

3: Food – Levels 1 & 2

Food products and safety in our region





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Students explore food production in their local area. The amount of learning that can take place outside the classroom will depend on the food system you choose to investigate. Visits or virtual online connections with local farms, orchards, cool stores, ports, and processing or packaging operations are useful to give glimpses into the broader context of food production. Opportunities may be limited due to the community's location or health and safety requirements. However digital representations such as videos, [LEARNZ virtual field trips](#), and advice from visiting experts can supplement or take the place of physical field trips.

If appropriate to your region, you may choose to look at the production of fibre, either from plants, such as timber, hemp products, or flax products; or animals, such as wool or hair. The production and processing of fibre products can be compared and contrasted to those used in the production and processing of food products.

Key understandings

- There are different parts to food supply chains that make up the pathway to consumers.
- Food processing is important to keep food safe.

Local food production

Food in our town

Help students identify food produced in their local area for local and regional consumption. Foods can include fruit, vegetables, meat, poultry, dairy produce, fish, and seafood.

1. Students brainstorm a list of foods produced in their local area. Link this activity to students' lives outside school – shopping at supermarkets, road-side stalls and farmers' markets, the farms they live on or the factories where their parents or neighbours work, their backyard chickens and vegetable gardens, the experiences of whānau members, etc.
2. Collate the information to create a class database about the local area. Categorise the food types (meat, seafood, poultry, fruit, vegetables, dairy, etc.) and their markets (local, regional, national or international).
3. Students can create a class garden (indoors or outdoors) and learn how to grow vegetables. End the school term or year with a shared class lunch, using the food that the students have grown.
4. Explore the broader historical picture. Connect with local iwi and visit a historic pa site with them. Explore the site with a focus on food growing, harvest, storage, preparation, and cooking. Examine the technology behind different food storage containers or pātaka, investigating why the technology was needed, the materials that were used, and how the design and materials created a functional item that was fit for purpose. Consider how we have adapted these containers by using a wider range of materials and more complex technology today.

Getting food on your table

Ask students to investigate how food is processed for human consumption. Help them to understand the importance of food safety, and how this is achieved and tested.

1. Encourage students to explore the components of a simple food supply chain that shows how food from a farm or orchard ends up on the table. Introduce words like producer, farmer, fisher, orchardist and consumer (people eating food).



2. Choose a food that is produced locally and investigate the journey from its origins to the consumer by interviewing someone who is involved in the food's production, for example, local food manufacturers and processors, farmers, chefs, restaurant or cafe owners, local iwi, supermarket owners, or regulatory authorities, such as MPI, local councils and health providers.
3. As students prepare their interview questions introduce the concepts of food safety, animal welfare and contamination and encourage them to ask questions around these ideas. This will give students an introductory base for the activities they meet in the next section of this resource. Their questions could be as simple as:
 - How is the food kept safe?
 - How do you look after the animals under your care (if applicable)?
 - How do you make sure pests and diseases don't damage or spoil food?
4. Student learning can be visually represented in a flow chart or an infographic showing the food supply chain for the chosen food. [Creative Blog](#) outlines ten free digital tools for making infographics.
5. Model the use of key vocabulary – 'growing', 'harvesting', 'packing', 'processing', 'distributing', 'storing', 'retailing', 'consuming' and 'supply chain'. As an ongoing shared writing activity, create an illustrated class dictionary or glossary for student reference.
6. Identify technologies that are used in the documented food supply chain and discuss how these have changed the supply chain. For example, the impact on efficiency of the chain, safety of food, safety of people, jobs for people, cost, etc.



Keeping our food safe

Any number of things can put our food and consumers at risk. Students investigate how pathogenic microbes occur in, or can get into the food system. These pathogens can lead to spoilage or foodborne illness. Once the students have a basic understanding of how pathogens get onto food, they can explore ways this can be avoided or minimised during food production and sale, and in the home.

All food systems can be affected by pathogens such as viruses, fungi, and bacteria. They may be naturally on the raw food items or may be present due to cross-contamination from direct human contact or a lack of cleanliness within the food system pathways.

The presence of pathogens or **spoilage organisms** can tip the balance of a food system. Food may not last through the food system when procedures that preserve and prevent contamination are not followed. Although often they cannot be seen, pathogenic microbes make people sick and we need to take precautions against them.

Students may be more familiar with the colloquial term “germs”. Encourage them to use the correct scientific terms to avoid confusion.

Some simple definitions

Pathogens – any organism that can cause disease. Bacteria, viruses and fungi are all pathogens.

Bacteria – single cell microorganisms found everywhere, including on and in animals, plants, the air, soil and waters. They can reproduce on their own. Examples include *Campylobacter* and *Salmonella*.

Viruses – smaller than bacteria, viruses can't reproduce themselves and need to get inside a host cell to be copied. Influenza and the common cold are caused by viruses. Examples from food include *Norovirus* and *Hepatitis*.

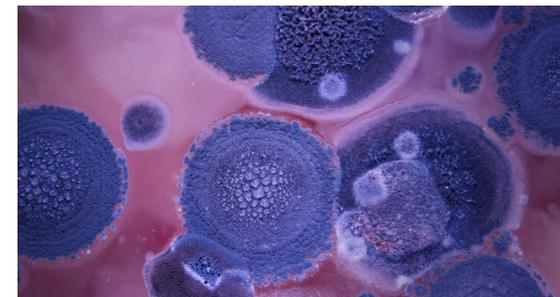
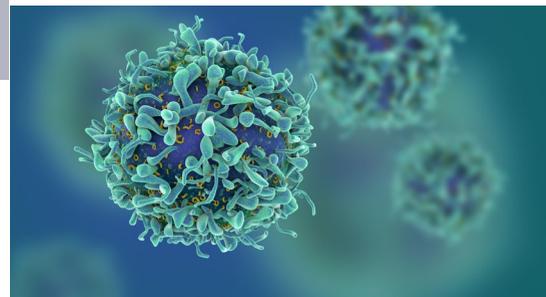
Fungi – there are many different types of fungi. Only some can be seen with the naked eye. Fungi feed on other organic matter. Examples include *Aspergillus* (the blue mould in bread and cheese), mushrooms and yeast. Some moulds produce aflatoxins that cause foodborne illness.

Pathogenic microbes

Help students investigate how pathogenic microbes occur in, or can get into the food system.

Viruses:

- Young students may find it difficult to understand living things that cannot be seen with the naked eye. Provide them with magnifying glasses to help them to understand the process of enlarging an image. If possible show them how to use a microscope to look at bacteria and fungi on slides. You can find examples online, such as [Huffington Post article on viruses](#), [Discover Magazine gallery of pathogens](#), [National Geographic gallery of pathogens](#) and [Live Science gallery of fungi](#).
- Students can make their own models of a virus using play dough and cotton buds.
 1. Roll the dough into a ball and poke the cotton buds into it. The protein spikes (represented by the cotton buds) are what viruses use to break into cells.
 2. Make some more balls of playdough and have the students roll their ‘virus’ over these balls (or cells) to illustrate how the tips of the protein spikes make it easy for viral cells to attach to other things. This is how they multiply and spread.
 3. Pathogenic microbes carry out a hand washing activity to remind students to always wash their hands. You will need: hand soap or lotion, glitter (this mimics the pathogenic microbes) and clean hands. As a class work through the activity [Germs and Hygiene](#) (note that this activity using the term ‘germs’ – encourage students to use correct scientific terms).



Reducing risk in the food chain

1. Present some sliced vacuum packaged ham to the class. As a class, discuss what the supply chain for the production might look like. Put supply chain words on cards and provide pictures to match them – for example, a pig, abattoir, refrigeration truck, supermarket, and a family. Discuss the people involved at each part of the chain.
2. Discuss with the students when and how the ham could become contaminated. This could happen during:
 - growing, through the presence of pathogens in the production process;
 - transportation, through the use of non-refrigerated trucks or containers;
 - preparation, by being prepared on a cutting board that has not been cleaned.
3. Talk about ways the ham could be protected from food contamination. Consider whether some of these ways could be applied to local food processing systems.
4. Investigate how temperature is used in preserving and transporting goods, and then ask the students to experiment with different ways of transporting small blocks of ice, changing the variables to minimise breakage and melting.
5. Introduce the idea of pasteurisation – heating milk to a certain temperature to kill pathogenic bacteria. Although the milk does not change in a way that can be observed easily, the bacteria in the milk is being damaged until it is inactive. A basic, non-factory demonstration (so that students can see all the steps) can be found in this [YouTube video](#).
6. Selecting one of the local food systems as a context, students can examine all or part of it in more detail.
 - Investigate the ways your food system contributes to the local community, above and beyond providing a food source.
 - Create a scenario where the safety of your food system is put at risk. Students can respond to this scenario by predicting the consequences and planning innovative and creative solutions.
 - Ask students to try to determine whose responsibility it is to make sure that our food is safe. Look at the roles and responsibilities of producers, processors, and consumers for example.
7. Encourage students to explore the ways risks are addressed and problems solved in the food supply chain. Guiding questions:
 - How is this part of the process important?
 - In what ways are humans involved in the process?
 - In what ways are machines involved in this process?
 - What kinds of pathogens could put this food system at risk?

- How is food protected from pathogens or pests in this food system?
 - What impact do particular pathogens have – consider the effect on food and the effect on people eating it.
 - What methods are used to promote and ensure the safety of the food in the food system, for example, hand washing, disinfecting, heating or refrigeration, chemical sprays, pasteurisation, irradiation.
8. Explore ways technology has helped people to ensure safety and quality within a food system.
 - Select a technological product that is a key part of the food system. Draw a diagram to show how it works.
 - Explore some possible future technological changes that are relevant to safety and quality within a food system (for example, [robotic dairy farms](#)).

Food retailing

Take the class to a supermarket to investigate how different foods are kept safe. Students look at all the different ways that food is stored (refrigeration or freezer units, boxes, sealed packets, etc). Look for ways foods are separated into aisles and departments, how stock is rotated, use-by and best-before dates and what happens to food that is spoiled.

Food labelling

Students investigate the information that is included in a food label – the ingredients; amount of product; nutritional information; best-before or use-by dates – and understand why food labelling is an important component of food safety systems.

1. Students investigate the food in their lunch boxes to identify which foods have a label and which don't; the information that the label tells them about the ingredients, the



- amount, and best-before and use-by dates. Discuss why some foods, such as fruit, have no label or labels with no information (for example, the stickers on apples).
2. Ask students to categorise food items into categories – the four food groups of grains, vegetables, fruit, protein and dairy.
 3. Collect food labels, wrappers and boxes for students to analyse.
 4. Check ingredient lists on labels and highlight unfamiliar vocabulary.
 5. Investigate the difference between best-before and use-by dates.
 6. Investigate what happens to food that is past its use-by date.
 7. Compare the shelf lives of dairy products and cereals.
 8. Compare the shelf lives of fresh foods and highly processed foods and investigate why some fresh food can become unsafe after a short space of time due to the presence of bacteria, viruses or fungi, whereas some processed food has a longer life.

Related resource

For more information about labelling, see: [Ministry for Primary Industries: Food labelling](#)

For more information about food groups, see [Understanding the five food groups](#).

Food safety at home

Help students understand that all the precautions taken in the food production system will not help if food safety rules are not followed in the home. Information can be integrated into home learning projects to spread the food safety message to whānau and have children follow good food handling practices in authentic contexts.

1. Introduce or remind students of the 3 Cs – clean, cook, and chill. See [Ministry for Primary Industries: Tips for food safety](#).
2. Clean
 - Remind students about the importance of hand washing, clean utensils and clean surfaces.
 - Students compose a handwashing song or rap, long enough to cover the recommended twenty seconds washing and twenty seconds drying time.
 - Students need to know that it is not enough to put food into a fridge. Covering food and keeping similar food items together can avoid cross contamination.



- Share this poster [fridge layout](#), which gives information about safe food storage in a fridge, with the students. The students draw a fridge on a sheet of A3-sized card and cut out pictures of food from magazines and place them in the appropriate places in their 'fridge'.
3. Cook
 - Explain to students that cooked food is safe only after it's been heated to a temperature high enough to kill harmful bacteria. Different temperatures are required for different foods and different pathogens. Colour and texture alone don't indicate when food is cooked.
 - Watch [Cooking Food](#) and talk about food in different context, such as at home, at school, BBQs or on a marae.
 4. Chill
 - Explain that most harmful bacteria cannot grow at low refrigeration temperatures.
 - Students create posters for their fridges, outlining tips for chilling foods – especially leftovers.
 5. As a class, make a documentary outlining the risks to food safety in the home and what you can do to keep yourself and whanau safe. Share with other students and community members at a healthy afternoon tea event.

Related resource

[Book 23: Fresh Food: How Food Keeps and Loses Its Freshness](#)

