Year 8 Design and Technology

Project Title: How does your garden grow? In Darwin.
Type: Summative
Overall Grade Weighting: 25%
Project Timeline: 6 weeks with 2 lessons per week.

Demographic and Background Context
Dripstone Middle School. Demographic profile includes 52/48 split of boys and girls. 23% indigenous students and 42% of students with a language background other than English. Attendance rate is 91%, with a rate of 85% for Indigenous and 92% for Non-Indigenous students. The student attendance level above 90% is 67% for all students, 46% for Indigenous students and 72% for Non-Indigenous. These attendance rates are somewhat above average for the Darwin region.

Likely, as a result of the significant percentage of Indigenous students, Dripstone Middle School has two programs specifically targeting them: CLONTARF and Stars foundation. Clontarf targets males specialising in sporting excellence and Stars targets females to select future careers and to make sound life choices. Dripstone has a VET program that allows students to contribute to achieving their NTCET whilst continuing traditional school attendance.

The classroom cohort has 23 students, with 12 boys and 11 girls. Five students are of indigenous background and nine students are of immigrant families where English is not the primary language spoken at home. Two students have low numeracy and literacy capabilities and are part of a school assistance program to improve their academic performance.

The following project will be conducted during the latter part of a subject/unit, rather than at the start. That is, if the technology subject is only conducted for one semester, it will be in the second term of that semester, when students are more familiar with the school farm, especially those that may be new to the school and gardening. This project will be the primary summative assessment for that unit.

Assumed knowledge: During this subject, students will have been taught about specific requirements of the growth of plants, fruits and vegetables within the Darwin region. They will have a sound understanding of the concepts of sustainability in the broader sense, as well as its application to gardening and farming practices. They will be very familiar with the School Farm and its vision.

Link to cross curriculum priorities and/or state frameworks:
This project links to:
Cross-curriculum priorities

- Sustainability

General Capabilities

- Critical and Creative Thinking
- Personal and Social Capability
- Intercultural Understanding

Australian Curriculum: Content Descriptors

Analyse how food and fibre are produced when designing managed environments and how these can become more sustainable (ACTDEK032 - Scootle)

- investigating the management of plant and animal growth through natural means and with the use of chemical products like herbicides and medicines when producing food and fibre products.
- recognising the need to increase food production using cost efficient, ethical and sustainable production technique.

Generate, develop, test and communicate design ideas, plans and processes for various audiences using appropriate technical terms and technologies including graphical representation techniques (ACTDEP036 - Scootle)

- using a variety of critical and creative thinking strategies such as brainstorming, sketching, 3-D modelling and experimenting to generate innovative design ideas.
- producing annotated concept sketches and drawings, using: technical terms, scale, symbols, pictorial and aerial views to draw environments; production drawings, orthogonal drawings; patterns and templates to explain design ideas.
- documenting and communicating the generation and development of design ideas for an intended audience, for example developing a digital portfolio with images and text which clearly communicates each step of a design process.

Select and justify choices of materials, components, tools, equipment and techniques to effectively and safely make designed solutions (ACTDEP037 - Scootle)

- practising techniques to improve expertise, for example handling animals, cutting and joining materials.
- identifying and managing risks in the development of various projects, for example working safely, responsibly, cooperatively and ethically on design projects, assessing uncertainty and risk in relation to long-term health and environmental impacts.

Use project management processes when working individually and collaboratively to coordinate production of designed solutions (ACTDEP039 - Scootle)

- explaining and interpreting drawings, planning and production steps needed to produce products, services or environments for specific purposes.
- organising time, evaluating decisions and managing resources to ensure successful project completion and protection of the work space and local environment.
- investigating the time needed for each step of production.

Learning Outcomes:

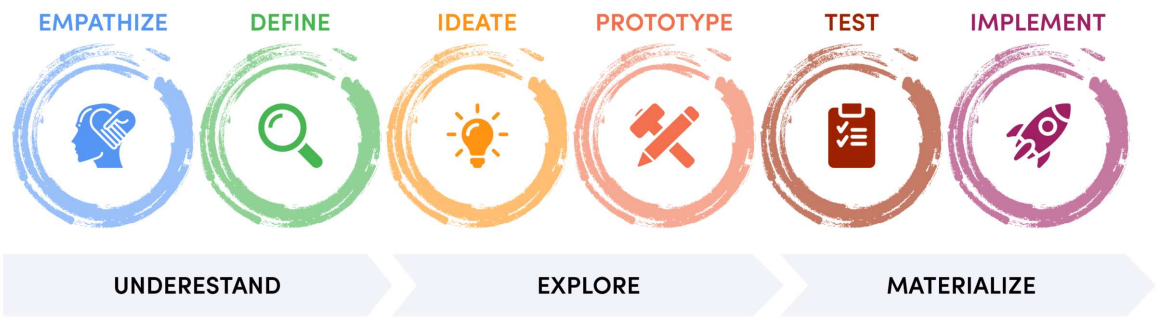
Students will investigate and identify suitable materials and designs for a garden bed, within context and with various constraints.

Students will investigate and identify suitable plants to be added to the school farm. These may be fruits and vegetable, however, is not essential.

Students will document their design process and learning throughout the project life, through a portfolio.

Students will work cooperatively, consider others' ideas and develop a plan in small groups to achieve an agreed upon aim or goal.

Unit of Work Outline:
This Unit will follow the 6 stages of Design Thinking Process (Stephanie Basemen, n.d.)



Week 1 – Lesson 1.1

Lesson Outcome: Students understand and consider factors influencing the problem.
Success Criteria: Students have empathised with the problem and its intended audience.
Teacher Notes: Empathise. Students will be introduced to the problem and be given time to consider factors that may influence their solution to the project. This period will focus on the problem they have been presented with and to conduct research.
Key questions:

- Who benefits from the final product?
- Why does it matter?
- How will the garden bed affect the end user?

Resources: Classroom-based lesson, design brief hand out, computer and internet access

Week 1 – Lesson 1.2

Lesson Outcome: Students will define the problem/issues to be answered through this project.
Success Criteria: Students have analysed and defined the problems to be answer.
Teacher Notes: Lesson 1.2 – Define. Students will consider what key problems need to be solved to complete the project. This lesson will also consist of research into background information regarding the project.
Key questions:

- What are the problems? Prioritise the problems.
- What are we aiming to achieve/complete?
- What is the success/fail criteria?

Resources: Classroom-based lesson, computer and internet access

Week 2 – Lesson 2.1

Lesson Outcome: Students will consider the problem and identify ways/methods/techniques to answer the problem.
Success Criteria: Students have produced a variety of differentiated solutions to the problem.
Teacher Notes: Ideate. After students have had time to consider the problems and factors influencing their project, they will consider possible solutions to the problem.

"It's not about coming up with the 'right' idea, it's about generating the broadest range of possibilities." Stephanie Basemen (n.d.)

Key Outcomes:

- A variety of design ideas – at least 3
- Consider a variety of materials. Research may be encouraged or required.
- Consider requirements of the plants that are planned to be planted.
- Consider what plants are most suitable to the environment and season.

Resources: Classroom-based lesson, computer and internet access

Week 2 – Lesson 2.2

Lesson Outcome: Students will continue from Lesson 2.1 and develop prototypes to test ideas.
Success Criteria: Students have produced a variety of differentiated solutions to the problem.
Teacher Notes: Ideate (cont.) and Prototype/Test. Continuation of the above for groups that require it. During this period students will be able construct prototypes and test any solutions they wish to. Resources and material must be planned for prior to the lesson commencing or students will be required to only use resources that are already available.
Resources: Classroom-based lesson or within the farm area, computer and internet access, access to tools and materials that may needed to test prototypes.

Week 3 – Lesson 2.3

Lesson Outcome: Students will have chosen a design from the previous two lessons to plan and develop.
Success Criteria: Students have chosen from the iterate process and have planned how and when it will be completed.
Teacher Notes: Planning. During this period student will be required to choose a solution from their designs to complete the project. This choice is not absolute and maybe changed during the construction process. Students will be given time to consider the requirements of their chosen design, then be required to submit a list of materials required for the garden bed. Note: Students will be required to request any additional resources by this lesson for their project. The classroom teacher should also pre-empt any additional resources through observation of student plans and activities. This may include plants.
Resources: Classroom-based lesson or within the farm area, computer and internet access.

Week 4 – Lesson 3.1

Lesson Outcome: Students will have chosen a design from the previous two lessons to plan and develop.
Success Criteria: Students have prepared their garden bed area to begin building and other materials and resources are also prepared.
Teacher Notes: Site preparation. Students will be located at the farm for this period. They will use this period to prepare their garden bed site and prepare any tools and materials they intend to use.
Resources: Farm-based lesson, computer and internet access (minimal), access to tools and materials to prepare for building garden bed.

Week 4-5 – Lesson 3.2-4

Lesson Outline: Garden bed build and development. Students will use these three periods to build and document the construction of their garden bed. This will be done under supervision of the classroom teacher and Farm Manager or Grounds Manager.
Lesson Outcome: By Lesson 3.4 students will have completed the build of their garden bed and planted seeds or seedlings of their chosen plants.
Success Criteria: Garden beds are complete and plants are planted.
Resources: Farm-based lesson, computer and internet access (minimal), access to tools and materials to prepare for building garden bed.

Week 6 – Lesson 4.1

Lesson Outcome: Students consider how their design solution has or has not successfully completed the design problem.
Success Criteria: Students have assessed, based on their own criteria, how well the design answers the problem.
Teacher Notes: Evaluate. Based on their own evaluation criteria, students will assess their own garden bed, to assess if it met the Design Brief aims/intent.
Resources: Classroom-based lesson, computer and internet access, students may be required to refer to their garden bed at the farm.

Week 6 – Lesson 4.2

Lesson Outcome: Students finalise their portfolios for presentation.
Success Criteria: Students have completed and submitted their presentation.
Teacher Notes: Portfolio preparations and submission. Students will complete final preparation of their portfolio and submit at the completion of the lesson.
Resources: Classroom-based lesson, computer and internet access, students may be required to refer to their garden bed at the farm.

Marking Rubric

Marking Criteria	**Not yet meeting Expectation**	**Mostly Meets Expectation**	**Fully Meets Expectation**	**Exceeds Expectation**
Portfolio Presentation 10 Marks	No/insufficient recording of research and design process	Limited recording of research and design process. Portfolio is difficult to follow.	Good recording of research and design process. Portfolio is easy to follow.	Excellent recording of research and design process. Portfolio is easy to follow and understand
Research 10 Marks	Insufficient evidence of research for the project.	Some evidence of research for the project.	Good evidence of research for the project. Some contextual problems considered.	Good evidence of research for the project. Contextual problems clearly considered and addressed.

Garden Bed Design 20 Marks	Design is templated or copied from others or other resources.	Design is suitable for the existing farm and environment.	Design is unique and suitable for the existing farm and environment.	Design is innovative whilst being suitable for the existing farm and environment.
Sustainability Concepts 20 Marks	Product does not consider sustainability.	Product considers sustainability; however, execution is limited.	Product considers sustainability and delivers a sustainable garden bed.	Product considers sustainability and delivers a sustainable garden bed. It also considers the biodiversity profile of the area.
Plant Selection 10 Marks	Selection does not consider environment or existing farm	Selection is considerate of the environment or farm, and one other factor.	Selection considers the environment and farm, and two other factors.	Selection considers the environment, farm, season and pests, and more than two other factors.
Indigenous and Cultural Considerations 10 Marks	No cultural considerations are apparent	Few cultural considerations are apparent	Sufficient cultural considerations are apparent with evidence provided	Significant cultural considerations are apparent with evidence provided
Garden Bed Final Product 20 Marks	Garden bed does not meet the Design Brief requirements	Garden bed somewhat meets the Design Brief requirements	Garden bed meets the Design Brief requirements	Garden bed exceed the Design Brief requirements, with evidence of innovation.

References and Resources.

Australian Curriculum. (n.d.) Design and Technologies. https://www.australiancurriculum.edu.au/f-10-curriculum/design-and-technologies

Freshworks. (n.d.) What is the Design Thinking Process? https://freshworks.io/design-thinking-process/

Getting started with Sustainability in Schools. (n.d.) Building a Garden. https://sustainabilityinschools.edu.au/building-garden

Stephanie Basemen. (n.d.) Design Thinking Process. https://www.stephaniebaseman.com/design-thinking-process