Government of **Western Australia**
School Curriculum and Standards Authority

Technologies:
Design and Technologies

Teaching, learning and assessment exemplar

Year 6

Acknowledgement of Country

Kaya. The School Curriculum and Standards Authority (the Authority) acknowledges that our offices are on Whadjuk Noongar boodjar and that we deliver our services on the country of many traditional custodians and language groups throughout Western Australia. The Authority acknowledges the traditional custodians throughout Western Australia and their continuing connection to land, waters and community. We offer our respect to Elders past and present.

Background

This teaching, learning and assessment exemplar (the exemplar) has been developed by the School Curriculum and Standards Authority (the Authority) as part of the *School Education Act Employees (Teachers and Administrators) General Agreement 2017* (Clause 61.1–61.3).

Disclaimer

Any resources such as texts, websites and so on that may be referred to in this document are provided as examples of resources that teachers can use to support their learning programs. Their inclusion does not imply that they are mandatory or that they are the only resources relevant to the course. Teachers must exercise their professional judgement as to the appropriateness of any they may wish to use.

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SDI Productions. (2015). [iStock photograph ID: 498196790]. Retrieved July, 2021, from https://www.istockphoto.com/

Pixabay. (n.d.). [Photograph of coloured paper]. Retrieved December, 2025, from https://pixabay.com/photos/fantasy-illusion-lie-571938/

Contents

The Western Australian Curriculum

The *Western Australian Curriculum and Assessment Outline* (the *Outline* – https://k10outline.scsa.wa.edu.au/) sets out the mandated curriculum, guiding principles for teaching, learning and assessment, and support for teachers in their assessment and reporting of student achievement. The *Outline* recognises that all students in Australian schools, or international schools implementing the Western Australian Curriculum, are entitled to be given access to the eight learning areas described in the *Alice Springs* (*Mparntwe*) *Education Declaration*, December 2019.

The Technologies curriculum

The mandated curriculum is presented in the year level syllabus documents.

The Technologies curriculum delivers a sequential and age-appropriate progression of learning with the following key elements:

- a year level description that provides an overview of the context for teaching and learning in the year
- a series of content descriptions, populated through strands and sub-strands, that sets out the knowledge, understanding and skills that teachers are expected to teach and students are expected to learn
- an achievement standard that describes an expected level that the majority of students are achieving by the end of a given year of schooling. An achievement standard describes the quality of learning (e.g. the depth of conceptual understanding and the sophistication of skills) that would indicate the student is well placed to commence the learning required in the next year.

This exemplar

This Technologies exemplar articulates the content in the *Outline* and approaches to teaching, learning and assessment reflective of the Principles of Teaching, Learning and Assessment. This exemplar presents planning for eight weeks of teaching and learning for each of the four terms, with a time allocation of one hour per week.

Catering for diversity

This exemplar provides a suggested approach for the delivery of the curriculum and reflects the rationale, aims and content structure of the learning area. When planning the learning experiences, consideration has been given to ensuring that they are inclusive and can be used in, or adapted for, individual circumstances. It is the classroom teacher who is best placed to consider and respond to (accommodate) the diversity of their students. Reflecting on the learning experiences offered in this exemplar will enable teachers to make appropriate adjustments (where applicable) to better cater for students' gender, personal interests, achievement levels, socio-economic, cultural and language backgrounds, experiences and local area contexts.

Using this exemplar

This teaching, learning and assessment exemplar provides suggestions to support the delivery of the mandated curriculum content. The exemplar provides:

- a teaching and learning sequence
- the mandated curriculum content to be taught at each point of the teaching and learning sequence, suggested resources, sample assessment tasks and marking keys
- the number of lessons to deliver the teaching and learning experiences
- learning intentions and support notes that may provide focus questions and additional information and/or examples to assist with the interpretation of curriculum content
- support notes to assist teachers to unpack the content and support teaching and learning experiences
- teaching and learning experiences that outline the structure of the lesson. These explicitly state each activity that the lesson will progress through and the key focus area for that activity.

Links to electronic resources

This sequence of lessons may utilise electronic web-based resources, such as videos and image galleries. Teachers should be present while an electronic resource is in use and close links immediately after a resource, such as a video, has played to prevent default ‘auto play’ of additional videos. Where resources are referred for home study, they should be uploaded through Connect, or an equivalent system, that filters advertising content.

Best practice

Teaching and learning

The teaching and learning opportunities offered in this exemplar are not exhaustive. Thus, teachers are encouraged to make professional decisions about which learning experiences, and the sequence in which they are delivered, are best suited to their classroom context, taking into account the availability of resources and student ability.

This sample may prove a useful starting point for amplifying creativity in the classroom, while presenting the embedded expectations of the Western Australian Curriculum: Technologies.

Teachers may find opportunities to incorporate the General Capabilities and the Cross-curriculum Priorities into the teaching and learning program.

Ways of teaching – teachers can locate additional information on the Ways of teaching from the School Curriculum and Standards Authority (the Authority) website https://k10outline.scsa.wa.edu.au/home/wa-curriculum/learning-areas/technologies/design-and-technologies/p-10-design-and-technologies-teaching/design-and-technologies-ways-of-teaching.

Assessing

Assessment, both formative and summative, is an integral part of teaching and learning. Assessment should arise naturally out of the learning experiences provided to students. In addition, assessment should provide regular opportunities for teachers to reflect on student achievement and progress. As part of the support it provides for teachers, this exemplar includes suggested assessment points. It is the teacher's role to consider the contexts of their classroom and students, the range of assessments required, and the sampling of content descriptions selected to allow their students the opportunity to demonstrate achievement in relation to the year level achievement standard. Teachers are best placed to make decisions about whether the suggested assessment/s are used as formative or summative assessment and/or for moderation purposes.

Ways of assessing – a range of assessment strategies that can enable teachers to understand where students are in their learning is available on the Authority website https://k10outline.scsa.wa.edu.au/home/wa-curriculum/learning-areas/technologies/design-and-technologies/p-10-design-and-technologies-assessing/design-and-technologies-ways-of-assessing.

Reflecting

Reflective practice involves a cyclic process during which teachers continually review the effects of their teaching and make appropriate adjustments to their planning. The cycle involves planning, teaching, observing, reflecting and replanning.

This exemplar supports reflective practice and provides flexibility for teachers in their planning. The exemplar shows how content can be combined and revisited throughout the year. Teachers will choose to expand or contract the amount of time spent on developing the required understandings and skills according to their reflective processes and professional judgements about their students' evolving learning needs.

Year level description

In the middle to late childhood phase of schooling, students develop a sense of self, their world expands, and they begin to see themselves as members of larger communities. Learning experiences emphasise and lead to an appreciation of both the commonality and diversity of human experience and concerns.

Design and Technologies builds on concepts previously acquired and students continue to develop an understanding of design thinking skills. Students experiment with a variety of materials to investigate the advantages of different representational forms for different purposes and situations, such as for engineering systems, food and fibre production, food preparation systems, and suitability and functionality in a product.

In Year 6, students have opportunities to learn about technologies in society and ways people in design and technologies occupations address competing considerations, including sustainable factors, as they create solutions in at least one of the following Design and Technologies contexts: Engineering principles and systems, Food and fibre production, Food specialisations, and Materials and technologies specialisations. Students consider ways competing technologies are used in the production of products and develop an understanding of designs for services and environments for community needs.

Students understand and appreciate different points of view, develop the ability to think in more abstract terms, and undertake sustained activities for longer periods. They work collaboratively and communicate decisions to develop agreed protocols, set goals, manage competing factors, resources and time to develop solutions for a given task. Students design alternative solutions, achieved through an iterative process. They develop negotiated criteria to evaluate design features, selected technologies, functionality and consideration of constraints of the designed solution to achieve a purpose.

Achievement standard

By the end of the year:

Students identify ways people address competing considerations, including sustainable factors in the design of products, services and environments. In Engineering principles and systems, students connect ways electrical energy and forces can control motion, sound or light in a product or system. In Food and fibre production, students consider design features, consumer demand and managed environments for food and natural fibre systems. In Food specialisations, students consider food choices, consumer demands, and preparation systems in the design of a meal/food product. In Materials and technologies specialisations, students consider the properties of selected materials, technologies and production systems, to plan and develop a designed solution for an identified purpose.

In the Design and Technologies contexts, students define ways competing considerations affect decisions on the selection of technologies, resources, techniques and sustainable factors in the design of a solution. Students manage and consider alternative solutions through discussion, critical thinking, modifying processes and initial design ideas using a range of appropriate technical terms, technologies and techniques. They implement production plans and safe procedures when using a variety of technologies and components to produce solutions. Students develop negotiated criteria to evaluate design features, selected technologies, processes and functionality of the designed solution. They use agreed protocols to set goals, manage competing factors, resources and time, and communicate decisions and solutions for a given task.

Term 1

Weeks 1–8: Food specialisations

Term 1 Week 1: Building a balanced plate

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Technologies and society** People in design and technologies occupations address competing considerations, including sustainable factors in the design of products, services and environments **Design thinking skills** **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task	**Learning intention** Understand how the *Australian Guide to Healthy Eating* (the *Guide*) can be used to design meals with a wide variety of nutritious foods. **Focus questions** • What is the *Australian Guide to Healthy Eating*? • How can the *Guide* be used to plan for a variety of food choices? • What are competing considerations to focus on when designing a food product? **Support notes** View the teacher video *Facts about the Australian Guide to Healthy Eating (AGHE)* – Refresh.ED • https://www.youtube.com/watch?v=7rgI5q-XnKg. Engage students in a discussion to identify the design features of the *Guide*. Explore, develop and demonstrate ways to use the *Guide* and plan for a wide range of meals and snacks, particularly when there are competing considerations, such as time, costs and taste preferences. As with many solutions that are produced to solve a problem, issues may be identified; for example, where to place fruit yoghurt and ham, roasted salted nuts or plain crackers, or the fact that the way various foods are prepared may impact their placement on the *Guide*.	**Introduction** Revise with students their prior knowledge about food choices to create varied meals. Introduce the *Australian Guide to Healthy Eating*. • https://www.eatforhealth.gov.au/guidelines/australian-guide-healthy-eating. After viewing the *Guide*, students explain its purpose and use. Acknowledge that the *Guide* has been created to help solve a design problem; for example, to help consumers plan a wide variety of healthy meals and snacks. Discuss how designers address competing considerations in the design of the *Guide*, including illustrations, font, format and messaging. Encourage students to consider what audience the *Guide* was designed for and how this might impact the choice of design elements. Use an image of the *Guide* to analyse and annotate various design features, such as the round shape that might represent a plate, and the size of each of the five sections. How do the design features help plan varied food consumption, such as for meals and snacks? Ask students why some foods are difficult to place on the *Guide*. Introduce the class activity. Identify six areas in the classroom that represent sections of the *Guide*. Select a food like lasagne. Students move to the area where they

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Consider the placement of certain foods as a design problem. Students make decisions and create a solution, based on the principles of the guidelines for the task, Difficult-to-place foods. **Suggested assessment points** Observe students' justification for the placement of foods from a recent meal into a blank *Guide*. Check students' understanding of why some foods may be difficult to place on the *Guide*. Students report on the difficulties in placing some foods on the *Guide*. They record ideas, represent design features and plan solutions to use the *Guide*.	would place the food. Ask individuals to justify the location. Repeat with various foods. As a class, draw conclusions on why some foods are difficult to place on the *Guide*, especially processed foods. Discuss possible solutions, to assist in the planning of meals and snacks, based on the *Guide*. **Learning activity** Provide students with a daily meal log. • https://www.familydaily.app/blog/7-day-family-meal-plan • Use a blank image of the *Guide* and place the individual food items into the sections of the Guide. Students share the *Guide* with another student and discuss which foods were difficult to place; for example, Greek yoghurt. Use the *Australian Guide to Healthy Eating* – Poster: blank template https://www.eatforhealth.gov.au/accessible-versions-australian-dietary-guidelines-resources. Students write a report on the difficulties experienced when attempting to place some foods on the *Guide*. Working in pairs, they record ideas through an interview process, visual representations of modified design features, and plan alternative solutions. Record a video to share ideas with the class. **Conclusion** Review learning intentions. If time permits, share and reflect on student placement of foods and use of the *Australian Guide to Healthy Eating*.

Term 1 Week 2: Snack attack pack design

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Context **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Design thinking skills** **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task Investigate and select resources considering constraints, properties and functions appropriate for the given task **Designing** Design alternative solutions achieved through an iterative process, including critical thinking, graphical representations, use of a range of technologies, techniques, technical terms and/or a sequence of steps **Evaluating** Develop negotiated criteria to evaluate design features, graphics, selected technologies, processes and functionality with consideration of constraints for the designed solution	**Learning intention** To design the meal and preparation techniques to create a Snack attack pack that is easy to transport for a quick meal after school. **Focus questions** • How do snacks stack up against the *Australian Guide to Healthy Eating*? • Which food preparation techniques could contribute to the preparation of a snack? • What strategies will assist in the development of the solution within the given time constraint? **Support notes** This learning experience involves teacher directed introduction to the given task. Students plan during this lesson and then produce the product in the next lesson. Print a blank design template for students to use for the design/technology process for this task (Appendix A.2). The teacher has a predetermined list of resources for the students to complete this task which includes: • vegetables, fruit, cheese, nuts/seeds (avoid these depending on school's nut policy; however, ensure students know these are a great option), cooked meat • selected equipment – chopping board, plate, knife, grater, cleaning cloth • storage container.	**Introduction** Consider the design problem: When I get home from school, I need to get ready for training, but I am hungry and I want to eat something. A possible solution could be to quickly prepare a snack to take to training. As a class, clarify the design problem. Students define the problem on the design template provided (Appendix A.2). It is predetermined that students will create a snack as a solution to the problem – the Snack attack pack. Through discussion, clarify with students the preparation techniques that are appropriate. Think about how processing food may add extra components to the final product. The visual appeal of the final product may change, or the texture/way of eating may differ depending on the processing of the food. **Learning activity** Students work independently to design and plan production for a Snack attack pack to take to training, taking into consideration: • the food available • equipment, such as chopping boards, bowls, knives. Consider sustainability – reusable and washable items, or natural fibre/biodegradable single use items • a suitable container to transport the snack • 20 minutes' preparation time.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Features of the solution could include: • a quick to prepare snack • a tasty, nutritious food option prepared from the given set of resources (food and equipment) • portability • ability to be prepared within the given time. **Suggested assessment points** • To what extent do students make a comparison of the ingredients with the recommendations in the *Australian Guide to Healthy Eating*? • Are students able to explain the choice of processing techniques? • Are students able to check the development of the set of sequenced steps for logical progression?	As a class, collaboratively establish criteria (at least three) to be used to evaluate the Snack attack pack. One criterion could include a comparison of ingredients with the recommendations in the *Australian Guide to Health Eating*. Students sketch the design for the Snack attack pack in the space provided in the template and annotate, using correct technical terms. In the space provided in the template, establish production procedures, that is, a set of sequenced steps to safely prepare the Snack attack pack. Include processing techniques, such as slicing, mixing, and chopping. Remind students to include the washing up and clearing away steps. Discuss a strategy they could incorporate to ensure the solution is prepared within the given time**.** **Conclusion** Discuss with students and reflect on the techniques to prepare food in this task. The size of the storage container may impact on techniques. If time permits, have a student buddy review the completed design/technology process template. Discuss feedback on the set of sequenced steps, and timing.

Term 1 Week 3: Snack attack pack

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Context **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Producing and implementing** Use a range of technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intention** To use a range of equipment and preparation techniques, working safely and collaboratively when creating the Snack attack pack. **Focus questions** • What safe procedures are in place when using the selected components and equipment? • What adjustments did you make to the set of sequenced steps? **Suggested assessment points** • Integrate the collaboratively developed criteria into a quiz using software, such as Plickers https://get.plickers.com/ to evaluate the Snack attack pack. • Alternative for no devices: Select one or more of the categories from the collaboratively developed criteria as an exit slip to allow you to observe students' ability to evaluate their Snack attack pack.	**Introduction** A Snack attack pack is on its way. Ensure students are conscious of managing their time and ability to work with/alongside others in the use of resources. Review the safety procedures they need to implement during the production phase of this task. Remind students to move around the room with care. Reiterate the system for collecting food and equipment, and the location of individual and shared preparation areas. Revise the processes to be used as outlined in each individual set of sequenced steps. Ask students whether they followed their planned sequenced steps or made adjustments. They should justify any adjustments that were made. **Learning activity** Students prepare their Snack attack pack. **Conclusion** Remind students that washing up and clearing away is a collaborative process and that they have an obligation to contribute and ensure all equipment is returned, food scraps removed, and their Snack attack packs are ready to take to training.

Term 1 Week 4: Rainbow on a plate

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Context **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Design thinking skills** **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task Investigate and select resources considering constraints, properties and functions appropriate for the given task **Designing** Design alternative solutions achieved through an iterative process, including critical thinking, graphical representations, use of a range of technologies, techniques, technical terms and/or a sequence of steps **Evaluating** Develop negotiated criteria to evaluate design features, graphics, selected technologies, processes and functionality with consideration of constraints for the designed solution	**Learning intention** To design a plate of food art to promote the eating of a wide variety of fruit and vegetables. **Focus questions** • How can eating vegetables and fruit be fun for children? • What design features will make the solution appealing? • What preparation skills and techniques are needed to prepare the food? **Support notes** Prior to handling food, be aware of individual food allergies and food intolerances, and implement procedures to prevent food cross-contamination. The teacher should have available: • a variety of fresh vegetables and fruit • equipment – chopping boards, paper plates, plastic knives, forks, spoons, grater, wooden skewers, toothpicks, cleaning cloths. **Suggested assessment points** Collect student mind maps giving reasons for people not eating enough fruit and vegetables. Students note several valid reasons on a mind map. Observe and note the accuracy of students' sketches and annotations of the collaboratively designed plate of food art, with list of resources/components used.	**Introduction** As a class, brainstorm potential reasons why some people are not eating enough vegetables and fruit. Using a mind map technique, select three to four reasons to explore why, such as leafy greens may have a bitter taste. Show stimulus material, such as images or videos of food art for children, which make vegetables and fruit appealing and fun to eat. Refer to Appendix A.1 for examples. Develop reasons collaboratively into criteria for evaluation and justification of the selected design processes and solutions. This may include the vegetables used in the design, how preparation techniques affect the design, what to improve and other criteria that the class comes up with. **Learning activity** After viewing the stimulus material, each student creates a simple design for a creative, fun plate of food art that will encourage children to eat vegetables and fruit. The students sketch their design and annotate which foods could be used where in the design. Students identify preparation techniques best suited to selected vegetables/fruits and which foods could be prepared by using more than one technique, such as carrots can be sliced, grated and diced. Provide students with the opportunity to taste, identify flavours and describe the texture for a variety of vegetables and fruit.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Students individually complete Questions 1 and 2 of Assessment task 1, Food art (Appendix B) in class.	Students describe ways different foods provide colour, shape and size to the design. Explain how different techniques may impact on texture, colour and patterns. Students finalise their sketch and annotations for the class plate of food art. Using the vegetables and fruit, the teacher demonstrates preparation techniques or skills, such as peeling, grating, slicing, chopping and dicing, which may be used to produce the design. Students could complete the preparation technique or skill, and the teacher demonstrates another skill. Create the plate of food art. **Conclusion** Students develop a list of resources/components used to create the design and align with preferred preparation technique/s; for example, carrot grated.

Term 1 Week 5: Exploring nutrients and flavours

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Technologies and society** People in design and technologies occupations address competing considerations, including sustainable factors in the design of products, services and environments **Design thinking skills** **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task	**Learning intention** To explore different preparation techniques that may affect the flavour and appeal of various fruits and vegetables. **Focus questions** • What nutrients are present in different fruits and vegetables? • How might differing tastes impact peoples' selection of foods? • What might a plate look like that offers a variety of different flavour and nutrient combinations? **Support notes** Fruits and vegetables offer a variety of different nutrients. It is useful for us to consider eating a variety of fruits and vegetables to increase the nutritional value of the plate. A helpful tool to use to determine the different nutrients present in fruits or vegetables is the colour. Colour indicates what nutrients are naturally present within the food. Foods can be naturally sweet or sour, salty or spicy. Preparation techniques can change the flavour of foods, e.g. pickling vegetables in vinegar preserves them and changes the look and flavour of the food. **Suggested assessment points** Assessment task 1, Food art (Appendix B) Students alter/add to Questions 1 and 2 in class.	**Introduction** Discuss with students why it is important to maintain a well-balanced diet with a variety of fruits and vegetables. Discuss with students why young people might tend to choose foods of a certain flavour, e.g. sweet. Brainstorm students' favourite fruits and vegetables as a class. Categorise them into various colour groups: purple/blue, red, orange/yellow, green, brown/white. Discuss the different nutritional components of colours within fruits and vegetables using the resources from Nutrition Australia • https://nutritionaustralia.org/resources/eat-a-rainbow/ Reflect on the class brainstorm of favourite fruits and vegetables. Note if there are any groups that are over or under-represented. Is there a reason why? Discuss with students that fruits and vegetables can also be prepared in different ways which can alter the flavour and look of the food. Some cultures use preservation techniques when certain foods aren't available all year round. View the ABC's *Gardening Australia* episode on preserving vegetables. • https://www.abc.net.au/gardening/how-to/packing-your-pickles/9436338

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Discuss the reasons for preserving vegetables, and the flavour change that occurs when soaking a vegetable in a vinegar brine. **Learning activity** Ask students to consider and reflect on their initial responses in the Summative Assessment task completed in the previous lesson (Appendix B). Challenge the students to review and add to their responses, including some fruits and vegetables from each of the colour categories and flavour varieties, thereby increasing the nutritional value of the plate. **Conclusion** Review the learning intentions and share student alterations if time permits.

Term 1 Week 6: Food art investigating

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Context **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Design thinking skills** **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task Investigate and select resources considering constraints, properties and functions appropriate for the given task **Designing** Design alternative solutions achieved through an iterative process, including critical thinking, graphical representations, use of a range of technologies, techniques, technical terms and/or a sequence of steps	**Learning intention** To sequentially design, plan and reflect upon what is required to successfully create a plate of food art that will encourage children to eat a variety of fruit and vegetables. **Focus questions** • What will my plate of food art look like? • What resources/components are required to make the food art? • What are the set of sequenced steps required to produce the solution (a plate of food art)? **Support notes** In preparation for the next lesson, revise design ideas, safe step-by-step techniques and skills to slice, dice and chop, and principles of food preparation. Offer ways students could limit food wastage. Provide opportunity for students to trial/practise preparation techniques based on the proposed final design. **Suggested assessment points** Explanation of diagrammatic modifications to the design idea, based on peer feedback, with appropriate technical terminology and annotations. Review the set of clearly detailed sequenced steps, required to produce a food product (the class plate of food art).	**Introduction** How can we encourage children to eat fresh vegetables and fruit? What is the solution? A plate of food art designed to entice and encourage children to eat more vegetables and fruit. Students review various elements of design based on the use of fresh foods. Introduce students to competing considerations when designing solutions, such as ways eating a variety of foods is promoted. Engage students in an activity that reviews design ideas, identifies safe preparation techniques, and limits food wastage. This could include practising appropriate preparation techniques, such as slicing and grating. **Learning activity** Students design their plate of food art using the Design worksheet (Appendix A.3). This is a rapid design process which encourages students to develop and modify design ideas based on feedback provided by others. There is a time limit of five minutes for students to plan their initial design ideas.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Students individually complete Question 3 of Assessment task 1, Food art (Appendix B) in class.	Based on the final design, students develop a resource/components list, including labelled equipment that is necessary for producing their food art design. For example: • selected vegetables and fruit • decorative food items, such as sultanas, currants • equipment – chopping board, paper plate, plastic knife, fork, spoon, grater, wooden skewers, toothpicks, cleaning cloth. Students collaboratively develop a set of sequenced steps based on the production of the class plate of food art. Incorporate systems for hygiene practices, clean-up processes, waste disposal, and presentation of the final product. **Conclusion** As a class, review and refine the criteria to evaluate the design processes and appropriateness of the final product.

Term 1 Week 7: Food art production

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Context **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Producing and implementing** Use a range of technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intention** To use a range of equipment and food preparation techniques to create a plate of food art that encourages children to eat a wide variety of fruits and vegetables. **Focus questions** • What safe procedures need to be in place to produce the solution? • What factors influence the set of sequenced steps? **Support notes** Students should be familiar with the application of the principles of food safety and hygiene practices appropriate for each step in the production process. Prior to the lesson, have the fresh food items and equipment ready for students to select the required resources and/or components. Include items for cleaning and washing up. **Suggested assessment points** Observe student engagement, cooperation and application of safe food preparation practices. Observe student application of the set of sequenced steps to develop the solution, the plate of food art.	**Introduction** Revise the principles of food safety and hygiene practices to be implemented during production. Include procedures to wash up and clean all surfaces after production. Discuss safe classroom behaviours and practices to minimise risks and finish in accordance with the set of sequenced steps. Movement around the room should be controlled at all times. Reiterate the system to collect food and equipment, and the location of individual and shared preparation areas. It may be necessary to share equipment and space. Outline the importance of working individually and collaboratively. Emphasise the need to follow instructions to implement the set of sequenced steps. Encourage students to consider the ways of working when managing items individually and what tasks require sharing, negotiation or group work. Students note any variations or modifications to the plan and provide a brief explanation for why these have been made.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Learning activity Students to: • replicate the proposed design as closely as possible • wash equipment and clean surfaces • present the final product, the creative plate of food art, in the designated display area • photograph, record/store images • eat a variety of fruit and vegetables from their plate of food art. There is opportunity for students to exhibit their ICT capability with a digital display of the visual representations (infographics), accessible by students through a QR code, photographic display or video. **Conclusion** Exit task – if time permits, students discuss the taste and texture features they experienced when sampling their food art.

Term 1 Week 8: Food art evaluation

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Context **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Evaluating** Develop negotiated criteria to evaluate design features, graphics, selected technologies, processes and functionality with consideration of constraints for the designed solution	**Learning intention** To evaluate the success of the design and the procedures followed to create a plate of food art. **Focus questions** • What design features made the final solution appealing? • What strategies did you use to manage the set of sequenced steps? • What safe procedures did you implement? **Support notes** A variety of graphic organisers are referenced in Appendix A.1. Revise the *Australian Guide to Healthy Eating*. The *Guide* is a product created to solve a design problem. Identify the design problem. Identify the ways the plate of food art complements the design of the *Guide*. Alter the criteria based on class discussion to help guide the class discussion. Provide some criteria that students may have used to evaluate their creative plate of food art. Use these or the criteria developed by the class to evaluate their food art.	**Introduction** Ask students to reflect on the solution they produced in the previous lesson. Display images of the final products to promote discussion. Identify a range of design features, use of colour, textures and shapes. Encourage individuals to share their experience, to discuss their food art and compare with the original design idea. List some of the textural and taste descriptors students came up with when sampling their food. Discuss production processes and design problems evident in the classroom environment. Did the location of the resources, cutting stations and washing up area affect the planned sequenced steps? Engage students in a discussion about what design processes worked well and what did not work well. Did the plan for safe procedures work? Suggest ways to change and improve, ensuring a reference to project management. As a class, discuss ways individuals can manage situations when difficulties arise. What did you do to manage the implementation of the planned set of sequenced steps? What adjustments did you have to make and why?

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	List these criteria, and allow space for students to write the criteria they used, then their evaluation. **Suggested assessment points** Observation of active participation and contribution to class discussion and the Plus, Minus, Interesting chart (PMI) group activity. Students to individually complete Question 4 of Assessment task 1, Food art (Appendix B) in class.	**Learning activity** Separate class students into groups of three. Set a time limit for the students to use a graphic organiser, such as a PMI, to reflect on: • production processes • the final product. A speaker for each group reports their findings to the class. Collate the findings to develop a class PMI. Use the PMI to select criteria by which to measure the success of individual plates of food art. **Conclusion** Students use the criteria developed collaboratively by the class to evaluate their creative plate of food art.

Term 2

Weeks 1–8: Food specialisations

Term 2 Week 1: Food choice investigation

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Context **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Technologies and society** People in design and technologies occupations address competing considerations, including sustainable factors in the design of products, services and environments **Design thinking skills** **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task	**Learning intention** To explore the competing considerations that occur when people choose to prepare meals. **Focus questions** • What are the competing considerations to overcome when designing a food product, such as a sandwich or a salad for a varied and nutritious meal? • What are possible food preparation techniques for a varied and nutritious meal? **Support notes** Decisions about food are affected by cultural customs, religious beliefs, food/nutrition knowledge, food preparation skills, climate/seasons, availability of food, sustainability (reduce waste), advertising, peer pressure, lifestyle, access to technology, equipment, time available, costs, food distribution, organisation. Personal taste, likes/dislikes (for flavour, texture, and colour), often form the basis for addressing competing considerations. In preparation for the next lesson, pairs of students choose either a sandwich or a salad to design and produce. Based on the resources/ingredients provided by the teacher, the students develop a list of proposed components/ingredients and discuss food preparation techniques for eating, including washing ingredients, peeling, cutting, shredding.	**Introduction** There are times when you need to make a choice, i.e. 'you can't have both'. Think about when it is difficult to make a decision about food. It could be as simple as, which colour, what shape, or what flavour ice cream will you choose? Focus students on when competing ideas such as wants, health requirements, costs and seasons cannot be satisfied at the same time. **Learning activity** In small groups, students explore when individuals, families, and communities address competing considerations, particularly food-related choices. Assign student groups to the categories of individuals, families or communities. Use a graphic organiser, such as cloud thoughts or a mind map titled Individuals/Families/Communities to make food decisions. Record how and why individuals, families or communities make decisions about food. Define and identify food products and food services in the category. Set a time limit. Bring the small groups together by category, that is, individuals, families or communities. Have a 'messenger' from each group visit a 'like' group to discuss and share ideas.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Suggested assessment points Observe student engagement and cooperation within the small group activity. Review students' summary chart of competing considerations for understanding and application of ideas, and overarching reflection on the effectiveness of collaborating in small groups.	Display the graphic organisers. Identify a manager to lead discussion on the ways people address competing considerations when making decisions about food choices (products or services). Assign a scribe to collate considerations for each category. Lead a discussion for students to reflect on, and summarise the ways individuals, families, and communities address competing considerations when making decisions about food products and food services. Individually, students create a chart of competing considerations to self-reflect and summarise ideas for each category, including an overarching reflection on their group's ability to collaborate effectively. **Conclusion** Introduce the problem of deciding what to make for lunch, a sandwich or a salad. Students develop a desired list of ingredients for each option. Set a time limit to complete, then share and discuss with a partner. Identify constraints, such as seasonal foods, cost, access to equipment and food preparation skills.

Term 2 Week 2: Design a nutritious lunch

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Context **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Design thinking skills** **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task **Designing** Design alternative solutions achieved through an iterative process, including critical thinking, graphical representations, use of a range of technologies, techniques, technical terms and/or a sequence of steps	**Learning intention** To design and plan the steps to complete a sandwich/salad, considering their choices from the food options available. **Focus questions** • What competing considerations need to be addressed when designing a food product for lunch? • What design processes will be incorporated and explain why? **Support notes** Refresh student ideas for deciding on and including elements of design in the designing phase. The teacher to demonstrate and explain sketch techniques, such as outline shapes through to detailed representations, top view, side view, 3D views, depending on student abilities. Note the criteria that students suggest for the evaluation and keep it displayed for the next two lessons to refer to at evaluation time. **Suggested assessment points** Students create two designs to demonstrate their understanding of representing solutions both diagrammatically and in written text.	**Introduction** Consider the problem: Will it be a sandwich or a salad for lunch? Refer students to the desired list of possible ingredients from the previous lesson. As users, the students make decisions to remove or add to the list and consider factors, such as allergies, availability, flavour, and likes/dislikes. They consider different combinations for colour, taste, ease of preparation; for example, grating, chopping, or slicing, and within the constraints outlined by the teacher. Discuss with students, competing considerations when making their choices. Establish the constraints the students will work with to create the solution of what to produce for lunch. For example, provide a list of ingredients for students to select a specified number, show the range of equipment available, and revise various food preparation techniques. Revise various food preparation techniques to ensure students create an appropriate solution for a food product. As a class, discuss criteria that could be used to evaluate the solution. **Learning activity** Students develop design ideas for a sandwich and a salad. Each design to be represented as a diagram/sketch, top view/side view and annotated using technical terms. Students identify specific design techniques using

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Review student planning to produce the selected solution for lunch: • selects appropriate resources, such as ingredients, utensils and equipment. • develops a set of detailed and logically sequenced steps.	appropriate technical terms and provide this information as a written summary for each design. Use a small group Think-pair-share strategy to assist students to identify competing considerations and select a preferred design; that is, will it be a sandwich, or a salad for lunch? Students to justify their decision. Revise with the students the processes implemented in the investigating and designing phases. Define the problem of what to make for lunch, design alternative solutions, and identify the available resources, and food preparation techniques to be used. In their planning, students develop a list and provide a sketch of the utensils and equipment they will require to produce the design. They present this information in chart form. In planning the production phase, the teacher identifies and presents to the class various design problems that exist in the classroom. Consider location and distribution of ingredients, safety procedures to have in place for student movement around the room, the limited number of utensils and equipment, how and where wash/clean-up procedures will take place. Based on the selected design, and considering safe procedures, pairs of students develop a set of sequenced steps they plan to implement to make their choice of lunch in the next lesson.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Conclusion Use a Think-pair-share strategy for students to check the set of sequenced steps developed by another pair of students for logical development and make suggestions for improvement.

Term 2 Week 3: Produce a nutritious lunch

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Context **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Producing and implementing** Use a range of technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intention** To use agreed protocols and equipment safely when producing their sandwich/salad design. **Focus questions** • What competing considerations need to be addressed to ensure safe procedures are applied to produce lunch? • How will you work collaboratively with your partner? • What adjustments to the sequence of steps, if any, were required when considering resources and the classroom design problems? **Support notes** Ensure safe procedures are applied when using the selected equipment and to minimise the impact of identified design problems in the classroom. **Suggested assessment points** Anecdotal observation in the application of the set of sequenced steps, and ways students resolved design problems collaboratively in the classroom to ensure safe movement around the classroom. Discuss the selection of components/ingredients and techniques used to make the sandwich or the salad. Note ideas on sticky notes or digitally annotate the photograph. These could be used as prompts to complete the evaluating process next lesson.	**Introduction** It is almost lunchtime. Identify areas in the classroom where competing considerations need to be addressed – not everyone can collect ingredients, utensils, equipment or wash up at the same time. Assign students to various locations and rotate. Remind students to always move around the classroom in a controlled manner. **Learning activity** Ask students to read the sequenced steps and ensure they understand how procedures will work in the class. Address questions. Encourage students to write notes of any adjustment required to the sequenced. Highlight to students the necessity to work collaboratively and all students have an obligation to contribute to a safe working environment. When sharing equipment, use patience, work at a safe pace, and revise the systems developed earlier for the safe movement around the room. Students photograph the final product and note significant features or any obvious changes from the original design. Package the sandwich or salad in paper or a lunchbox for easier transport to the lunch area. **Conclusion** All students to be active participants in the clean-up process, including the storage of utensils and equipment. Students to complete the evaluating process next lesson.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	If students have individual devices, use the Post-it® app to insert the image and collate sticky notes around the image, for visual brainstorming, and could be included in a digital planning document easily. Play Store: https://play.google.com/store/apps/details?id=com.mmm.postit&pcampaignid=web_share Apple Store: https://apps.apple.com/us/app/post-it/id920127738?platform=ipad	

Term 2 Week 4: Evaluating your lunch

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Design thinking skills **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Evaluating** Develop negotiated criteria to evaluate design features, graphics, selected technologies, processes and functionality with consideration of constraints for the designed solution	**Learning intention** To evaluate the design process and solution for the sandwich/salad final product. **Focus questions** • What criteria will be used to evaluate and justify the design processes implemented in the production of the lunch product? **Support notes** Students to work collaboratively and independently to reflect on the design processes and the solution produced, for either the sandwich or the salad. To help sort ideas use a graphic organiser, such as the affinity diagram from: Getting it Together https://getting-it-together.moadoph.gov.au/teacher-guide/graphic-organisers.html. Explain how students will initially work independently and then work in pairs as a Think-pair-share activity. The class will collaborate to draw out and identify the main ideas and develop these ideas into criteria for each of the design processes and the solution. **Suggested assessment points** Assess the written response, which discusses the benefits and issues of working collaboratively to overcome classroom design problems.	**Introduction** Outline to students the process of evaluating the lunch produced last lesson. Students will work independently. Distribute copies of the affinity diagram or access a copy available on the class intranet and annotate on individual devices. Provide a title for the diagram. The two categories to be evaluated are design processes, and the solution. Populate the two large boxes at the top of the affinity diagram. In each of the remaining boxes under each heading, write one idea, such as what went well, what did not go so well, taste and colour. Add additional boxes as required. **Learning activity** Use a Think-pair-share activity with another student to discuss main ideas and make alterations if necessary. Repeat the Think-pair-share activity with another student. Highlight or circle the common ideas. As a class, reflect on the criteria suggested for evaluation in Lesson 2. Write these on the reverse side of the organiser. Individually students respond to each criterion to complete the evaluation process. **Conclusion** Students to respond to the question posed by the teacher to discuss how working collaboratively helps to address classroom design problems.

Term 2 Week 5: Snack stack planning

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions	**Learning intention** To work in collaboration as a designer/producer to plan the production of a Snack stack. **Focus questions** • What do designers need to plan and communicate for producers to manage processes and develop solutions? • What does working collaboratively feel like and look like? **Support notes** Students to work in pairs as designers. A worksheet is provided in Appendix A.5. In the following lesson, the students will work in another pair combination as producers. The producers will follow the instructions developed by the designers using the designer worksheet to produce a food product, the Snack stack. For example: • the designers define the problem • the teacher defines the set of ingredients; be specific, such as one celery stick, portion of carrot, two rice cakes (to suit class budget). The producers will implement the design using the listed resources and the set of sequenced steps to produce the Snack stack product.	**Introduction** Are you an effective designer? Assign students in pairs to work collaboratively as designers. The designers complete the designer worksheet this lesson (Appendix A.5). They are to create design ideas and communicate plans to develop a solution to the Snack stack. Discuss the title and possible implications for design features; for example, selected ingredients for a stack of vegetables for a snack. Explain to students how to define the problem clearly and explicitly. Designers prepare a statement to outline the problem. Discuss with students the ingredients and quantities permitted, as prescribed by the teacher. Emphasise that the designers do not have to use all ingredients or quantities provided and should work within the constraints. The teacher provides examples, drawing from previous lessons, of design techniques, annotated with appropriate technical terms for students to develop two designs. **Learning activity** Through discussion, designers select the preferred design. They justify the selected design and provide a brief written description to support reasons for the selection, in the space provided on the worksheet.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	In the next lesson the producers will be provided with the designers' worksheet, completed this lesson by the designers. **Suggested assessment points** Student pairs self-reflect to ensure design intentions and instructions as designers are communicated clearly. Teacher observes and notes student actions, skills, engagement, and cooperation when working collaboratively in a partnership.	Explain the importance of a clear set of logically sequenced steps required to produce the solution. This is the method that designers will use to communicate their intentions to the producers in the development of the solution. Include explicit instructions on ways to safely prepare the ingredients. Discuss with the students possible ways to reflect on the design processes and how the proposed solution will be achieved. This will form the basis of the criteria for evaluation and should be added to the last page of the design sheet (Appendix A.5). **Conclusion** Discuss with students, what did it feel like and look like to work cooperatively in a partnership?

Term 2 Week 6: Produce Snack Stack

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Design thinking skills **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Producing and implementing** Use a range of technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intention** To work in collaboratively a partnership as a designer/producer to create a Snack stack. **Focus questions** • Were the design processes communicated clearly to the producers? • Were the producers able to follow the instructions given by the designers? **Support notes** Regroup the students to become producers for this lesson. The producers make the solution for the defined problem, a healthy Snack stack within the lesson, including the clean-up process based on the designer worksheet completed last lesson **Suggested assessment points** Observe student engagement and successful application of the design idea and instructions provided by the designers of the product. Students note issues and strategies implemented to resolve the situation. Observe student participation within the partnership. Note the ways roles and issues were managed, and what communication strategies were implemented. Collect images to demonstrate steps in the sequenced steps (for next lesson).	**Introduction** Can students follow the instructions? Working in a partnership as producers, follow the instructions developed in the last lesson by the designers to produce a solution, the Snack stack. **Learning activity** As a class, make decisions on how to distribute the worksheets; for example, fold the worksheets and place in a box. The producers select from the box. Be sure students do not select their own designer worksheet. Using the design idea, other given constraints and instructions, the producers interpret and follow the template. At no time are they to communicate with the designers to clarify any issues. Any issues should be resolved collaboratively with their partner. Make notes on how the producers managed the situation and the decisions they consequently made. When the producers have received their instructions, discuss the importance of carefully reviewing all instructions and identifying potential issues before they commence production. Remind students of the practical aspect of production and the importance of maintaining safe procedures to produce the Snack stack. Assign roles and establish communication strategies within the partnership. It is recommended that

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		the producers photograph each of the steps in the sequenced steps. The photographs can be ordered and annotated using an application, such as Keynote presentation, Book Creator, PowerPoint, Google Slide or iMovie. See links in Appendix A.4. The producers can use this technique when presenting to the designers in the next lesson to highlight issues and success. If individual/shared devices are not available, teacher may take photos and print for an instructional manual that can be manually annotated. **Conclusion** Ensure clean-up procedures are completed thoroughly and cooperatively. Record an image of the final product for review in the next lesson. Reflect on how the students followed instructions and whether the instructions were clear.

Term 2 Week 7: Snack Stack evaluation

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Evaluating** Develop negotiated criteria to evaluate design features, graphics, selected technologies, processes and functionality with consideration of constraints for the designed solution	**Learning intention** To evaluate the success of the collaborative process in creating a Snack stack. **Focus questions** • Were the design ideas for a solution replicated by the producers? Why or why not? • Were the set of sequenced steps logical and clear? Why or why not? **Support notes** Students to develop strategies to compare the final product with the original design idea prepared by the designers. Identify design features that are/are not evident in the final product. Encourage students to make suggestions as to why or why not. Assist students to review: • the list of resources/ingredients for consistency with the design • if the set of sequenced steps communicated ideas and information clearly, and without ambiguity • the application of proposed food preparation techniques. Identify and describe reasons for differences and the impact on the final product.	**Introduction** Was the final product what the designers had planned? Display the designers' worksheets to show the design idea both diagrammatically, with annotations, and the written description. Producers place an image of the final product beside the design. **Learning activity** Students participate in a gallery walk and prepare review notes on at least three designs with accompanying image, noting differences and similarities. Students make suggestions as to why there are differences or similarities between the design and the final product. Decide if this is to be a timed task. As a class, summarise and develop a list of reasons why differences or similarities exist. Distribute the criteria developed in Week 6 (last page of the worksheet) to the producers to evaluate the design process and the solution. When complete, display with the design and the image of the final product. Provide time for the producers to sort and order a selection of photographs relevant to the resources used, communication of the design idea and the set of sequenced steps, and application of preparation techniques. They develop a brief presentation using an application, such as Keynote, PowerPoint, Google Slides, Book Creator or iMovie.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Suggested assessment points Observe and question students during the gallery walk. To what extent could students suggest reasons for differences between the original design idea and the final solution? What valid reasons did students provide for why the final solution was/was not a close replica of the selected design? Review the presentation prepared by the producers.	Producers to meet and interview the designers. Gather as a group of four and review the design, set of sequenced steps, image of the final product and the completed evaluation criteria. The producers in their presentation highlight any issues, differences and similarities between the design and the final product and provide reasons why. The designers respond through discussion and annotate issues, reasons for the differences and reasons for the similarities on the designer's worksheet. Remind students to ask if they enjoyed eating the Snack stack for flavour, texture, ease of eating, and taste. **Conclusion** The presentations may be shared on a class shared file or printed out into booklets for students to view alternative designs and Snack stacks. Optional, and if time permits, the producers in Lesson 6 may wish to meet the producers of their Lesson 5 design. Repeat the review process (as above) or discuss as a group of four. Use a graphic organiser, such as Placemat, to record feedback.

Term 2 Week 8: Taste test

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Food specialisations** Food choices, consumer demands and preparation systems affect the use of a food in a meal/product **Design thinking skills** **Producing and implementing** Use a range of technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intention** To understand how different preparation techniques can affect the flavour of foods. **Focus questions** • Will the application of food preparation techniques impact the taste of food? • What were the three most popular foods tasted, and identified during the activity? **Support notes** Revise with students the elements that help us to decide if we like a food or not, such as flavour, texture, aroma. Will the application of food preparation techniques impact on the taste of food? Display or distribute the set of sequenced steps for the tasting procedure, and a data collection sheet. Discuss the establishment of a data collection procedure with the students. The note taker for each group enters responses on a chart or, preferably a spreadsheet accessed through the class shared file. The data collated at the conclusion of the activity should indicate the most popular foods identified and the preparation technique applied. The collection of data can indicate if the application of food preparation techniques impacted on the taste of food.	**Introduction** It is suggested to photograph each step of this activity. The images may be used to prepare a small promotional video of the activity. The experts are taste testing! All participants in this activity must be aware of individual food allergies and/or food intolerance within the student group, and procedures to prevent cross-contamination. Revise food safety and hygiene practices. Explain and demonstrate to the class appropriate safe food handling procedures for a blind tasting, including washing hands, the use of clean surfaces, tongs, skewers/toothpicks and gloves. **Learning activity** Organise students for a blind tasting: • place students in groups of three • each group to prepare four sets of food and display on a tray/board, covered with paper towel • select up to five food samples for each set, approximately a teaspoon size sample • apply food preparation techniques, such as chopping, slicing or grating each food in the set. A sample set of food could consist of bread, cucumber, melon, cauliflower and apple.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Prior to the lesson: • gather suitable blindfolds • select a variety of fresh food, considering a range of textures, flavours and aromas suitable for blind tasting. **Suggested assessment points** Students save the summary of data from the class shared file to their personal device; reflect on the results and examine if food preparation techniques influenced the correct identification of fresh food.	Demonstrate the procedure for successful blind tasting using the three-step interview process. Assign roles for each member of the group: • interviewer – asks questions about the food, what does it smell like, feel like, shape and size • note taker – enters responses into a shared class document using a digital device or a chart, and collates data at the end of the activity • interviewee – blindfolded taster makes predictions on what the food is, based on texture, smell, and flavour and identifies the food preparation technique applied. To ensure a successful tasting process, remind students not to talk about the food during the tasting process. When the first tasting is completed, the interviewee moves to another group. Repeat the process. Move again to another group. Ensure all students have the opportunity to work in each of the three roles, in differing locations so that they are familiar with the food samples available. **Conclusion** At the conclusion of the activity, students work collaboratively to wash and put away equipment and clean surfaces. Using the photographs taken during the activity, students to develop a 10–15 second fresh food promotional video. If shared or individual devices are not available, students can perform this as a sketch act.

Term 3

Weeks 1–8: Engineering principles and systems

Term 3 Week 1: What is electrical energy?

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system	**Learning intention** To understand how electrical energy creates movement, sound or light in a system. **Focus questions** • What is electrical energy? • How does a flow of electrical energy create movement, sound or light in a product or system? **Support notes** Prior to the lesson, prepare components required for a simple electric circuit for each pair of students. For example: • power source (battery) • connectors (wires, preferably with alligator clips, for the electricity to pass through, or a graphite pencil to draw the circuit and use as a conductor of electricity) • load (lightbulb, LED or buzzer). Describe the components required to develop an electric circuit. Introduce the terms product and system and differentiate using examples. Explain the purpose of a switch in an open and closed electric circuit, that is, turn off and turn on.	**Introduction** What is electricity? Prompt class discussion using a quick online quiz, such as Kahoot!, to stimulate a variety of ideas about electricity. Include how electricity is present in nature, as lightning. A series of illustrations, images or short video clips could be used. Develop the idea of connecting several components in an electric circuit so that a current can flow to produce a desired result. This could be to produce movement, sound or light, such as a torch. Ask, what are the components in a torch, kettle, toaster, hair dryer? Explain the power source. Students select an item (product) and individually sketch their idea of how the electricity flows in a circuit and label various components, using appropriate technical terms. Use the sketch to discuss ideas with students. Probe what happens when the switch is on, and off. Modify the sketch and include a brief written explanation. Develop the idea of an electric circuit being a continuous loop that can carry an electrical current. Revise terms including switches, resistors, bulbs, buzzers, leads, negative (black), and positive (red). To have a flow of electrical energy, a power supply, such as batteries, and materials to conduct the electric current are required.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Illustrate various power sources used in simple community systems, such as batteries, generators, mains electricity, solar cells. Compare with power sources for small electrical items. **Suggested assessment points** Review the image or sketch of simple electric circuits for accuracy and understanding of electrical energy flow. Determine students' fundamental understanding, through annotated sketches and the constructed circuit, of an electrical energy flow to control movement, sound or light in a system.	**Learning activity** Provide each pair with the components necessary for a simple electric circuit. Students work collaboratively and refer to the sketch to construct a simple electrical circuit. Students explain how electrical energy might flow in a home or building, such as the school. Build on how electrical energy is evident in products, such as televisions, computers, washing machines, air conditioners, cordless power drills. Ask students to explain and modify their sketches to include various products. Extend the discussion to include systems, such as the local power grid, home, fuel pumps, solar panels, cars. **Conclusion** If time permits, in pairs students select a system (from a list provided), to develop an annotated sketch to demonstrate and predict how electrical energy can produce movement, sound, or light in a system. Each sketch must have a title; for example, 'How traffic signals work'. Highlight to students how society relies on systems, such as cooling systems, transport (electric train) systems, and sound systems. Confirm with students that a system is a process or collection of parts that work together. Display completed sketches for review by peers.

Term 3 Week 2: Electrical energy in product design

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Technologies and society** People in design and technologies occupations address competing considerations, including sustainable factors in the design of products, services and environments	**Learning intention** To explore the possibilities of electrical circuits in creating products for different purposes. **Focus questions** • What are competing considerations when designing electric products, services and environments? • How can an electric circuit make an interesting decoration for your bedroom or add sparkle to a costume? **Support notes** Introduce competing considerations and relevancy to sustainability when using electrical energy in products, services and environments. Provide an opportunity for students to discuss and develop opinions for competing considerations, including: • sustainability, for current and future use of electrical energy when designing products, such as when taps and hand dryers are turned on through movement • systems, such as sensors, which open doors or turn on lights for the needs of individuals • environments, such as lights turning on for safety in confined spaces or extraction fans turning on based on air quality in the room. Expand the discussion to include an explanation of diodes, particularly light-emitting diodes (LEDs).	**Introduction** Should hot air hand dryers or paper towel dispensers be installed to dry hands? Use two or three examples of sustainable options such as programming a washing machine to operate during off-peak times. Introduce and discuss the term, and competing considerations. Students work in groups of three with a time limit to identify examples of competing considerations. Select a range of examples to discuss. Identify spaces in the classroom to agree or disagree. Students move to a space and validate choices. Investigate how products, such as LEDs, were developed from competing considerations, including sustainability. Draw connections to current use in various products, services and environments. Make predictions for future use. Extend the discussion to include the use of LEDs and outline a variety of ways to create interesting decorations using LEDs or add sparkle to costumes and items. Also consider alternative items, such as personal items (pencil case, school bag), clothes, name badges, face masks, class decorations (Christmas, book theme) using a simple electric circuit kit.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Show a short video to explain the use and sustainability advantages of LEDs. Outline how a simple electric circuit kit, comprising coloured LEDs can be used when designing a product to create a solution for a given task. See Appendix A.6 for an example. **Option A:** Investigate using playdough as a conductor in a simple electrical circuit. Using the original items for the basic electrical circuit and multicoloured playdough, encourage students to design a decoration for their bedroom that is made interesting by the use of LEDs. Students may also wish to investigate and incorporate other items that are conductors of electricity to add into the circuit and add interest to their decoration. **Option B:** If ample resources are available, investigate and source simple electric circuit kits to add sparkle to clothing, such as costumes for the class assembly item. For inspiration, search wearables and Lilypad. The Lilypad system uses a set of wearable electronic pieces which can be sewn onto fabric (felt, for example). Identify and list individual items to add to the digital design idea. **Suggested assessment points** Observe and note student decision-making and validation for the competing considerations activity. An individual sketch showing initial draft design for bedroom decoration/costume, including labels, annotations and a brief description of the design idea.	Define the problem: **Option A:** Investigate ways to create an interesting decoration for your bedroom using materials that conduct electricity and light up. The solution should include a simple electrical circuit with LEDs. Demonstrate a basic electrical circuit with the use of playdough to make it look like a shape/character that lights up. **Option B:** Investigate ways to add sparkle to costumes and/or items for the class assembly item. The solution should include a simple electric circuit with LEDs. Demonstrate a simple electric circuit kit, such as a wearable Lilypad with LEDs of various colours. **Learning activity** Students identify and label the components of the electric circuit. Encourage discussion on how light is produced in this product, with questions, such as: • How is the circuit closed? • Where is the power source? Working in small groups, students discuss ideas for initial design and ideas on how an electric circuit with LEDs could be used to create a decoration/add some sparkle. Individually students prepare a rapid sketch of their preferred design idea. Suggest additional items which will add to the overall design idea. Label and annotate the preferred design idea. Support the sketch with a brief description. **Conclusion** Display sketches for consideration by all class members.

Term 3 Week 3: Design an electrical circuit decoration (part A)

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task Investigate and select resources considering constraints, properties and functions appropriate for the given task	**Learning intention** To investigate the materials and steps required to make an electrical circuit decoration/costume. **Focus questions** • What is the defined problem? • What are the set of sequenced steps? • What resources are required to create the solution? • What strategies will be used to plan, develop and communicate ideas for a solution? **Support notes** See Appendix A.6 for examples of videos that may offer creative inspiration and practical ideas. Outline the use of a storyboard including a set of sequenced steps to communicate ideas and information. Based on the tutorial videos, demonstrate how to interpret the information and develop a prototype. This process will be the basis for students to identify skills required to develop their plans, ideas, and display as a storyboard. **Suggested assessment points** Observe students working in small group situations. Note independently developed plan, sketch and list of resources identified for producing and implementing.	**Introduction** As a class, students work collaboratively to develop a range of ideas which use a simple electric circuit and includes playdough as a conductor to create a decoration for their bedroom or LEDs to decorate costumes/items for the class assembly item. Ask students to define the problem. Students record their responses in written form on a blank storyboard or on a digital file and give reasons why using an electric circuit will be a solution for the problem. View a video that shows ways in which students can use playdough as a conductor to create a decoration for their room or ways to stitch LEDs onto clothing. Based on this information, students independently develop a draft set of sequenced steps. Sketches and diagrams may be included. **Learning activity** In small groups, students compare their draft of sequenced steps. They analyse, discuss omissions, edit where necessary, alter sequencing. Groups make decisions and modifications to create a detailed set of sequenced steps, that is, create a solution. Each student should have an edited set of sequenced steps. The group identifies and creates a list of resources required to complete the solution. Refer to the rapid sketch design idea from the previous lesson.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Students use a blank storyboard format to demonstrate a set of sequenced steps, presented either on card or in a digital format. Include photographs (and video) and written text as evidence.	Groups share their list with another group to edit, make suggestions and pass to another group. Return the list to the original group to review. As a class, develop a detailed list of resources. Small groups identify safe procedures and skills required to implement the set of sequenced steps. Each student to develop a plan, with reference to the rapid sketch of their idea, and include a list of resources. They place their plan on the storyboard as a set of sequenced steps, with specific skills identified, ready for the next lesson. **Conclusion** As a class discuss what criteria should be used to assess the final product. Keep a record of two to three criteria, agreed upon by the group, for use in the evaluation stage.

Term 3 Week 4: Design an electrical circuit decoration (part B)

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Design thinking skills** **Designing** Design alternative solutions achieved through an iterative process, including critical thinking, graphical representations, use of a range of technologies, techniques, technical terms and/or a sequence of steps **Producing and implementing** Use a range of technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intention** To design a decoration/costume in an electrical circuit, considering equipment required **Focus questions** • What will the design idea look like? • Where will the components of the electric circuit be placed? • What specific production skills will be needed? **Support notes** Prior to lesson ensure resources required to demonstrate the application and safe production of specific skills are ready for use. Based on the list developed in the previous lesson, take the students through each of the specific skills required to safely apply procedures and equipment needed to develop the design to create the desired solution. **Option A:** Investigate materials that conduct electricity. Explore how playdough conducts electricity, but modelling clay does not, and how these items may be used to create interesting decorations with the LED lighting.	**Introduction** What will the design look like? Review the initial rapid design for the sparkle. Are modifications required? If selecting **Option A:** Spend the session with the students experimenting with a variety of materials to discover if they conduct electricity. Experiment with separating playdough with modelling clay and consider how to use this effectively in the design. Have a variety of materials available for use and separate the students into small groups, using the electrics wired with clips attached to test out different items. Encourage students to have their previous design out in order to add/alter/adjust according to what is discovered during this investigation. If selecting **Option B:** Students estimate the size of the design and where it will be placed on the costume. Make modifications to fit within the proposed area and theme. This will be the template. Annotate with appropriate technical terms. With the design and template size determined, place a sketch over the top of the template to draw the location of the electric circuit. Consider placement of components, such as the LEDs for effect, the switch, and the power source.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Option B: Demonstrate how to: • thread a needle and apply a running stitch with an oversew stitch at either end • transfer the template shape to the felt/fabric (two shapes required) • use the glue gun safely at a specific location in the classroom • other skills, as determined by the teacher or students. Answer queries and discuss the finer skill development with individual students. **Suggested assessment points** **Option A:** Students add and alter their storyboard, as required. **Option B:** Observe student engagement, cooperation and application of safe procedures when using the designated components and equipment to develop skills required to produce the planned design.	**Learning activity** Based on the teacher demonstration, select and practise the application of the skills required to produce and implement the planned design, and electric circuit to make the design sparkle. After practising specific production skills, revise the set of sequenced steps and the proposed design idea, and make any necessary modifications and/or note important details to remember for smooth production. **Conclusion** Working collaboratively, students clear away equipment and safely store materials for the next lesson.

Term 3 Week 5: Produce an electrical circuit decoration

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Design thinking skills** **Producing and implementing** Use a range of technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intention** To follow the design and use a range of equipment to create an electrical circuit decoration/costume safely. **Focus questions** • What safe procedures and equipment are required to develop the solution? • What modifications, if any, were required to the set of sequenced steps to ensure clear instructions are in the correct order? **Suggested assessment points** Create a marking key based on your chosen task to cover the sub-strands; Investigating and defining, Designing, and Producing and implementing. Students use a storyboard to demonstrate a set of sequenced steps, presented either on card or in a digital format and include photographs, video and written text as evidence. The storyboard will form the main evidence for the summative assessment.	**Introduction** How do I make the planned design? Revise with students the application of safe procedures in the producing and implementing phase to develop individualised plans and ideas, and to work collaboratively when using and sharing a variety of components and equipment. **Learning activity** Give students a few minutes to review their plans, check the annotated design template for accuracy and add notes, if required. Collect all required components and equipment. Check against the resource list. Outline locations of workstations for specific tasks. Remind students of safety procedures and consider movement around the room. Using the set of sequenced steps, students produce the product to make the decoration or costume item sparkle. **Conclusion** Students clean up and store away equipment. Products may need to be stored in a safe place to dry and be ready for the final decorative component next lesson.

Term 3 Week 6: Evaluate the electrical circuit decoration

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Evaluating** Develop negotiated criteria to evaluate design features, graphics, selected technologies, processes and functionality with consideration of constraints for the designed solution	**Learning intention** To evaluate and alter the electrical circuit adding additional sparkle lights to improve the decoration/costume. **Focus questions** • What additional resources are required for extra sparkle to the design? • What design problems affect the production plan? • What criteria will be used to evaluate and justify the design process and final product (solution)? **Support notes** Distribute the product developed last lesson. Have students check the electrical flow of energy. When switched to the on position will the LEDs add sparkle to the original design idea? Display all products. Turn the electric circuits on and initiate class discussion about which features are significant and make the products sparkle. **Suggested assessment points** Observe student participation and contribution to discussion both in the smaller groups and the class. Students to use the criteria developed by the class to evaluate the product. Note students' evaluation of the product for each criterion.	**Introduction** The final touch. Review the final product developed during the previous lesson. Do the LEDs emit light when the switch is in the on position? **Learning activity** In small groups, students review each final product against the design and the set of sequenced steps. They discuss similarities and discrepancies, and suggest reasons why, and make notes on the storyboard. As a group, review modifying the design with additional sparkle items or functionality ideas. Provide a time limit for students to add extra sparkle to their product. Students display the products on a table and turn the circuit to on. Initiate discussion with students to identify significant features and what makes specific products sparkle and stand out. After the discussion, the class reflects on two to three criteria for each of the design processes and the solution from Week 3. Individually, students apply the criteria to evaluate the product and justify the location of the sparkle on the decoration/costume. **Conclusion** Students assist with the cleaning and storing of all equipment.

Term 3 Week 7: Using electrical circuits in safety products

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Technologies and society** People in design and technologies occupations address competing considerations, including sustainable factors in the design of products, services and environments **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Designing** Design alternative solutions achieved through an iterative process, including critical thinking, graphical representations, use of a range of technologies, techniques, technical terms and/or a sequence of steps	**Learning intention** To consider how electrical circuits might be used to design safety products. **Focus questions** • What are real-world design problems and ways products or services can solve problems? • How do competing considerations impact design features of products, services or environments? • What is an opportunity? **Support notes** Extend the class discussion to how you may need to design a product or service for the problem where a solution has not been created. This is referred to as an opportunity, that is, an opportunity to create a new design idea. In pairs students select a real-world design problem from the class list or propose their own problem. They are required to: • define the problem • design, both diagrammatically and in written text, at least one solution using annotations and a range of techniques to create a solution • incorporate an electrical circuit to control movement, sound and/or light in the product or system • identify competing considerations, including sustainability	**Introduction** Brainstorm real-world design problems, such as how can a child lost in the bush be found quickly, or how can we make a teddy bear talk, or how can LEDs or a bell be activated on my skateboard or scooter? Consider a design problem. When a person becomes lost in bushland, they must be found quickly to improve their chances of survival, particularly if extreme weather conditions are forecast, but how can we find them? Discuss possible solutions with the class. Forecast how can we locate people quickly to ensure their chances of survival? Make predictions for use of electronics incorporated into garments when making searches in the future. Introduce to students several real-world design problems for discussion and incorporate the use of electrical circuits and ways to activate movement, sound and/or light. **Learning activity** In pairs students develop a design idea to create a possible solution for the selected real-world problem. **Conclusion** The class shares their ideas and information. Display draft designs for review. Students use sticky notes to provide feedback and pose questions for consideration on other designs. The design is to be completed next lesson.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	• plan, develop and communicate ideas and information for a solution • make predictions on how the product or service could be used in the future. Use a variety of examples, such as use of body heat as an alternative power source to power electronic textiles. Embedded sensors in clothes may be able to monitor movement and assist in locating a lost person in the future. To help create solutions, modify or substitute existing technologies. **Suggested assessment points** Diagrammatic representation and supporting written text of a solution for an identified real-world design problem. A marking key based on the requirements of the real-world problem to be applied at the conclusion of the design phase. Observation of student engagement to collaboratively solve design problems.	

Term 3 Week 8: Sharing our designs idea

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Technologies and society** People in design and technologies occupations address competing considerations, including sustainable factors in the design of products, services and environments **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions	**Learning intention** To reflect upon feedback and design an electrical circuit product that can be used as a safety device. **Focus questions** • What is the selected real-world design problem? • What are the competing considerations that have impacted design features of the product or service? • What sustainability factors have been considered? • What design idea opportunity has been developed? **Suggested assessment points** Diagrammatic representation and supporting written text of a solution for an identified real-world design problem.	**Introduction** Discuss with students how to reflect on the feedback provided through discussion and on sticky notes at the conclusion of the previous lesson. **Learning activity** Students complete the design idea for the identified real-world problem and address the focus questions. At the conclusion of the design phase, each pair of students join with two other pairs. Each pair is to present their design idea to the small group. Based on the requirements of the task, discuss each design. Bring the class together and ask each group to share one design problem and the proposed solution. Direct class discussion on competing considerations, sustainability factors, and the various opportunities created. Display design ideas, either as a design gallery around the classroom or on the class shared file. Students should select six to eight designs to review using a graphic organiser, such as a PMI. Use the information gathered through the PMI to contribute to a class discussion to rank the top three design ideas. **Conclusion** Have the designers of these ideas present their design to the class for further discussion and implications on future use.

Term 4

Weeks 1–8: Engineering principles and systems

Term 4 Week 1: What is a force?

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Technologies and society** People in design and technologies occupations address competing considerations, including sustainable factors in the design of products, services and environments	**Learning intention** To understand how forces affect other objects through movement. **Focus questions** • What is a force? • What types of forces affect objects/products? • How can a force control movement in a product or system? **Support notes** Prior to the lesson, establish several examples of forces located at various places around the room. Ask individual students to demonstrate a force, such as push a chair, pull a chair, open a door, kick/bounce a ball, twist a towel. Stimulate discussion through viewing videos. Examples of appropriate videos are referenced in Appendix A.7. **Suggested assessment points** Assess students' understanding of forces using their visual representation of information about different kinds of forces, such as an infographic.	**Introduction** What is a force? Prompt class discussion through application of various examples of forces in action. Include how forces are present in nature, such as in earthquakes, glaciers, cyclones. View short instructional videos (Appendix A.7) to understand forces are a push or a pull action on an object or product. A force may cause an object or product to move, accelerate, slow down, and even stop. As a class, create an extensive list of different types of forces that impact objects, products and structures. From the list, determine two main types of forces, either contact or non-contact. Investigate a range of different kinds of forces at work around us every day. The list could include; normal, applied, spring, tension, frictional, compression, shear, bending (or refraction), gravitational, magnetic, air resistance, torsion force. Randomly assign a force to each pair of students to investigate. The investigation is to include a brief definition, description of how it works, annotated sketch, examples, impact on objects or structures (buildings and bridges), contact or non-contact force; and include an interesting fact.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Learning activity Each pair to visually represent information on different kinds of forces. Examples could include a poster, word clouds, tree map, filmed demonstration, or an electronic infographic. Suggested infographic templates (Appendix A.7) https://www.canva.com/infographics/templates/. **Conclusion** Share each group's work. Each pair references the infographic and the kind of force investigated during a one- to two-minute presentation to the class or a small group.

Term 4 Week 2: Investigating levers

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Design thinking skills** **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task Investigate and select resources considering constraints, properties and functions appropriate for the given task	**Learning intention** To investigate how levers use force. **Focus questions** • How do levers, linkages, and catapults work to transfer force? • How to get a mechanical advantage with the use of a lever? **Support notes** Review the infographics created in the previous lesson to revise the different kinds of forces, and use of force for everyday activities. Clarify technical terms and diagrammatic representations of different forces. Teach students the three classes of lever, based on an illustration. See Appendix A.7 to find appropriate links to assist in explaining this concept. Various Levers and Linkages kits are commercially available and include a range of components to make several models to demonstrate levers, linkages, and catapults. Alternatively, students can create simple linkages, levers and catapults with the use of icy pole sticks, rubber bands, masking tape, straws and cups. See Appendix A.7 for examples for both.	**Introduction** Pull the lever! What lever? View a brief video to demonstrate how levers work to transfer force. As a class develop a list of common levers in the home and at school. Identify the components of a lever, such as a rigid bar, a fulcrum, a load and point of effort. **Learning activity** Students sketch of a pair of scissors and identify the lever components. Repeat the process with other common items. Compare sketches with another student. Use objects at your desk, such as a ruler and items in the pencil case, to construct a simple lever. There are three classes of levers. Demonstrate and discuss with a partner the effort required for each class by adjusting the lever. Photograph the layout of the components for a lever for each class. Label and briefly describe each. Store the photographs in students' personal Technologies file, or print, annotate and file/display in the classroom. Based on available resources, students work with a partner to develop a set of sequenced steps to create a model of a lever. Use the model to demonstrate how a lever works to transfer force to move an object. Create a 10–15 second video to explain the class of the lever, and how the lever model works to transfer force.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Suggested assessment points Anecdotal notes on sketches and an understanding of how levers work. Check the annotated photographs, the different classes of levers, and a highlight video of the set of sequenced steps required to create a lever (or linkage, catapult) and incorporates force.	**Conclusion** If time permits, share videos with the class or in small groups.

Term 4 Week 3: Cams, crankshafts and cranks!

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task Investigate and select resources considering constraints, properties and functions appropriate for the given task	**Learning intention** To work collaboratively to explain how cams, camshafts and cranks use force. **Focus questions** • Where do you find cams, camshafts and cranks? • How do cams, camshafts, and cranks work to transfer force? • What strategies help to work collaboratively to plan, develop and effectively communicate ideas and information? **Support notes** Cams and cranks kits are commercially available and include a range of components to make several models using a camshaft and crank. Alternatively, kits are available which provide separate components in a variety of sizes and in various quantities. For some suggestions on how to create a simple camshaft with crank handle (Appendix A.7). **Suggested assessment points** Assess students' understanding from their set of sequenced steps applied to produce a final product, incorporate force, and strategies to consistently work collaboratively and effectively share information and ideas.	**Introduction** Where would you find a camshaft, cam and crank? View short videos/images to demonstrate how a force is utilised with the use of a camshaft. As a class, discuss where camshafts and cranks are used. Give examples of practical applications of the crank. Make a sketch of a camshaft and identify the slider, axle, crank (crank handle) and direction of force. See Appendix A.7 for suggestions. Discuss how the position of the crank and the crank handle, affect force and speed. Predict how and when to switch between different types of motion by using cams. **Learning activity** Students work with a different partner to investigate and clarify the problem of incorporating a camshaft into a small working model. Provide them with a commercially available cams and cranks kit, or a range of everyday construction materials that could be used to create a model of a simple crank. See Appendix A.7 for suggestions. Based on the available resources, pairs develop a set of sequenced steps to create a model of a crank and camshaft. Use the model to demonstrate how a crank and camshaft work to transfer force to move an object. Outline strategies and individual roles to work collaboratively when planning and developing ideas and information to create the camshaft model.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Conclusion When the camshaft and crank model is complete, each student is to: • review the final product • describe how force is produced • reflect on working collaboratively. Students use a graphic organiser of their choice or interview each other and record the responses.

Term 4 Week 4: Gears and worm drives

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Design thinking skills** **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task Investigate and select resources considering constraints, properties and functions appropriate for the given task **Producing and implementing** Use a range of technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intention** To experiment with different technologies to explain how gears work to create force and motion. **Focus questions** • Where do you find gears and worm drives? • How do gears and worm drives transmit force and motion? • How do gears and worm drives control movement in a product or system? **Support notes** Various kits are commercially available and include a range of components to make several models using gears and worm drives. Alternatively, kits are available which provide separate components in a variety of sizes and quantities. **Suggested assessment points** Student report on the ways gears work to transmit force and motion.	**Introduction** Get moving, get into gear! View a short video to demonstrate how gears are used to transmit force and motion. As a class, discuss and give practical examples of where gears and worm drives are used. See Appendix A.7 for a suggested video. Demonstrate the direction of force and how motion is generated. Students sketch and annotate the direction of force and motion for a set of two gears without a worm drive. Change direction and use correct terminology to describe what happens. **Learning activity** Ask students what happens if the size and number of the gears were changed? Identify the direction of motion. Experiment with a variety of sizes and combinations. Sketch and annotate at least three combinations. Using a short video as a support, discuss how a worm drive works within a gear. See Appendix A.7 for a suggested video. Discuss with the students how force is differently distributed with this type of gear. Using the sketches, and various wheel combinations, students explain the transmission of force and motion to another student.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Students work in small groups to investigate the ways of incorporating gears and a worm drive into small working models, such as provided with a commercially available gears and worm drive kit. Based on the available resources, students develop a set of sequenced steps to create a model to show how gears mesh. Use the model to demonstrate how gears and worm drives transmit force and motion to move an object. If kits with gears are not available, students may go on a gear hunt by walking around the classroom/school to look for items that use gears. They can list and/or take photos of the items. Students may (if appropriate) experiment with how the gears work. For example, spinning the pedals on a bicycle. **Conclusion** At the completion of the gears and worm drive model/search, students develop a report on the ways gears work to transmit force and motion.

Term 4 Week 5: Forces and board games

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Design thinking skills** **Investigating and defining** Break down a design brief to define the purpose, requirements and constraints for a given task Investigate and select resources considering constraints, properties and functions appropriate for the given task **Evaluating** Develop negotiated criteria to evaluate design features, graphics, selected technologies, processes and functionality with consideration of constraints for the designed solution	**Learning intention** To investigate and define what is needed to create a board game that uses force to control movement. **Focus questions** • How can force control movement in a game (board game or a game of similar size to a board game)? • What decisions need to be made to create a solution? • What criteria will be developed to evaluate and justify the design processes and the solution? **Support notes** Remind students of the infographics (or other visual presentation) developed in Week 1 to illustrate the range of different forces investigated. Allocate a folder on the class shared file for each Game of force. The completed evaluation criteria to be placed in this file after playing the game. A voting system will determine the most popular and challenging Game of force. **Suggested assessment points** Observe pair and class participation. Students complete Questions 1 and 2 of Assessment task 2, Game of force (Appendix C).	**Introduction** It's game on! How can force control movement in a game (board game or a game of similar size to a board game)? Students will work in pairs to develop a Game of force; a tactical game that incorporates force, is educational, fun to play, and where the player with the most points might not win. **Learning activity** Students investigate a variety of commercially available board games. They note common features and any quirky details that add interest. Ask students to reflect on the different types of forces investigated and infographics developed in Week 1. The task is for students to work collaboratively in pairs to plan, design, and communicate ideas and information to create a game where force is used to control movement. Students define the problem, develop a set of sequenced steps, and implement management strategies to create a board game within the given time frame. The guidelines for designing the board game, Game of force, include: • shows how force can control movement in the game • is educational • two to four people will play the game • include a set of rules for play • play the game on an area as stipulated (by the teacher)

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		• the player with the most points might not win • consider a theme, colour, text type and font size • time frame for task completion. Based on the constraints and as a class, collaboratively negotiate three to five criteria to evaluate and justify design processes and solutions. In pairs, students set goals, allocate roles and make decisions on the theme and application of a selected force. Review the draft set of sequenced steps and make additions where necessary. Assess the suitability of the available resources and make inquiries about additional resources, if required. Commence a rapid design sketch of various components of the game and annotate. Student pairs set out a draft sequence of steps to manage the development of the game. Break down the constraints to clarify the given task and define the problem. Use a graphic organiser to sketch initial ideas and information. Students identify available resources and note extra requirements and/or components that may need to be negotiated with the teacher. **Conclusion** Engage in class discussion to collaboratively develop three to five criteria to evaluate and justify design processes and solutions. The evaluation will be stored in the class shared file.

Term 4 Weeks 6–7: Designing a board game

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Design thinking skills** **Project management** Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions **Designing** Design alternative solutions achieved through an iterative process, including critical thinking, graphical representations, use of a range of technologies, techniques, technical terms and/or a sequence of steps **Producing and implementing** Use a range of technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intention** To collaboratively design and create a board game that uses force to control movement, following safety procedures. **Focus questions** • What design features will be incorporated in the game to make it appeal to players? • What alternative design solutions could be considered? • What resources/components are required to complete the game? • What safety procedures need to be in place to produce the solution? **Support notes** Revise progress, time management plan and discuss identified issues with the safe use of components and implementation of procedures. Teach ways to interrogate design problems, make modifications, and substitute resources if necessary to achieve the desired solution. Ensure design ideas are presented diagrammatically, clearly annotated, and with written text. Review the draft set of sequenced steps with additional steps to improve clarity and processes.	**Introduction** What are the rules? Bring the class together to share ideas, information and assess progress. How will force control movement in the game? Reflect on the collection of commercial board games and the infographics highlighting the different kinds of force. Ask students to consider the guidelines. How do the rules work? What will the game look like? Ask students to think about the design, both diagrammatically and with supporting text, considering the many components required for the game. **Learning activity** Students revise the list of available resources and review the draft sequence of steps set out to manage the project. Will production be finished within the time frame? Identify areas of concern and suggest strategies to resolve issues. Students identify potential safety issues and procedures to include in the set of sequenced steps to ensure safe production of the game. **Conclusion** Students trial the game and make any modifications.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Broadly discuss strategies for successful partnerships, including communicating ideas and information, and clearly defined roles. **Suggested assessment points** • Monitor student progress in the management of task requirements • Observe students' understanding of design problems, the ability to modify designs, and sustainable use of resources • Observe student engagement to collaboratively solve design problems, develop effective communication strategies, share ideas, and information to ensure success and the desired solution. Students complete Questions 3, 4 and 5 of Assessment task 2, Game of force (Appendix C).	

Term 4 Week 8: Sharing and evaluating our games

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Contexts **Engineering principles and systems** Forces and electrical energy can control motion, sound or light in a product and/or system **Design thinking skills** **Evaluating** Develop negotiated criteria to evaluate design features, graphics, selected technologies, processes and functionality with consideration of constraints for the designed solution	**Learning intention** To evaluate the success of the Game of force product. **Focus questions** • What design features make the Game of force appealing? • Were the rules of play easy to follow? **Support notes** Outline the procedure to: • assign a Game of force to each group of four students to play • individually evaluate each game played using the criteria determined earlier and available on the class shared file • evaluate each game played before moving on to another game • individually vote for the most popular and challenging game played. **Suggested assessment points** Students complete Question 6 of Assessment task 2, Game of force (Appendix C) in class.	**Introduction** Let's play! Display each Game of force to promote discussion. As a class, identify a range of design features, components, use of colour, theme and rules. Individuals to share their experience, to discuss how force is used to control movement and any difficulties they resolved. **Learning activity** Students reflect on the design inspiration, production processes, and resources available. Randomly assign a Game of force to a group of four students. Stress the need to follow the rules and have fun. When the game is finished, students individually evaluate the game using the criteria developed. Return the game and select another to play and evaluate. **Conclusion** At the conclusion of playing, instruct students to use the voting system to select a favourite and most challenging game.

Appendix A

Resources

Appendix A.1: Resources – Term 1

Resource	Link/information
Edith Cowan University Refresh.Ed video resource for teachers, hosted on YouTube	Refresh.ED. Facts about *the Australian Guide to Healthy Eating* (AGHE). https://www.youtube.com/watch?v=7rgI5q-XnKg
Visual of the Australian Guide to Healthy Eating	Eat for Health. *Australian Guide to Healthy Eating*. https://www.eatforhealth.gov.au/guidelines/australian-guide-healthy-eating
Daily meal log sample meal plan	Family Daily. Sample 7-Day Family Meal Plan: Nutritious, Easy, and Kid-Friendly Ideas. https://www.familydaily.app/blog/7-day-family-meal-plan
Accessible versions of the Australian Dietary Guidelines. Navigate to a blank template for use in planning snacks and meals	Eat for Health. Accessible versions of Australian dietary guidelines resources. https://www.eatforhealth.gov.au/accessible-versions-australian-dietary-guidelines-resources
Examples of graphic organisers	Getting it Together. Graphic organisers. https://getting-it-together.moadoph.gov.au/teacher-guide/graphic-organisers.html
Online quiz format – classroom assessment tool	Plickers. Home page. https://get.plickers.com/
Video from a crafts YouTube page showing the process of creating food arts	Crafts Box. Fruit carving garnish. https://www.youtube.com/watch?v=KF1xFn7p9D8
Fact sheet and comparison table from Nutrition Australia, a not-for-profit organisation, exploring the nutrients in food based on colours	Nutrition Australia. Eat a rainbow. https://nutritionaustralia.org/fact-sheets/eat-a-rainbow/
Short video from ABC Gardening Australia program explaining how to pickle vegetables to preserve them when out of season	ABC *Gardening Australia*. Packing Your Pickles. https://www.abc.net.au/gardening/how-to/packing-your-pickles/9436338
Visual of the *Australian Guide to Healthy Eating*. (Blank template)	Eat for Health. *Australian Guide to Healthy Eating*. https://www.eatforhealth.gov.au/resources-suitable-printing

Appendix A.2: Design template – Term 1 Week 2

Define: What is the design problem?

Design: Sketch and label a Snack attack pack design.

Production procedure: In order, list the steps required to prepare the Snack attack pack.

_____

_____

_____

_____

_____

_____

_____

Appendix A.3: Design worksheet – Term 1 Week 6

Name: _____

Title: Food art design

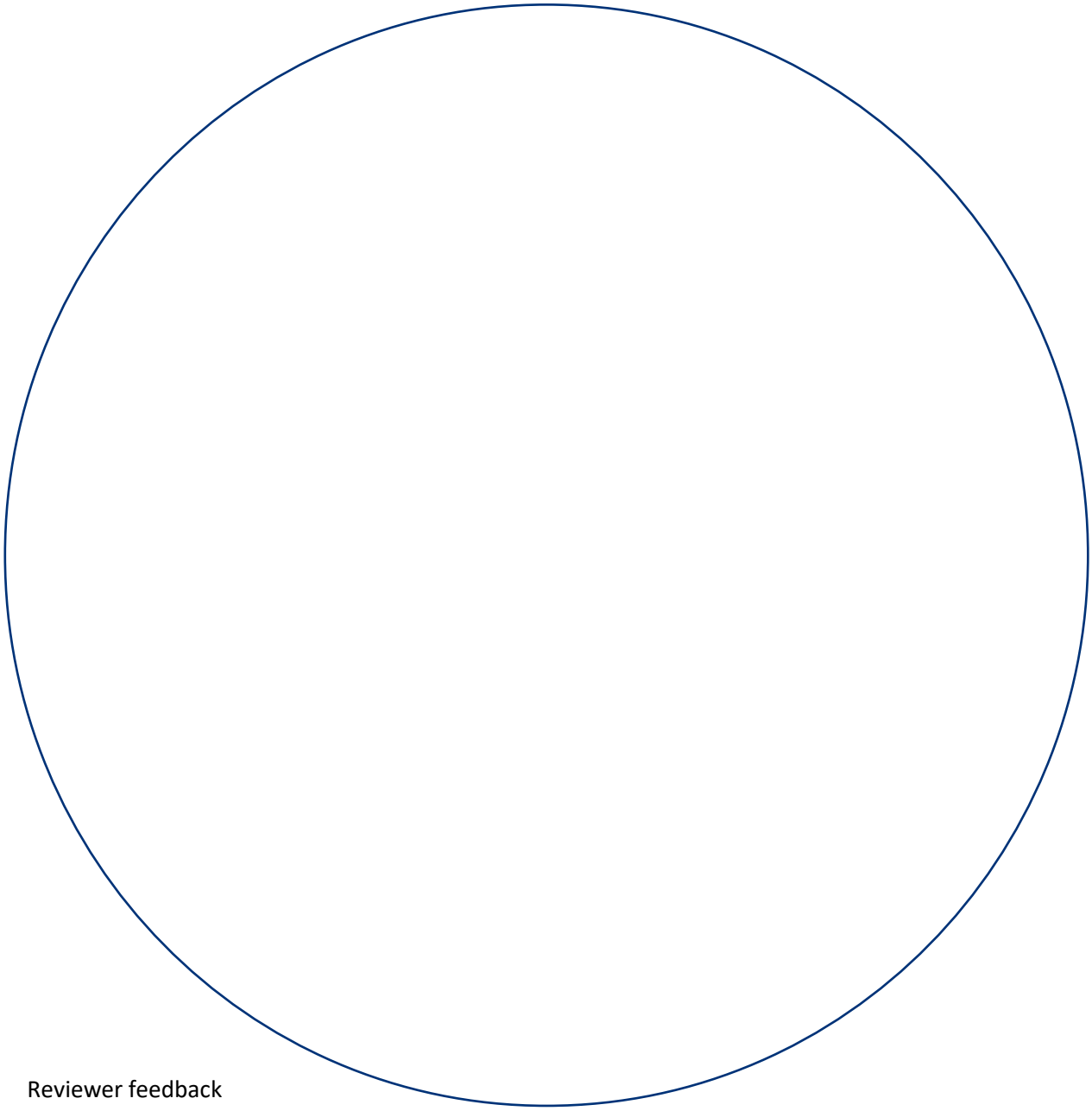
Before you start the design process, think about design features you liked from the videos.

1. Design instructions for a plate of food art:
   - use the plate shape below, Design 1 template
   - you have one minute of thinking time
   - use a rapid design process, that is five minutes to sketch a design idea
   - annotate design features; for example, sliced banana for fish scales
   - pass your annotated design to a reviewer.
2. The reviewer will give you feedback on your design. They will:
   - list two points they like about your design
   - list two suggestions to improve your design.
3. Based on the reviewer's recommendations:
   - modify your design to incorporate the feedback using Design 2 template
   - add colour
   - complete in five minutes.
4. Ask another student to check your modified design and provide feedback.
5. Finalise the design you will take into production.
6. Based on your final design, list the components/ingredients required to produce the plate of food art.

Paper plate		

Design 1

Sketch and annotate a design for a plate of food art. You have five minutes.



Reviewer feedback

Good points

1. _____

2. _____

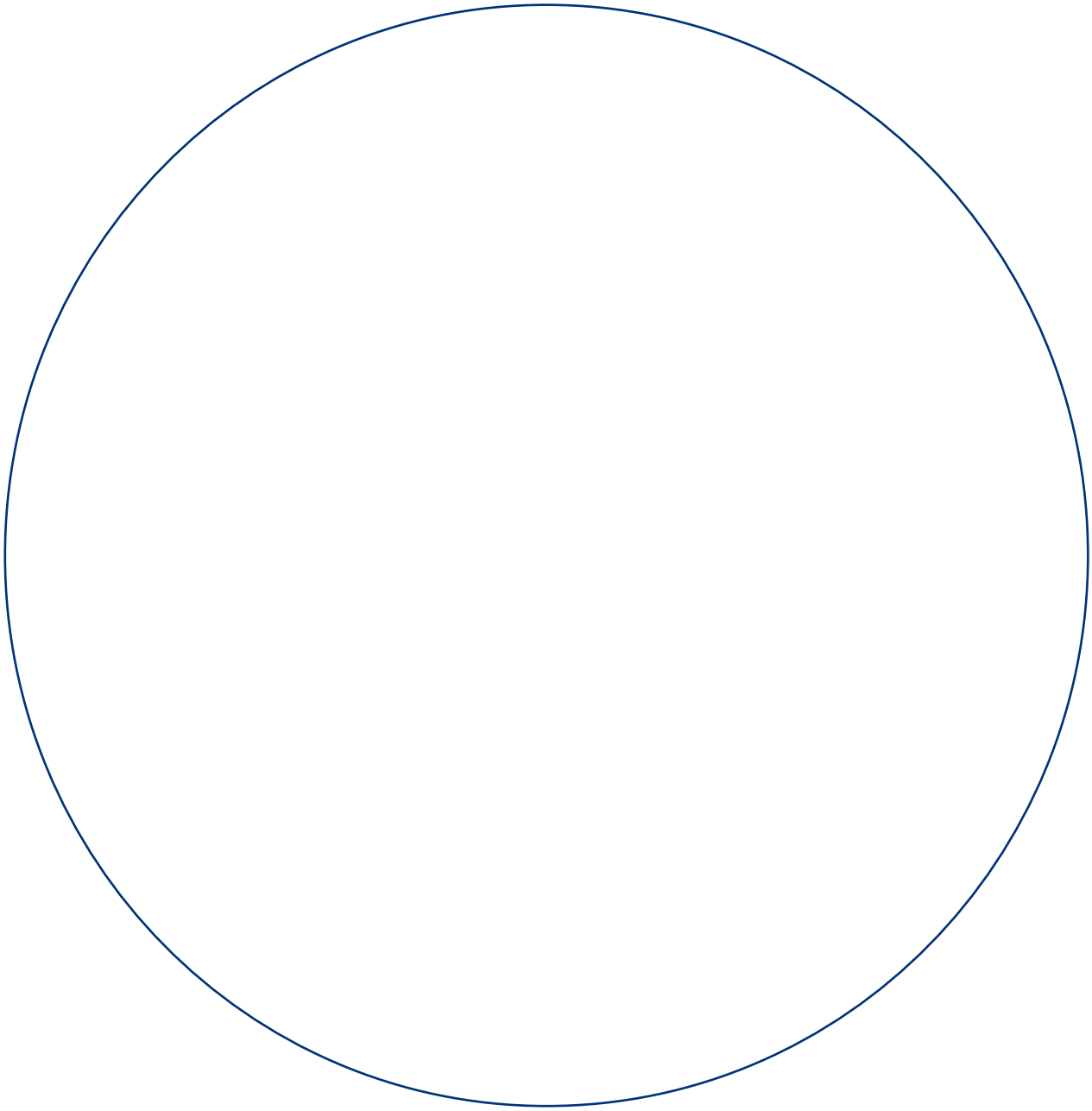
Improvement suggestions

1. _____

2. _____

Design 2

Modify your design to incorporate the feedback.



Feedback from another student

_____

_____

_____

Appendix A.4: Resources – Term 2

Resource	Link/information
Application for inserting images and sorting sticky notes into colours around the photo for ease of brainstorming and reflecting on ideas. Available on both Apple and Android devices.	*Post-it®* App Google Play: https://play.google.com/store/apps/details?id=com.mmm.postit&pcampaignid=web_share Apple Store: https://apps.apple.com/us/app/post-it/id920127738?platform=ipad
Australian produced source of graphic organisers. Select the Affinity diagram.	*Graphic organisers* Getting it Together. (n.d.). *Graphic organisers.* https://getting-it-together.moadoph.gov.au/teacher-guide/graphic-organisers.html
Application for presentation of materials. Please note, only available on Apple devices.	Keynote Apple App Store: https://apps.apple.com/au/app/keynote/id361285480
Application or online web browser for presentation of materials. Please note, login required for browser version.	Microsoft PowerPoint Google Play Store App: https://play.google.com/store/apps/details?id=com.microsoft.office.powerpoint&hl=en Apple App Store: https://apps.apple.com/au/app/microsoft-powerpoint/id586449534 Browser version: https://www.microsoft.com/en-us/microsoft-365/powerpoint
Application or online web browser for presentation of materials. Please note, login required for browser version.	Google Slides Google Play Store App: https://play.google.com/store/apps/details?id=com.google.android.apps.docs.editors.slides&hl=en Apple App Store: https://apps.apple.com/au/app/google-slides/id879478102 Browser Version: https://workspace.google.com/products/slides/
Application or online web browser for presentation of materials. Please note, login required for browser version. Please note the app is only available on Apple devices.	Book Creator Apple App Store: https://apps.apple.com/au/app/book-creator-for-ipad/id442378070?l=en-GB Browser Version: https://bookcreator.com/

Resource	Link/information
Most up to date Mac devices and iPads will have iMovie predownloaded. If it is not appearing, use this link to access the download for MacOS (laptops) or iOS (iPads). Please note iMovie is only available on Apple devices.	iMovie MacOS and iOS download link for Mac device or iPad: https://www.apple.com/au/imovie/

Appendix A.5: Designer worksheet – Term 2 Weeks 5–7

Name: _____

Title: Snack stack

Three-week outline:

- Week 5
  The designers will develop a design idea and communicate instructions to produce a food product, a Snack stack. The designers are:

  Student 1 _____

  Student 2 _____

- Week 6
  Based on the given design and instruction the producers will produce a food product, a Snack stack. The producers are:

  Student 1 _____

  Student 2 _____

- Week 7
  Review production of the Snack stack based on the designers' design and instructions

Design task:

1. Outline the problem.

   _____

   _____

   _____

2. List the ingredients chosen from those available (provided by the teacher) to produce the solution.

Draft design 1

Sketch a design idea for the Snack stack and annotate.

Draft design 2

Sketch a second design idea for the Snack stack and annotate.

Identify appealing features of each draft design.

Design 1

_____

_____

_____

_____

Design 2

_____

_____

_____

_____

Select one design and strike through the discarded design.

Outline why you selected the design.

_____

_____

_____

_____

_____

As the designers, describe how you expect the Snack stack to look.

_____

_____

_____

_____

_____

1. Name and sketch the utensils and equipment the producers will need to make the Snack stack.

2. Develop a set of detailed sequenced steps for the producers to follow.

3. As the designers, develop a set of criteria for the producers to evaluate the design processes and the solution, the Snack stack.

Criterion 1

_____

_____

_____

Producer response

_____

_____

_____

Criterion 2

_____

_____

_____

Producer response

_____

_____

_____

Criterion 3

_____

_____

_____

Producer response

_____

_____

_____

Appendix A.6: Resources – Term 3

Resource	Link/information
Game-based learning platform	Kahoot. (n.d.). *Home page.* https://kahoot.com/
Short video explaining how LED is more energy efficient, and thereby sustainable, than a traditional incandescent bulb	Constellation (2017). *What is the difference between LED and incandescent lighting.* https://www.youtube.com/watch?v=eJ0f_L1Kjs0
Website with a step-by-step explanation and embedded videos explaining how to use playdough and modelling clay to create a decoration within an electrical circuit. Tutorials explaining how to use a wearable electrical circuit to add to fabric, the Lilypad	Science Buddies (2023). *Electric Play Dough Project 1.* https://www.sciencebuddies.org/science-fair-projects/project-ideas/Elec_p073/electricity-electronics/squishy-circuits-project-1 Sparkfun. (n.d.). *Tutorials.* https://learn.sparkfun.com

Appendix A.7: Resources – Term 4

Resource	Link/information
Videos that introduce the term force, the various types of force and impact on movement	*What is Force? | Force and Pressure |Physics | Don't Memorise* [YouTube clip]. https://www.youtube.com/watch?v=IJWEtCRWGvI Cognito. *GCSE Physics – Contact and Non-Contact Forces#40* [YouTube clip]. https://www.youtube.com/watch?v=WCPTKRaScgE Don't Memorise. *What is Force? – Part 1| Forces and Motion | Physics | Don't Memorise* [YouTube clip https://www.youtube.com/watch?v=B6mi1-YoRT4
Link to Canva, an online resource or app used for the creation and display of information. Please note a free login is required.	Canva. (n.d.). *Infographic templates.* https://www.canva.com/infographics/templates/ Google Play Store: https://play.google.com/store/apps/details?id=com.canva.editor&hl=en_AU Apple App Store: https://apps.apple.com/au/app/canva-design-photo-video/id897446215
The three classes of levers, based on the illustration available at this website TEDEd video and resources to assist in the explanation of how levers work. If you are looking to purchase STEM kits, begin with searching for the following resources: • Engino Discovering STEM Mechanics – Levers and Linkages • Engino Discovering STEM Mechanics – Cams & Cranks • Engino Discovering STEM Mechanics – Gears & Worm Drives • Engino Discovering STEM Mechanics – Simple Machines • Engino Discovering STEM Newton's Laws • Engino Discovering STEM Structures – Buildings & Bridges • Meccano Junior Open Ended Bucket Can be purchased through a number of major Australian retailers	Ron Kurtus' School for Champions. *Levers are Simple Machines.* TEDEd (n.d.) *The might mathematics of the lever – Andy Peterson and Zac Patterson*. https://ed.ted.com/lessons/the-mighty-mathematics-of-the-lever-andy-peterson-and-zack-patterson Engino (n.d.) *Engino – STEM construction toys and classroom solutions*. https://www.engino.com/ Meccano (2024). *Meccano Junior.* https://www.meccano.com/en_us/products/778988580530 STEM Inventions (2020). *Young Engineers: Pyramid Catapult – Easy and powerful DIY STEM project for kids*. https://www.youtube.com/watch?v=Zg1Pz0WUMW4

Resource	Link/information
Video as inspiration for creating DIY levers, linkages and catapults with simple materials easily accessed in classrooms.	
Video examples of cams and cranks in simple toys made by children Explanation of how cam mechanisms work BBC – please note the video will not work in Australia, but the diagrams and information is extremely helpful Video showing a basic crankshaft toy made from everyday objects, should a commercial product not be a viable option for your classroom.	Food Related (2019). *Simple Automata CAM toy compilation.* https://www.youtube.com/watch?v=7W3wgwUfjZA&t=8s BBCBitesize (2024). *What is a cam mechanism?* https://www.bbc.co.uk/bitesize/articles/z2gfcxs#zv4s46f Maker{Futures}. (2021). *How to make a crankshaft toy.* https://www.youtube.com/watch?v=WKXlRhNFaxI&t=369s
A short video explaining how gears work and are used to distribute force. A short video explaining how a worm works as a type of gear.	Next Generation Science (2021). *Simple Machines – Gears.* https://www.youtube.com/watch?v=-m3Er8Zcb_A Mr. Dillman's Tech Channel (2022). *Basic Mechanisms – Worm & Wheel.* https://youtu.be/zZgQerfkbUY?si=rXuHHQmi46ja1FNu

Appendix B

Assessment task 1

Food art

Task details

Title	Food art
Description	Students create a plate of food art designed to promote the eating of a wide range of fruit and vegetables
Type of assessment	Summative
Ways of assessing	To create a solution to encourage children to eat more fresh vegetables and fruit, using safe procedures to prepare and handle food
Evidence to be collected	Annotated design, set of sequenced steps to create a solution, final product and evaluation using the collaborative criteria
Suggested time	Five one-hour lessons in class
Differentiation	Teachers should differentiate their teaching and assessment to meet the specific learning needs of their students, based on their level of readiness to learn and their need to be challenged. Where appropriate, teachers may either scaffold or extend the scope of the assessment task.

Content descriptions

Design thinking skills

Investigating and defining
Break down a design brief to define the purpose, requirements and constraints for a given task

Designing
Design alternative solutions achieved through an iterative process, including critical thinking, graphical representations, use of a range of technologies, techniques, technical terms and/or a sequence of steps

Producing and implementing
Use a range of technologies, components and/or equipment to implement agreed protocols to produce a designed solution

Evaluating
Develop negotiated criteria to evaluate design features, graphics, selected technologies, processes and functionality with consideration of constraints for the designed solution

Resources

- Assessment task 1 template

Instructions for teacher

Assessment task 1 may be modified based on prior learning. If students did not complete the Food specialisations context in Year 5, more attention will need to be given to the principles of food safety and hygiene practices. This could be the focus for the first lesson.

Edit the Food art template, as required, to suit the school or class context.

Often the evaluation component of the assessment task may occur at the commencement of the next lesson. Allocate time to review and discuss design ideas, production processes (the set of sequenced steps) and final solution before students independently evaluate their solution. The evaluation of the plate of food art will be based on the criteria collaboratively developed at the commencement of the task.

Instructions to students

Your task is to create a solution to encourage children to eat more fresh vegetables and fruit, using safe procedures to prepare and handle food.

You will investigate and design a plate of food art that will encourage children to eat more fresh fruit and vegetables. Be prepared to modify your original design idea to incorporate peer feedback. Focus on the set of sequenced steps and the order of production processes. The solution produced should look like your final design.

After production, you will evaluate your solution against the criteria.

Assessment task 1

Name: _____

Create a plate of food art designed to make fresh vegetables and fruit appealing and fun for young people, and ready to eat.

1. a. Define the problem. (2 marks)

_____

_____

_____

b. Describe how the plate of food art is a solution for the problem. (2 marks)

_____

_____

_____

2. Identify one design feature you liked from the food art videos. For example, several round slices of banana threaded flat onto a skewer to look like fish scales. Repeating this design idea would make the fish look fat.

Describe a design feature you liked. (2 marks)

_____

_____

_____

_____

_____

3. Based on the teacher demonstration, and the list of resources/components, create a set of sequenced steps to produce the plate of food art. (2 marks)

4. Use the criteria developed by the class to evaluate your creative plate of food art. Below are four sample criteria.
   a. Explain why your food art design is an appealing solution to encourage children to eat more fresh vegetables and fruit. (2 marks)

_____

_____

_____

_____

   b. Identify the vegetable or fruit you least like and describe how you used it in your design. (2 marks)

_____

_____

_____

_____

   c. Select one preparation technique, e.g. grating, and describe how you used it in the design of your food art. (2 marks)

_____

_____

_____

_____

   d. Describe one modification (improvement) you would consider if you were to make the plate of food art again. (2 marks)

_____

_____

_____

_____

Marking key

Description	Marks
Investigating and defining	
1. a. Defines the problem of children not eating enough fresh vegetables and fruit	2
States the problem of children not eating enough fresh vegetables and fruit	1
Subtotal	**/2**
b. Describes how the plate of food art is a solution for the problem	2
States how the plate of food art is a solution for the problem	1
Subtotal	**/2**
Designing	
2. Describes a design feature they like from the stimulus material	2
States a design feature they like from the stimulus material	1
Subtotal	**/2**
Investigating and defining	
3. Creates a set of logical sequenced steps to produce the plate of food art	2
Creates a set of sequenced steps to produce the plate of food art	1
Subtotal	**/2**
Evaluating	
4. a. Describes why the food art design encourages children to eat more fresh vegetables and fruit	2
States why the food art design encourages children to eat more fresh vegetables and fruit	1
Subtotal	**/2**
b. Describes how a vegetable or fruit they dislike is used in the design	2
States how a vegetable or fruit they dislike is used in the design	1
Subtotal	**/2**
c. Describes how the selected preparation technique is used in the food art design	2
States how the selected preparation technique is used in the food art design	1
Subtotal	**/2**

Description	Marks
d. Describes one modification (improvement) they would consider, if they were to make the plate of food art again	2
States one modification (improvement) they would consider, if they were to make the plate of food art again	1
Subtotal	**/2**
Answers could include: I would choose to make the apple in a more interesting shape, as I cut it into quarters which wasn't very interesting to look at I could have layered two vegetables on top of each other so that children would eat them together and experience a different taste	
Total	**/16**

Appendix C

Assessment task 2

Game of force

Task details

Title	Game of force
Description	Students work collaboratively to develop a Game of force to demonstrate how force can control movement in a game (board game or game of similar size to a board game)
Type of assessment	Summative
Ways of assessing	To define the problem, design possible solutions and make decisions using a set of sequenced steps to create a board game which demonstrates how force can control movement in a product or system
Evidence to be collected	Annotated design ideas, a set of sequenced steps, including production processes for a solution, the final product and evaluation using the collaboratively developed criteria
Suggested time	Three one-hour lessons in class
Differentiation	Teachers should differentiate their teaching and assessment to meet the specific learning needs of their students, based on their level of readiness to learn and their need to be challenged. Where appropriate, teachers may either scaffold or extend the scope of the assessment task.

Content descriptions

Contexts

Engineering principles and systems

Forces and electrical energy can control motion, sound or light in a product and/or system

Design thinking skills

Project management
Use agreed protocols to set goals, manage competing factors, resources and time, to plan, develop and communicate decisions, when developing designed solutions

Investigating and defining
Break down a design brief to define the purpose, requirements and constraints for a given task

Designing
Design alternative solutions achieved through an iterative process, including critical thinking, graphical representations, use of a range of technologies, techniques, technical terms and/or a sequence of steps

Producing and implementing
Use a range of technologies, components and/or equipment to implement agreed protocols to produce a designed solution

Evaluating

Develop negotiated criteria to evaluate design features, graphics, selected technologies, processes and functionality with consideration of constraints for the designed solution

Resources

- Assessment task 2 template

Instructions for teacher

Assessment task 2, may be modified based on prior learning. If students did not complete the Engineering principles and systems context in Year 5, more attention will need to be given to the principles of using electrical energy and forces in a variety of products and systems. This could be the focus for Lesson 1. Student work samples and a teaching and learning program located on the Authority website, may assist teachers' understanding of the knowledge, skills and standards expected prior to commencing the planned assessment task.

Edit the Assessment task 2 template as required to suit the school or class context.

Students learn to engage in, and practise establishing collaborative criteria, to justify the design ideas, design processes and possible solutions.

Often the evaluation component of the assessment task may occur at the commencement of the task and through the related learning experiences. It is recommended to allocate time to review and discuss design ideas, production processes (the set of sequenced steps) and final solution before students independently evaluate their solution, in this instance the Game of force board game, based on the criteria collaboratively developed at the start of the task. Students are expected to provide feedback on a selection of products produced by other students through the evaluating process.

Instructions to students

Practise the application of electrical energy and forces in a variety of situations and models prior to commencing the design phase of Assessment task 2.

Focus on the set of sequenced steps and the order of production processes. The finished solution should look similar to the design idea, which may have been modified before being advanced to the production phase.

Assessment task 2

Name: _____

Work collaboratively with a partner to develop a Game of force to demonstrate how force can control movement in a game (board game or game of similar size to a board game).

1. a. Describe the task. (2 marks)

_____

_____

_____

b. Describe the force that will be used to control movement in the game. (2 marks)

_____

_____

_____

c. Identify one of the guidelines provided by the teacher, other than the use of force, and describe how you plan to incorporate it into the game. (2 marks)

Select from the following options:

- is educational
- include a set of rules for play
- the player with the most points might not win
- consider a theme, colour, text type and font size

_____

_____

_____

_____

_____

_____

Use the following space to develop your design idea. If necessary, modify to suit your planned design; for example using butcher's paper, sketching on a device.

2. Sketch a detailed design for your game. Annotate features with supporting text to describe the theme, colours, font type and size. (4 marks)

   Develop the design for your Game of force, including text to describe features.

Identify the available resources you plan to use in the chart below.

3. Based on the design idea, what additional resources are required to produce the game and where do you plan to get them? (2 marks)

Additional resources	Where to find the additional resources

4. Create a set of sequenced steps to develop the game. (3 marks)

5. Explain the ways you and your partner worked collaboratively to solve design problems.

(3 marks)

6. Use the criteria developed by the class to evaluate the Game of force.
   Below are the sample criteria. Teacher to use criteria to guide class selections or alter criteria based on what was agreed upon by the students.

   a. Explain how the design idea and selected resources use force to play the game. (3 marks)

   _____

   _____

   _____

   _____

   _____

   b. Explain how to play the Game of force. (3 marks)

   _____

   _____

   _____

   _____

   _____

   c. Describe the safety procedures applied when using resources and equipment to produce the game. (2 marks)

   _____

   _____

   _____

   _____

   d. Describe one design modification to improve the game. (2 marks)

   _____

   _____

   _____

   _____

Marking key

Description	Marks
Investigating and defining	
1. a. Provides a detailed description of the task	2
States the task	1
Subtotal	**/2**
b. Describes the force that will be used to control movement in the game	2
States the force that will be used to control movement in the game	1
Subtotal	**/2**
c. Describes the plan to incorporate the identified guideline into the game	2
States the plan to incorporate the identified guideline into the game	1
Subtotal	**/2**
Designing	
2. Develops a detailed design with annotations to describe the main features	4
Develops a design with annotations to describe the main features	3
Develops a design with one or two annotations to state a main feature	2
Outlines a design and notes a feature	1
Subtotal	**/4**
Investigating and defining	
3. Identifies additional resources and sources required to develop solutions	2
Identifies some additional resources	1
Subtotal	**/2**
Investigating and defining	
4. Creates a set of detailed, logical sequenced steps to develop the game	3
Creates a set of logical sequenced steps to develop the game	2
Creates a set of sequenced steps to develop the game	1
Subtotal	**/3**
Project management	
5. Explains the ways they work collaboratively to solve design problems	3
Describes the ways they work collaboratively to solve design problems	2
States a way they work collaboratively to solve design problems	1
Subtotal	**/3**

Description	Marks
Evaluating	
6. a. Explains how the design plan and selected resources use force to play the game	3
Describes how the design plan and selected resources use force to play the game	2
States how the design plan and selected resources use force to play the game	1
Subtotal	**/3**
b. Explains how to play the Game of force	3
Describes how to play the Game of force	2
States how to play the Game of force	1
Subtotal	**/3**
c. Describes the safety procedures applied when using resources and equipment to produce the game	2
States a safety procedure applied when using resources and equipment to produce the game	1
Subtotal	**/2**
d. Describes one design modification to improve the game	2
States one design modification to improve the game	1
Subtotal	**/2**
Total	**/28**