What's on the Packaging?

Food companies are required by law to include important information on labels of food products.

This includes the name of the product, the manufacturer, country of origin, an ingredients list in order of amount, company contact details and a clearly marked use-by or best-before date.
A nutrition information panel is also required on packaged foods which must include the amount of energy, protein, fat, saturated fat, carbohydrates, sugars and sodium contents, per serve and per 100 grams.

FOR STUDENTS:

1. Investigate the Yakult packaging. Write 5 examples of information presented on the pack. For example, use-by date.

CLASS ACTIVITY:

Discuss why we need food labelling requirements.

SMALL GROUP ACTIVITIES:

Discuss the difference between best-before and use-by dates.

Yakult

www.yakult.com.au

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