Ekka

ROYAL QUEENSLAND SHOW

CURRICULUM ALIGNMENT & CLASSROOM RESOURCES

STUDENT MADE CHEESE COMPETITION



Years 7 - 12

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COMPETITION OVERVIEW

Student Made Cheese

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



CURRICULUM ALIGNMENT

YEAR 7

Achievement Standard

They use particle theory to explain the physical properties of substances and develop processes that separate mixtures. Students plan and conduct safe, reproducible investigations to test relationships and aspects of scientific models. They use equipment to generate and record data with precision. They select and construct appropriate representations to organise data and information. They process data and information and analyse it to describe patterns, trends and relationships.

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 and critical thinking

Numeracy

Digital literacy

Ethical understanding

Aboriginal and Torres strait islander histories and cultures



CURRICULUM ALIGNMENT

YEAR 8

Achievement Standard

Students plan and conduct safe, reproducible investigations to test relationships and explore models. They select and use equipment to generate and record data with precision. They select and construct appropriate representations to organise and process data and information. They analyse data and information to describe patterns, trends and relationships and identify anomalies. They identify assumptions and sources of error in methods and analyse conclusions and claims with reference to conflicting evidence and unanswered questions. They construct evidence-based arguments to support conclusions and evaluate claims.

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)

Creative and critical thinking

Numeracy

Digital literacy

Ethical understanding

Aboriginal and Torres strait islander histories and cultures



CURRICULUM ALIGNMENT

YEAR 9

Achievement Standard

They explain observable chemical processes in terms of changes in atomic structure, atomic rearrangement and mass. Students explain the role of publication and peer review in the development of scientific knowledge and explain the relationship between science, technologies and engineering. They analyse the different ways in which science and society are interconnected. Students plan and conduct safe, reproducible investigations to test or identify relationships and models. They select and use equipment to generate and record replicable data with precision. They select and construct appropriate representations to organise, process and summarise data and information. They analyse and connect data and information to identify and explain patterns, trends, relationships and anomalies. They analyse the impact of assumptions and sources of error in methods and evaluate the validity of conclusions and claims.

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)

Creative and critical thinking

Numeracy

Digital literacy

Ethical understanding

Aboriginal and Torres strait islander histories and cultures



CURRICULUM ALIGNMENT

YEAR 10

Achievement Standard

Students analyse the importance of publication and peer review in the development of scientific knowledge and analyse the relationship between science, technologies and engineering. They analyse the key factors that influence interactions between science and society. Students plan and conduct safe, valid and reproducible investigations to test relationships or develop explanatory models. They select equipment and use it efficiently to generate and record appropriate sample sizes and replicable data with precision. They select and construct effective representations to organise, process and summarise data and information. They analyse and connect a variety of data and information to identify and explain patterns, trends, relationships and anomalies. They evaluate the validity and reproducibility of methods, and the validity of conclusions and claims. They construct logical arguments based on analysis of a variety of evidence to support conclusions and evaluate claims.

Creative and critical thinking

Numeracy

Digital literacy

Ethical understanding

Aboriginal and Torres strait islander histories and cultures

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)

Select and use equipment to generate and record data with precision to obtain useful sample sizes and replicable data, using digital tools as appropriate (AC9S10I03)



CURRICULUM ALIGNMENT

SENIOR SECONDARY - CHEMISTRY UNIT 1 & 2

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.





CURRICULUM ALIGNMENT

SENIOR SECONDARY - CHEMISTRY UNIT 3 & 4

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).





CLASSROOM RESOURCES

Teachers Cheese Making Workshops

Teachers that attend our Cheese Making Workshops are provided with a resources pack for making Blue Cheese and Camembert, plus a Food Safety Plan and guidelines for making cheese in your classroom. These resources have been produced in conjunction with our workshop presenter Russell Smith. Mr Smith is a cheesemaker, advocate for the Australian cheese industry and chief judge for the Royal Sydney, Royal Queensland and Royal Perth Shows. Back in 2010, Russell developed these one-of-a-kind experiences for teachers through the free cheese making program with the RNA, winning the Peter Doherty Award for outstanding and innovative contributions to STEM Education presented by the Queensland Government.
For more information, head to https://www.ekka.com.au/competitions/education/student-made-cheese/ or contact Competitions entries@rna.org.au

Ekka – Meet Kay, A Dairy Farmer - Years 7 - 12

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

A Day in the Life of a Dairy Farmer with Ben Geard - Years 7 - 9

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.
dairy.com.au/you-ask-we-answer/what-is-the-daily-routine-of-a-dairy-farmer

Dairy Australia – Dairy Jobs Matter - Senior Secondary

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



CLASSROOM RESOURCES

A Brie(f) History of Cheese - 7 - 12

Before empires and royalty, before pottery and writing, before metal tools and weapons – there was cheese. As early as 8000 BCE, Neolithic farmers began a legacy of cheesemaking almost as old as civilization. Today, the world produces roughly 22 billion kilograms of cheese a year, shipped and consumed around the globe. Paul Kindstedt shares the history of one of our oldest and most beloved foods.
ed.ted.com/lessons/a-brie-f-history-of-cheese-paul-s-kindstedt

The Chemistry of Cheese - 7 - 12

This NBC News Learn video, one in a 6-part "Cheeseburger Chemistry" series, uses cheese-making to explain protein denaturing, coagulation, and the difference between chemical and physical change.
youtube.com/watch?v=AmXnc5ViBfU

Decoding the Science of Cheese - 7 - 12

A technical resource for cheesemongers, cheese buyers, and cheese connoisseurs.
cheesescience.org/

Why the Mould Behind Brie Cheese Is Disappearing - 7 - 12

The world's supply of brie and camembert could be in danger. One mould, called Penicillium camemberti, is responsible for the cheeses' iconic white rinds and creamy, tangy centers. But the qualities that once made it a star of the cheese world are becoming a liability — driving some to hunt for colorful fungi in the wild to make completely new cheeses. So, are these famous French fromages really facing catastrophe? And what does this mean for cheese lovers around the world?
youtube.com/watch?v=-KObTYIAlGI

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ROYAL QUEENSLAND SHOW

DISCOVER QUEENSLAND'S BIGGEST CLASSROOM

Join schools from across the state bringing learning to life through the Ekka experience.



Scan here to get involved!

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ROYAL QUEENSLAND SHOW

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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