Ekka

ROYAL QUEENSLAND SHOW

CURRICULUM ALIGNMENT & CLASSROOM RESOURCES

STUDENT FERMENTED BEVERAGES



Year 7 - Senior Secondary

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COMPETITION OVERVIEW

Student Fermented Beverages

The competition is a fun way to educate students about the importance of agriculture and producing quality products.

Classes include non-alcoholic fermented beverages such as kombucha, kefir, and ginger beer, allowing students to explore fermentation, experiment with flavours, and develop practical food science skills.

Classes 1 to 11 are open for competition to schools that incorporate fermentation studies in Chemistry, Science, Agriculture, and Hospitality as part of their curriculum.



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

Students explore mixtures, sugar solutions, yeast/bacteria, basic fermentation setups (e.g. ginger beer, kombucha), and monitor pH or CO_2 changes.

By the end of Year 7, students:

- **Use particle theory to describe differences between pure substances and mixtures**
- **Apply properties of substances to separate mixtures**
- **Plan and conduct reproducible investigations, identifying variables and risks**
- **Use equipment to measure and record data precisely (e.g. pH, time, temp)**

In the competition, students demonstrate this by:

- **Identifying mixtures (e.g. ginger beer) and pure substances (e.g. water, sugar)**
- **Explaining how carbonation or flavour changes arise from fermentation (chemical vs. physical changes)**
- **Planning and testing variables (sugar levels, time, temperature)**
- **Using tools (e.g. pH meter, thermometer, timer) to monitor their beverage fermentation**

Numeracy

Ethical understanding

Digital literacy

Creative and critical thinking

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)



CURRICULUM ALIGNMENT

YEAR 8

Achievement Standard

Students investigate physical/chemical changes in fermentation; compare outcomes of different ingredients and conditions.

By the end of Year 8, students:

- **Describe physical and chemical changes, including temperature effects**
- **Interpret data, identifying patterns and trends**
- **Apply scientific knowledge to evaluate evidence and draw conclusions**

In the competition, students demonstrate this by:

- **Explaining fermentation as a chemical change (sugar → ethanol + CO_2)**
- **Observing physical changes (bubbling, colour changes, settling)**
- **Comparing results across trials and explaining which variables led to better fermentation**
- **Drawing conclusions about optimal conditions (e.g. warmer vs. cooler fermentation)**

Numeracy

Ethical understanding

Digital literacy

Creative and critical thinking

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)



CURRICULUM ALIGNMENT

YEAR 9

Achievement Standard

Students apply deeper chemical knowledge (equations, reactions), model respiration in yeast, and analyse fermentation rates.

By the end of Year 9, students:

- **Explain chemical reactions, including word equations**
- **Analyse data and evaluate methods for accuracy and fairness**
- **Explain how science knowledge informs decisions in society**

In the competition, students demonstrate this by:

- **Writing word equations: glucose → ethanol + carbon dioxide**
- **Analysing fermentation speed across temperature ranges**
- **Evaluating whether contamination affected results**
- **Discussing how fermentation is used in industry (e.g. cider production, kombucha trends)**

Numeracy

Ethical understanding

Digital literacy

Creative and critical thinking

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)



CURRICULUM ALIGNMENT

YEAR 10

Achievement Standard

Students investigate fermentation as a reaction, use analytical tools (titration, hydrometers), and evaluate findings critically.

By the end of Year 10, students:

- **Explain chemical reactions, including energy changes and reaction rates**
- **Design investigations, justify methods, and evaluate evidence**
- **Consider ethical, safety, and social factors in scientific decision-making**

In the competition, students demonstrate this by:

- **Explaining how temperature/sugar affects fermentation rate**
- **Using methods like pH testing, measuring CO_2 levels or sugar content**
- **Justifying which formula or method gave the best result (based on data)**
- **Considering food safety and ethical production of beverages**

Numeracy

Ethical understanding

Digital literacy

Creative and critical thinking

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

Achievement Standard

At this level, students may be studying Chemistry, Biology, Agricultural Science, Food Science, Hospitality, or Technologies. Below are typical aligned senior standards.

In the competition, students demonstrate:

- **Real-world application of scientific method**
- **Analytical, technical and product design skills**
- **Understanding of safe, ethical, and sustainable food production**
- **Capability to communicate findings in a scientific or consumer format**

Numeracy

Ethical understanding

Digital literacy

Creative and critical thinking

Chemistry

- Use stoichiometry and reaction rates to model fermentation
- Conduct titration to assess acidity or ethanol content
- Evaluate experimental reliability and validity in beverage formulation
- Apply understanding of organic chemistry (alcohols, esters) and equilibrium

Biology

- Understand microbial metabolism and enzyme activity in fermentation
- Design investigations using controlled variables and valid sampling
- Apply data analysis and modelling in comparing strains or ingredients

Agricultural Science / Food & Nutrition

- Design a value-added agricultural product (e.g. mead, cider)
- Understand post-harvest handling, microbial food safety, and consumer appeal
- Conduct sensory evaluations and present findings professionally



CLASSROOM RESOURCES

Fermentation - Years 7 - 12

This resource consists of 2 sets of automated illustrated slides with voice over presenting information about fermentation and useful microorganisms. It includes the use of terms such as enzymes and anaerobic respiration.
https://app.education.nsw.gov.au/rap/resource/access/21bb2395-a250-49e9-b96f-e604b714e124/1

Fermented foods

Fermentation is a process where microorganisms such as bacteria and yeast transform foods and drinks. This resource introduces the science of fermentation, explores common fermented products like yoghurt, kefir and kombucha, and highlights the importance of food safety when producing fermented foods.
https://www.qld.gov.au/health/staying-healthy/food-pantry/food-labelling/food-product-guides/fermented-foods

Fermented Drinks - Years 7 - 12

Students carry out experiments with yeast and market research to help them modify an existing recipe for a fermented drink (such as ginger beer) to produce a drink that would appeal to their school or community.
https://www.sciencelearn.org.nz/resources/1949-fermented-drinks

Fermentation - Years 7 - 12

In this activity, students set up an alcoholic fermentation, prepare and view a slide of bacteria responsible for monolactate fermentation and answer questions about a video clip on gut bacteria fermentation.
https://www.sciencelearn.org.nz/resources/1848-fermentation

How to Make Fermented Drinks: A Delicious & Healthy Guide

Fermented drinks are made using beneficial microorganisms that transform ingredients into flavourful, probiotic-rich beverages. This resource explores how fermentation is used to create drinks such as kombucha and kefir, while introducing students to concepts in microbiology, nutrition, and food production. It also highlights the importance of safe food preparation and healthy alternatives to sugary drinks.
https://meemawsrecipes.com/how-to-make-fermented-drinks/





CLASSROOM RESOURCES

Complete Kombucha Guide for Beginners

This guide walks through the whole beginner process: what kombucha is, what the SCOBY does, which tea and sugar to use, how long fermentation takes, what temperature works best, how to know when a batch is ready, and what to do after first fermentation. It also covers the main safety concerns and the common beginner problems that make people second guess a healthy batch.
https://www.oldschoolferments.com/kombucha-guide/

To Her Own Tune Suzie Muntz, grape grower - Years 7 - 12

What do wine grapes and bagpipes have in common? They take a lot of practice to hit the sweet spot and Suzie loves them both. Suzie realised you don't need to own a farm to study agriculture and went for it, studying hard and taking every opportunity to get her hands dirty. Picked by Wine Australia I 2015 as one of their Future Leaders, Suzie still is one of only a handful of female grape growers in the country. She is encouraging more women to join her.
visiblefarmer.com/Women/

Careers in Wine/Viticulture - Years 11 - 12

Career Harvest is a one-stop shop for prospective students to discover rewarding careers in Agriculture. Wine Australia supports a prosperous Australian grape and wine community – and they've released a series of videos about the many career opportunities in viticulture. Take a look at the three videos online and encourage further exploration into career opportunities.
careerharvest.com.au/career-videos/wine-viticulture-careers



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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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