

**CURRICULUM ALIGNMENT &
CLASSROOM RESOURCES**
**STUDENT MADE CHEESE
COMPETITION**



GRADE 7 - GRADE 12

COMPETITION OVERVIEW

The Student Made Cheese Competition is an engaging way to teach students where their food comes from.

The competition assists secondary students at a basic level - discovering how cheese is made, where it comes from and the dairy industry as a whole. Within the Secondary curriculum, the cheese-making unit crosses over general science subjects such as Chemistry and Science Inquiry and Experimental Skills.

The competition follows on from the RNA Teachers' Cheese Making Workshops, led by international dairy judge Russell Smith.

IMPORTANT CONTACTS

Competition Enquiries

entries@rna.org.au

Education Content Enquiries

education@ekka.com.au

Ekka School & Group Bookings Enquiries

groupbookings@ekka.com.au

VERSION 8.4

Science Understanding: Chemical Sciences

Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques

([ACSSU113](#))

Science Inquiry Skills: Planning and Conducting

Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed ([AC SIS125](#))

Measure and control variables, select equipment appropriate to the task and collect data with accuracy ([AC SIS126](#))

VERSION 9

Science Understanding: Chemical Sciences

Use a particle model to describe differences between pure substances and mixtures and apply understanding of properties of substances to separate mixtures ([AC9S7U06](#))

Science Inquiry: Planning and Conducting

Plan and conduct reproducible investigations to answer questions and test hypotheses, including identifying variables and assumptions and, as appropriate, recognising and managing risks, considering ethical issues and recognising key considerations regarding heritage sites and artefacts on Country/Place ([AC9S7I02](#))

Select and use equipment to generate and record data with precision, using digital tools as appropriate ([AC9S7I03](#))



*Creative & Critical
Thinking*



*Ethical
Understanding*



Numeracy



Digital Literacy



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Dairy Australia – Responsible Production in the Dairy Industry

This project-based learning (PBL) unit has a series of activities that will inspire your students to use their thinking skills. It will also establish an appreciation of the processes they can apply as they come across difficulties in unfamiliar information and new ideas. Using six phases: Define, Discover, Dream, Design, Deliver and Debrief. Students will learn through designing and producing a solution for consumers and the industry by creating an educational product. It will also educate them about how the Australian dairy industry has embraced sustainable practices on farm, in processing, packaging and delivery of dairy products to customers.

<https://www.dairy.edu.au/resources/secondary-school-unit-resources/farm-to-plate-responsible-production-in-dairy-year-7-and-8>



ADDITIONAL LEARNING RESOURCES

Ekka – Meet Kay, A Dairy Farmer

Owners of the Tommerup Dairy Farm, Kay and Dave introduce our host, Sammie O'Brien to their cows, dogs, sheep, pigs and chickens. Tommerup is a fifth generation dairy farm in Kerry, Queensland with Jersey Cows that produce milk with a higher amount of butterfat, which provides a naturally creamier and richer flavour. Students can also understand the process of milking the cows via the machine milking process. <https://youtu.be/RKmEeKBUt-o>

Dairy Australia – A Day in the Life of a Dairy Farmer with Ben Geard

There is a lot of work that goes into running a dairy farm. Watch this video and find out what Ben Geard gets up to throughout the day on his farm in Tasmania, including the morning milking, feeding his animals and paddock management. Providing a great introduction to cheese making activities, this video highlights the production process of milk for students.

<https://www.dairy.edu.au/resources/video-resource/a-day-in-the-life-of-a-dairy-farmer>

**DISCOVER
DAIRY**



VERSION 8.4

Science Understanding: Chemical Sciences

Chemical change involves substances reacting to form new substances ([ACSSU225](#))

Science Inquiry Skills: Planning and Conducting

Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed ([AC SIS140](#))

Measure and control variables, select equipment appropriate to the task and collect data with accuracy ([AC SIS141](#))



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VERSION 9

Science Understanding: Chemical Sciences

Compare physical and chemical changes and identify indicators of energy change in chemical reactions ([AC9S8U07](#))

Science Inquiry: Planning and Conducting

Plan and conduct reproducible investigations to answer questions and test hypotheses, including identifying variables and assumptions and, as appropriate, recognising and managing risks, considering ethical issues and recognising key considerations regarding heritage sites and artefacts on Country/Place ([AC9S8I02](#))

Select and use equipment to generate and record data with precision, using digital tools as appropriate ([AC9S8I03](#))



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**DISCOVER
DAIRY**



VERSION 8.4

Science Understanding: Chemical Sciences

Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer ([ACSSU179](#))

Science Inquiry Skills: Planning and Conducting

Plan, select and use appropriate investigation types, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods ([AC SIS165](#))

Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately ([AC SIS166](#))

VERSION 9

Science Understanding: Chemical Sciences

Model the rearrangement of atoms in chemical reactions using a range of representations, including word and simple balanced chemical equations, and use these to demonstrate the law of conservation of mass ([AC9S9U07](#))

Science Inquiry: Planning and Conducting

Plan and conduct valid, reproducible investigations to answer questions and test hypotheses, including identifying and controlling for possible sources of error and, as appropriate, developing and following risk assessments, considering ethical issues, and addressing key considerations regarding heritage sites and artefacts on Country/Place ([AC9S9I02](#))

Select and use equipment to generate and record data with precision to obtain useful sample sizes and replicable data, using digital tools as appropriate ([AC9S9I03](#))



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Dairy Australia – Dairy Food Safety: The Australian Approach

The Australian Dairy Industry is committed to producing quality food, while providing best care for our animals, protecting the environment and supporting dairy workers and communities. Food safety in Australia is crucial to protect the health of the consumer and for the dairy industry, this means that milk and dairy foods are kept safe along the supply chain - from the farm right through to the customer.

<https://www.dairyaustralia.com.au/resource-repository/2022/10/16/dairy-food-safety---the-australian-approach-booklet#.Y4gm03YzaUI>



ADDITIONAL LEARNING RESOURCES

Ekka - Meet John, A Dairy Farmer

Join Sammie O'Brien as she takes you behind the scenes of Kenilworth Dairies, a working dairy farm and cheese factory. Kenilworth Dairies is owned by John and Margaret Cochrane, their son Kelvin and wife Ronnie. Dairy farmers for many generations, the Cochrane family are passionate about producing quality dairy products for Australians, including their award-winning cheese.

<https://youtu.be/VXLG3zoeMxs>

Dairy Australia - A Day in the Life of a Dairy Farmer with Brian and Michele Lawrence

Discover everything that Brian and Michele get up to in a day on their dairy farm. This includes milking via a rotary milking parlour, examining the data collected via automated milk production technology and cow health and feeding and caring for the cows, there's always lots to do. Providing a great introduction into the cheese making activities, this video highlights the milk production process for students.

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**DISCOVER
DAIRY**



VERSION 8.4

Science Understanding: Chemical Sciences

Different types of chemical reactions are used to produce a range of products and can occur at different rates ([ACSSU187](#))

Science Inquiry Skills: Planning and Conducting

Plan, select and use appropriate investigation types, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods ([AC SIS199](#))

Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately ([AC SIS200](#))

VERSION 9

Science Understanding: Chemical Sciences

Identify patterns in synthesis, decomposition and displacement reactions and investigate the factors that affect reaction rates ([AC9S10U07](#))

Science Inquiry: Planning and Conducting

Plan and conduct valid, reproducible investigations to answer questions and test hypotheses, including identifying and controlling for possible sources of error and, as appropriate, developing and following risk assessments, considering ethical issues, and addressing key considerations regarding heritage sites and artefacts on Country/Place ([AC9S10I02](#))

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VERSION 8.4 - CHEMISTRY UNIT ONE & TWO

Science Inquiry Skills

Design investigations, including the procedure/s to be followed, the materials required, and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics ([ACSCH002](#)) & ([ACSCH041](#))

Conduct investigations, including the use of devices to accurately measure temperature change and mass, safely, competently and methodically for the collection of valid and reliable data ([ACSCH003](#)) & ([ACSCH042](#))

Science as a Human Endeavour

The use of scientific knowledge is influenced by social, economic, cultural and ethical considerations ([ACSCH012](#)) & ([ACSCH051](#))

Science Understanding – Properties and Structure of Materials

The Importance of Purity

There is a large range of situations in chemistry where knowing and communicating the level of purity of substances is extremely important. Impurities can affect the physical and chemical properties of substances, resulting in inefficient or unwanted chemical reactions. Scientists use methods such as mass spectrometry to identify impurities and the level of contamination ([ACSCH014](#)).

Separation methods which improve the purity of substances are used for food, fuels, cosmetics, medical products and metals used in microelectronic devices. Scientific conventions and international standards are used to represent the purity of materials to ensure consistent applications of standards ([ACSCH009](#)).

Science Understanding – Rates of Chemical Reactions

The Importance of Enzymes

Enzymes are specific to particular reactions and act as important catalysts in many biological reactions, including those involved in digestion and respiration. Evidence for the existence and action of enzymes initially arose from Louis Pasteur's study of fermentation of sugar to form alcohol in the nineteenth century. Further work, involving a wide range of scientists, proposed that enzyme action was associated with protein molecules ([ACSCH049](#)).

Catalysts work in a variety of ways, and knowledge of the structure of enzyme molecules helps scientists to explain and predict how they are able to lower the activation energy for reactions ([ACSCH053](#)).

This work often relies on evidence from laboratory experiments as well as analytical methods used to determine the structure of molecules ([ACSCH049](#)). For example, Australian John Cornforth was awarded the Nobel Prize for chemistry for his study of the molecular geometry of enzymes and how they are able to catalyse essential biochemical reactions.



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Dairy Australia – Food Safety

Food Standards Australia New Zealand (FSANZ) under its Standard 4.2.4 requires all dairy farms to have a documented on-farm food safety program. All dairy manufacturers and processors must also have a documented food safety program. The relationship between Australian dairy companies, and their domestic and international markets, has been developed over years through close communication with customers and consistent delivery of safe, quality dairy products. Students can delve further into the importance of food safety through dairy distribution, transport, manufacturing and farms.

<https://www.dairyaustralia.com.au/manufacturing-resources-and-support/food-safety#.Y4hF23YzaUk>



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Dairy Australia – Dairy Jobs Matter

A job in dairy farming provides stability, a reliable source of income and ability to plan how work fits into your life, not the other way around. You get to work with beautiful animals everyday and there are always interesting things to learn along the way. Learn more here:

<https://www.dairy.com.au/dairy-matters/dairy-jobs-matter>



VERSION 8.4 - CHEMISTRY UNIT THREE & FOUR

Science Inquiry Skills

Design investigations, including the procedure/s to be followed, the materials required, and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics ([ACSCH075](#)) & ([ACSCH113](#))

Conduct investigations, including using volumetric analysis techniques and constructing electrochemical cells, safely, competently and methodically for the collection of valid and reliable data ([ACSCH076](#)) & ([ACSCH114](#))

Science as a Human Endeavour

The acceptance of scientific knowledge can be influenced by the social, economic, and cultural context in which it is considered ([ACSCH084](#)) & ([ACSCH122](#))

Science Understanding – Chemical Equilibrium Systems

Development of Acid/Base Models

Lavoisier, often referred to as the father of modern chemistry, believed that all acids contained oxygen. In 1810, Davy proposed that it was hydrogen, rather than oxygen, that was common to all acids ([ACSCH083](#)). Arrhenius linked the behaviour of acids to their ability to produce hydrogen ions in aqueous solution, however this theory only related to aqueous solutions and relied on all bases producing hydroxide ions. In 1923 Brønsted (and at about the same time, Lowry) refined the earlier theories by describing acids as proton donators ([ACSCH083](#)). This theory allowed for the description of conjugate acid-bases, and for the explanation of the varying strength of acids based on the stability of the ions produced when acids ionise to form the hydrogen ions. This concept has been applied to contemporary research into ‘superacids’, such as carborane acids, which have been found to be a million times stronger than sulphuric acid when the position of equilibrium in aqueous solution is considered.

Science Understanding – Properties and Structure of Organic Materials

Functional Groups and Organic Chemistry

Over 80 per cent of all known compounds are organic compounds. Initial work in the area of organic chemistry was based on observational chemistry, with nineteenth century attempts to organise the diversity of organic compounds based on grouping them according to their reactions. This theory was primarily based on empirical observations of reactivity, and did not consider the structure of the compounds. The theory of chemical structure was initially evident in work describing the concept of the interatomic bond, as formulated independently and simultaneously by Kekulé and Couper in 1858 ([ACSCH121](#)).

Further advances in understanding of the chemical structure of carbon-based molecules led to a classification based on functional groups. The chemical behaviour of the molecule can now be predicted based on known chemistry of the functional groups it contains. Developments in computer modelling have enabled more accurate visualisation and prediction of three dimensional organic structures, such as proteins, which is critical in drug design and biotechnology ([ASCSH120](#)).



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Ekka

EDUCATION

INTERNATIONAL AWARD WINNERS

The Royal Queensland Show (Ekka) is recognised for its excellence, over many years, by winning numerous awards at the International Fairs & Expos (IAFE) Awards.

IAFE has more than 1,000 members representing agricultural fairs from the United States, Canada, the United Kingdom, and Australia.

These awards represent the continued dedication the Ekka plays in bridging the country city divide, and educating the next generation on the essential role farming and agriculture plays in their everyday lives.



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