

PROCESSING TECHNOLOGIES: IMPLEMENT A PROCESS

Implement a process focuses on undertaking appropriate procedures to process a specified product. Products may include but are not limited to: fermented or non-fermented foods and beverages; biologically active products; household chemicals; toiletries; cosmetics; paper; resin or fibreglass products.

Initially students learn to follow appropriate processing operations and undertake testing to make a product that meets specifications. Students progress to complex processing operations that require analysis, modification, testing and calculation of relevant factors.

	LEVEL 6	LEVEL 7	LEVEL 8
LO	<i>Implement basic procedures to make a processed product</i>	<i>Implement advanced procedures to make a processed product</i>	<i>Implement complex procedures to make a processed product</i>
TEACHER GUIDANCE	<p>To support students to implement basic procedures to make a processed product at level 6, teachers could:</p> <ul style="list-style-type: none"> • Provide opportunity for students to undertake basic processing operations. • Develop step by step guides to inform student practice. • Enable students to undertake basic testing such as pH, temperature, size to determine appropriateness of a product. • Ensure students apply relevant health and safety practices. 	<p>To support students to implement advanced procedures to make a processed product at level 7, teachers could:</p> <ul style="list-style-type: none"> • Support students with their undertaking of advanced processing operations. • Guide students with advanced testing techniques such as: viscosity; moisture content; and degree of fermentation. • Ensure students comply with health and safety documentation such as HACCP and HSNO (see AS/NZ3343.3:200s) 	<p>To support students to implement complex procedures to make a processed product, at level 8, teachers could:</p> <ul style="list-style-type: none"> • Support students in determining the techniques that have been involved in specific processing of materials. • Discuss the difference between process control in the classroom and in industry for a specified product. • Demonstrate complex processing operations such as: distilling; cryogenic freezing; and batch transfer • Support students in the implementation of complex processing operations. • Provide or negotiate with students the selection of a specified product. • Support students in the development of safety plans, risk management plans and quality assurance plans.
INDICATORS	<p>Students can:</p> <ul style="list-style-type: none"> • Implement basic processing operations. • Conduct basic tests to determine if a product has met required specifications. • Follow relevant health and safety practices 	<p>Students can:</p> <ul style="list-style-type: none"> • Work independently in the execution of advanced procedures. • Undertake advanced testing techniques to determine if a product meets established specifications. • Comply with relevant health and safety documentation. 	<p>Students can:</p> <ul style="list-style-type: none"> • Analyse and justify the procedures used to process a specified product. • Explain how processing operations can be controlled by test feedback. • Evaluate the appropriateness of safety, risk management and quality assurance plans • Make informed decisions based on knowledge of techniques, operations and testing feedback. • Modify processing operations based on feedback from testing. • Calculate yield and relevant financial costs. • Develop suitable safety, risk management and assurance plans.
AS	<p>AS91082 Processing Technologies 1.60 <i>Implement basic procedures to process a specified product</i></p>	<p>AS91351 Processing Technologies 2.60 <i>Implement advanced procedures to process a specified product</i></p>	<p>AS91643 Processing Technologies 3.60 <i>Implement complex procedures to process a specified product</i></p>
	Level 1 Digital Technologies standards & assessment resources	Level 2 Digital Technologies standards & assessment resources	Level 3 Technology achievement standards & assessment resources DRAFT

PROCESSING TECHNOLOGIES: KNOWLEDGE OF PROCESSING

Knowledge of processing focuses on the underpinning concepts associated with processing.

Initially students learn about the operations and practices inherent to processing. Students progress to complex understandings that enable them to explain, evaluate and justify a broad range of operations and practices related to processing.

	LEVEL 6	LEVEL 7	LEVEL 8
LO	<i>Demonstrate understanding of basic techniques involved in processing materials</i>	<i>Demonstrate understanding of advanced techniques involved in processing materials</i>	<p>LEARNING OBJECTIVE PROGRESSES TO: <i>Implement complex procedures to make a processed product</i> See previous page</p>
TEACHER GUIDANCE	<p>To support students to develop understandings about basic techniques involved in processing materials at level 6, teachers could:</p> <ul style="list-style-type: none"> • Provide a range of case studies to demonstrate different processing systems and sequences. • Support students with their understanding of techniques and skills in a processing operation. • Demonstrate safe practices in processing. • Model a range of processing operations such as: measuring; safe disposal of biologically active material; culturing by plating; and controlling of enzymes. 	<p>To support students to develop understandings about advanced techniques involved in processing materials at level 7, teachers could:</p> <ul style="list-style-type: none"> • Support students with their understanding of how advanced techniques are implemented in processing materials. • Present a range of advanced processing operations such as: cell counting; emulsifying; and centrifuging. • Ensure students understand the difference between health and safety in the classroom and industry. 	
INDICATORS	<p>Students can:</p> <ul style="list-style-type: none"> • Explain the relationship between processing operations, tests, and expected outcomes. • Discuss processing operations and tests and their suitability for different materials and/or purposes. • Communicate the need for safe processing practices. 	<p>Students can:</p> <ul style="list-style-type: none"> • Identify advanced techniques used in processing materials. • Describe how processing operations and tests can be combined in a processing sequence. • Explain why specific tests are used in processing operations. 	
AS	<p>AS91083 Processing Technologies 1.61 <i>Demonstrate understanding of basic concepts used in processing</i></p>	<p>AS91352 Processing Technologies 2.61 <i>Demonstrate understanding of advanced concepts used in processing</i></p>	
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PROCESSING TECHNOLOGIES: KNOWLEDGE OF PRODUCT PRESERVATION, PACKAGING AND STORAGE

Product preservation, packaging and storage focuses on the ways in which products can be treated during and after their development in order to maintain their integrity over time by inhibiting internal degradation and/or protecting them from external damage. Initially students learn basic concepts relating to why certain types of products require the use of preservation techniques, and which techniques are suitable for use in domestic settings where the product planned to be used in the near future and storage will be within known environmental conditions. They also will learn how packaging and storage procedures work together to further protect products in local environments. Students progress to learning more advanced concepts relating to ensuring products maintain integrity over an extended time and the variable environmental conditions of a national market, and the increasingly sophisticated techniques used in industrial settings, and then to understanding the technical and sociocultural implications and complexities involved in the preservation, packaging and storage of products suitable for international distribution.

	LEVEL 6	LEVEL 7	LEVEL 8
LO	<i>Demonstrate understanding of basic concepts and techniques used in the preservation, packaging and storage of products</i>	<i>Demonstrate understanding of advanced concepts and techniques used in the preservation, packaging and storage of products</i>	<i>Demonstrate understanding of complex concepts and techniques used in the preservation, packaging and storage of products</i>
TEACHER GUIDANCE	<p>To support students to develop understandings about basic concepts and techniques used in the preservation, packaging and storage of products, at level 6, teachers could:</p> <ul style="list-style-type: none"> • Provide opportunity for students to explore why we need to preserve certain products to maintain their integrity over time. • Provide opportunity for students to explore different forms of packaging and storage instructions and relate this to the specific nature of the product and the techniques used in its preservation. • Ensure students are aware of the requirements for labelling of preserved products to ensure end-users can make informed choices. • Ensure students are familiar with a wide range of basic preservation techniques (eg, freezing, heating, air drying, chemical additives – use of vinegar/sugar), and packaging (eg, bottling, vacuum packing, solid wall containers, padded protective wrapping, labelling for identification) and storage procedures (eg, freezer, refrigerator, cool/dark cupboard) commonly used in domestic situations. • Guide students to understand how the techniques and procedures used in preserving/packaging and storage of a range of products allows them to maintain their integrity over time and in a known environment (eg, in the home, at school). • Provide students with multiple opportunities to select and test different basic techniques and procedures to enhance product integrity. This would include understanding the properties and implications of the materials used in the product and what is required of the product in terms of withstanding changes over short periods of time and in known environments. 	<p>To support students to develop understandings about advanced concepts and techniques used in the preservation, packaging and storage of products, at level 7, teachers could:</p> <ul style="list-style-type: none"> • Provide opportunity for students to explore a range of different types of products to understand the changes needed in the preservation/packaging/storage decision-making to ensure products are able to withstand changing environments over extended times (eg, preservation during transportation, storage in warehouses, packaging for safe handling etc.) • Guide students to develop understanding of how preserving/packaging and storage work together to ensure products maintain integrity over extended times and variable physical environments. • Provide students opportunity to explore and debate the implications of, and for, the distribution of products to national markets on the preservation, packaging and storage of products. • Provide opportunities for students to become familiar with a wide range of advanced preservation techniques (eg, spray drying of liquids, ultra violet reaction inhibition, liquid immersion freezing and chilling, chemical additives), and packaging (eg, canning, retortable pouches, gas flush packages, permeable packaging films, sealing mechanisms, portion control, labelling for point of difference – eco, heart ticks etc) and storage procedures (eg, controlled atmosphere) commonly used in industrial situations. • Provide students with opportunities to explore advanced techniques being used currently in a range of industries. This would include understanding the properties and implications of the materials used in the product and what is required of the product in terms of ensuring particular shelf-life and withstanding variable environmental conditions. 	<p>To support students to develop understandings about complex concepts and techniques used in the preservation, packaging and storage of products, at level 8, teachers could:</p> <ul style="list-style-type: none"> • Provide opportunity for students to debate how the preservation, packaging and storage of products have been influenced by changes in global distribution chains. This includes ways products can be made suitable for a range of consumers who may live in different political and social environments to where the product originated. • Guide students to develop understanding of how preserving/packaging and storage work together to ensure products maintain integrity and acceptability over extended times and variable physical, social and political environments. • Provide opportunity for students to explore a range of products to understand how the preservation/packaging and/or storage has changed cultures/society (needs, desires, the way life is experienced) in the past and present and to debate how they may change cultures/society in the probable future. • Provide opportunities for students to become familiar with a wide range of complex preservation techniques (eg, freeze drying, UHT sterilisation, cryogenic freezing, irradiation, high pressure sterilisation), and packaging (eg, aseptic filling, modified atmosphere packs, crush protection, dosage control, brand value packaging), and storage procedures (eg, accelerated storage life trials, modified atmosphere packs commonly used for products destined for international markets). • Provide students with opportunities to explore the implications and complexities involved in developing and distributing 'risk' products for international markets. This would include understanding the properties and implications of the materials used in the product and what is required of the product in terms of complex distribution chains. That is withstanding significant changes of time and environmental conditions including changing social, cultural and ethical dimensions.
INDICATORS	<p>Students can:</p> <ul style="list-style-type: none"> • explain the links between types of decay and preservation techniques • explain why a particular preservation and packaging technique was chosen for a specific product to be stored in a local environment • discuss how to control the storage environment to limit decay of different types of products during storage • discuss why legal labelling is required in a local environment • compare and contrast preservation and packaging techniques for a product to be stored in a local environment. 	<p>Students can:</p> <ul style="list-style-type: none"> • explain the links between combinations of decay mechanisms in preservation and packaging techniques • compare and contrast preservation and packaging techniques for a product in a national environment. • discuss why labelling is legally required and how labelling for marketing is used in a national environment. 	<p>Students can:</p> <ul style="list-style-type: none"> • explain how environmental factors interact to influence product quality • compare and contrast preservation and packaging techniques for a product in an international environment • compare and contrast legal, marketing and cultural requirements for labelling in two countries.
AS	<p>AS91084 Processing Technologies 1.62 <i>Demonstrate understanding of basic concepts used in preservation and packaging techniques for product storage</i></p>	<p>AS91353 Processing Technologies 2.62 <i>Demonstrate understanding of advanced concepts used in preservation and packaging techniques for product storage</i></p>	<p>AS91644 Processing Technologies 3.62 <i>Demonstrate understanding of combined preservation mechanisms used to maintain product integrity</i></p>
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