

UNIT PLAN: MAKING FERMENTED DRINKS		
Suggested learning intentions	Suggested learning experiences <i>The following learning experiences will provide you with starting points for an exploration of this topic. You may decide to narrow your focus to one component, or include most of the ideas in a unit that incorporates science and/or technology themes.</i>	Possible teaching/assessment activities
<p>Students define biotechnology.</p> <p>Students investigate and explain the use of fermentation in everyday contexts, such as soft drink production.</p>	<p>Introduction</p> <ul style="list-style-type: none"> • What is biotechnology? • Yeast are living organisms that can be used to make fizzy drinks. <p>Introduce the scenario During this unit, the students will make a fermented drink and then adapt it according to findings from:</p> <ul style="list-style-type: none"> • taste testing • consumer survey about fizzy drink preferences • science experiments focusing on how to keep the yeast alive. 	
<p>Students explore a range of traditional fermented drinks.</p> <p>Students consider the materials required to make their drinks in a manner that takes into account health and safety.</p>	<p>Planning and gathering materials</p> <ul style="list-style-type: none"> • Form groups of 3–4 and choose a recipe for a traditional drink (see Resources). • List the materials that will be required and allocate various items to each group member. • Discuss the need to sterilise work surfaces and containers, along with other health and hygiene issues surrounding the preparation of food for human consumption. • For homework, students begin finding out about the origins of their chosen drink. 	<p>A written summary describing the origins of the students' selected traditional drink</p>

<p>Students implement the instructions of a recipe in an accurate and hygienic manner.</p>	<p>Using an existing recipe Students prepare their workplace, set up their equipment, and follow their chosen recipe, using accurate measuring.</p> <p>Students reflect on how they carried out the task and how they could organise themselves better another time. Get unit plan resource: Fermented drinks worksheets</p> <p>In subsequent sessions, students check the progress of their drinks and complete any further processes required, e.g., filtering and bottling.</p>	<p>Student checklist.</p> <p>Teacher checklist to record students' ability to accurately follow the recipe and use hygienic practices during its preparation.</p>
<p>Students identify key features of commercially available fermented drinks.</p>	<p>Existing product analysis Analyse existing products available on the market in terms of their use, the labelling, the look and function of the container, the ingredients, and the taste. Get unit plan resource: Fermented drinks worksheets</p>	<p>Product analysis sheet.</p>
<p>Students identify the significant components of the fermentation process.</p> <p>Students define fermentation.</p> <p>Students identify one component in the fermentation system that can be altered and justify their choice.</p> <p>Students develop plans for a fair test.</p>	<p>Designing experiments to test yeast growth</p> <ul style="list-style-type: none"> • Identify the common ingredients in their drinks (yeast, sugar, water). • Brainstorm conditions likely to affect the growth of yeast. • Learn about fermentation – the yeast break down sugar to release energy; this process also releases carbon dioxide, which is what makes the drinks fizzy. • Plan how to set up an experiment to test variables involved in yeast fermentation. (The teacher could model an example.) • Design a fair test in which one of the variables is altered. The focus should be on identifying optimum growing conditions for yeast. Get unit plan resource: Fermented drinks worksheets 	<p>The plan of the group's experiment/fair test.</p>

<p>Biotechnology has been around for many years.</p>	<p>Consulting an expert Invite an adult to share their experiences about making a fermented drink like ginger beer.</p>	
<p>Using appropriate language to report taste tests.</p>	<p>Taste testing</p> <ul style="list-style-type: none"> - Who should test the taste of the drinks? - What do they like/not like about the drinks that have been made? - How can this information be recorded? <p>Commercially available drinks such as Bundaberg’s ginger beer or lemon, lime and bitters could also be included.</p>	<p>Charts recording results from taste tests.</p>
<p>Design a survey to collect information about fizzy drink preferences.</p>	<p>Surveying consumers</p> <ul style="list-style-type: none"> - What is the purpose of surveys? - What are the key features of surveys? (Clear questions, one idea per question, open versus closed questions – have some examples available for analysis.) - Design a survey to investigate consumer preferences regarding fizzy drinks: What do we want to find out? Who will we ask? How? What must we remember in our survey design? <p>For homework, each student collects five responses from their target group (for example classmates, neighbours, teachers).</p> <p>Graph results.</p>	<p>Group survey designed to find out people’s views about fizzy drinks and flavours they may like in a new drink.</p>

<p>Biotechnology requires balancing knowledge about the organism with constraints imposed by consumers.</p>	<p>Analysing findings Alterations to the traditional drink recipes need to take into account:</p> <ul style="list-style-type: none"> • taste testing • yeast experiments • survey results. <p>What if the class taste testing of the fermented drinks appears to contradict consumer preferences identified in the survey?</p> <p>What if the taste testing suggests preferences that might not suit the yeast (e.g., making the drink less sweet – but the yeast need the sugar to ferment and produce carbon dioxide)?</p>	<p>Written conclusions drawn from the results of the taste testing, yeast experiments, and surveys.</p>
<p>Adapt a traditional recipe to take into account findings from the taste tests, survey, and yeast experiments.</p> <p>Justify the changes that are made.</p> <p>Prepare a plan of action, identifying the required resources.</p>	<p>Adapting the recipe Students collate the information they have gathered, design their new recipe, and identify the materials and resources they require in order to make their modified drink. This includes writing a schedule showing when they need to scrape, filter, bottle, and refrigerate their drinks.</p> <p>The students discuss their proposal with the teacher before proceeding.</p>	<p>An annotated flowchart detailing results from previous work and how these are incorporated into the new recipe.</p>

	<p>Making the modified drink Students prepare to make their drinks following strict hygiene guidelines.</p> <p>Over the next few days, the students carefully monitor their drinks and carry out the various tasks required until the fermentation process is complete.</p>	
<p>Taste testing is not an <i>ad hoc</i> task.</p>	<p>Taste testing the modified drinks Analysing the changes: students consider the taste of their drink, what they like and dislike about their drink, and how they might change it if they made it again.</p> <p>Discuss:</p> <ul style="list-style-type: none"> - the purposes of taste testing - appropriate taste testing terminology - ways in which the students ensured that the yeast were kept alive. 	<p>Taste testing responses and reflection.</p>
<p>List the key features of an attractive, appropriate label.</p>	<p>Thinking about labelling Students create an appropriate label for their drink container, drawing on their findings from the earlier session in which they analysed existing products.</p>	<p>Drink labels.</p>

	<p>Product launch Students document their learning in a portfolio and use this as the basis of a presentation to promote their product to an audience.</p> <p>Students may also develop a flow chart or mindmap summarising their journey through the process of developing a new fizzy drink.</p> <p>The presentation should show the connections between understandings about how yeast grow, taste testing results, and survey results, and how they used this knowledge in the development of their final product. Get unit plan resource: Fermented drinks worksheets</p>	<p>The students' group portfolios.</p> <p>The group flow charts that summarise the students' progress through designing and making the modified fizzy drink.</p>
	<p>Reflecting on the task The students evaluate how well they think they have achieved the stated goals.</p> <p>What have they learned about biotechnology?</p>	<p>A self-reflection sheet.</p>