

CSIRO + TECH SCHOOLS  
**Bees with Backpacks**  
**Design Challenge**  
**2021**



**Gather your team,  
create the ultimate bee  
friendly habitat and  
pitch your idea to make  
it happen!**

**Win great tech prizes for  
you and your school.**

**Contact your local  
Tech School for more  
information.**



**Calling all young designers,  
coders and makers in Years  
7-10 + VCAL ...**

**Join a global project to save bees  
from extinction with this local  
initiative.**

Honeybees maintain biodiversity across the world, providing pollination for about 75 per cent of the fruits, vegetables and nuts we eat and one-third of all food. However, bee populations have declined dramatically over the past five decades.

Through this partnership with CSIRO, students will study food security, bees and bee behaviour to design a local habitat to increase bee activity.



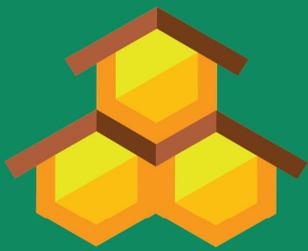
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# CSIRO + TECH SCHOOLS Bees with Backpacks Design Challenge



## Overview

This design challenge enables students explore the issue of bees and food security and to create and promote bee friendly environments.

**The CSIRO + Tech Schools Design Challenge** is supported with a comprehensive learning program co-designed by Tech Schools, CSIRO's Data61 team and local beekeepers. These learning and assessment materials are aligned with Victorian Curriculum STEAM subjects and will give students the necessary insights and background information to confidently approach the design challenge.

Students will learn about the science of bees and bee colonies, environmental factors that affect hive health and discover CSIRO smart hive technologies. Using bee data from the CSIRO Bees with Backpacks project, students will analyse and draw conclusions about bee movements from local beehives. Working in collaborative groups, students then design a bee friendly environment and promote their innovation with a community information campaign.

All teams must produce and deliver the requirements outlined in Stages 1 and 2 of the challenge. Stage 3 is a Pitch Final for the winning school from each Tech School region (regional finalist).

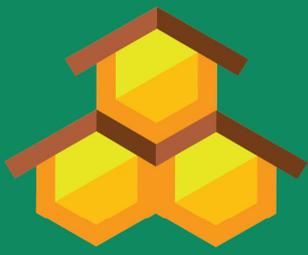
**STAGE 1 Registration:** Submit your Team Registration by **3.00pm on Friday 20 August 2021.** **STAGE 2 Entry Submission:** Submit your Team Entry by **3.00 pm on Friday 10 September 2021.** Submit registration and entry to **[ebroadbent@gordontafe.edu.au](mailto:ebroadbent@gordontafe.edu.au)**

There are three components to the competition submission:

1. Images of the group's bee friendly environment prototype
2. Links or digital files for the campaign presentation
3. A written team reflection on each stage of the project design process in which students evaluate what they contributed in their individual and team roles and how they have applied STEAM skills (maximum 500 words per section or 2 x single sided A4 pages including images).



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## STAGE 3 State Pitch Final

Winning regional teams pitch their entry at a State Pitch Final in Term 4 with the overall winner being announced at the end of this event.

This will be a live pitch of the team's Bee Friendly Environment Advertising Campaign idea (three minutes maximum) with all team members contributing. Teams will pitch/present ideas to CSIRO, Tech Schools, Beekeepers and community stakeholders.

### Tech Schools will provide you with a support pack including:

- Challenge terms and conditions, KEY DATES Timeline, learning and assessment materials and challenge evaluation rubrics.
- Provide the Bees with Backpacks Core Program modules that compliment the Competition and support online delivery (not essential for competition entry)
- Online challenge support from Geelong Tech School where needed
- Online facilitation for different aspects of the competition depending upon school needs.

### Schools need to:

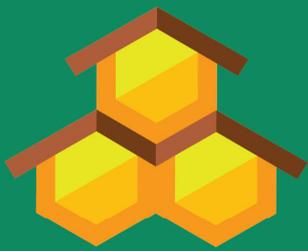
- Provide a member of staff to coordinate student teams and the written reflection on each stage of the project design process using the template provided. (Appendix 1).
- Submit Team Registrations no later than 3.00 pm on 20 August 2021.
- A teacher to deliver optional school program delivery Modules 1-5 of the CSIRO + Geelong Tech School Core Program.
- Tech School facilitation is available to assist with delivery of Module 4 (Data Analysis), if required.
- Work with Tech Schools to provide feedback and evaluation data.



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## Benefits

### Innovation:

The challenge is designed along real-world principles, giving students an opportunity to develop an active learning project which can be added to their CVs or personal folios. Students learn about career pathways and gain insights into the enterprise skills needed for the future of work.

### Work, life and enterprise skills:

The CSIRO + Tech Schools Design Challenge inspires young people to develop their confidence in enterprise capabilities such as collaboration, communication, project and time management, analytical, research, creativity, numeracy and literacy skills.

### Enhances curriculum with STEAM capabilities:

The challenge complements a wide range of subjects including design and technology, digital technologies, science, mathematics, media arts, visual arts, visual communication and design, English, humanities and business along with creative and critical thinking and personal and social capabilities.

## Eligibility

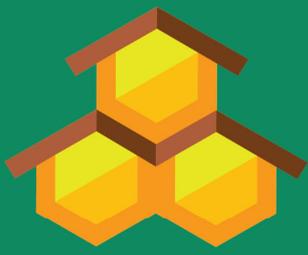
Secondary Students in Years 7-10 + VCAL in partner schools. The number of teams from each school that can be supported is limited and will be determined by Tech Schools in consideration of school size and available resources, fairness and equity.



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## KEY DATES Timeline

### Registration

By 3.00pm, Friday 20 August  
Week 5, Term 3, 2021

Teachers to register their team(s) by notifying Geelong Tech School of their intention to enter.

### Entry Development Time

All of Term 3  
2021

Online challenge support available at Geelong Tech Schools during this time. Email [ebroadbent@gordontafe.edu.au](mailto:ebroadbent@gordontafe.edu.au) for more information.

### Submission of entries

By 3.00pm, Friday 10 September  
Week 9, Term 3, 2021

Entries are submitted by the due date. Submit to Geelong Tech School contact Elly [ebroadbent@gordontafe.edu.au](mailto:ebroadbent@gordontafe.edu.au)

### Regional Winners Announced

By 3.00pm, Friday 17 September  
Week 10, Term 3, 2021

Winning Regional Teams notified.

### Pitch Workshop

Date TBC  
Week 2, Term 4, 2021

For all winning regional teams to prepare prior to pitch final

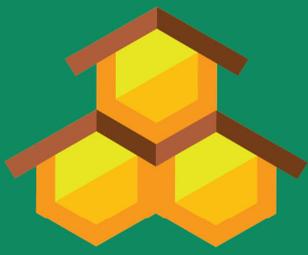
### Pitch Final

Date TBC  
Week 4, Term 4, 2021

Winning regional teams and teachers attend the state pitch final.



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## How to enter the challenge (see Key Dates Timeline)

1. Form your team of 3-5 students + mentor teacher
2. Complete workbook modules 1-5 in class
3. Participate in the online challenge immersion session on.
4. Register your team by completing the Team Registration.
5. In teams, complete module 6
6. Submit your prototype, campaign and team reflection.

## Please read these entry rules and instructions carefully

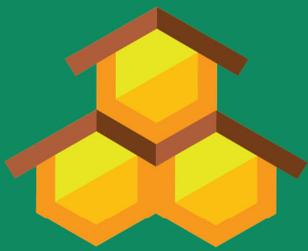
1. By entering the CSIRO + Tech Schools Design Challenge you agree to abide by these Terms and Conditions. If you fail to abide by any of the rules, you and your team may be disqualified from the challenge at the sole discretion of host Tech School.
2. You will enter the CSIRO + TECH SCHOOLS Design Challenge as a team of between 3 and 5 students.
3. Entry to the CSIRO + TECH SCHOOLS Design Challenge is free of charge and restricted to students in year 7-10 + VCAL who attend partner schools of host Tech Schools.
4. Teams must have submitted a Team Registration by the required date to be eligible to submit an entry. Teams are required to nominate a teacher from their school as coordinator and point of contact.
5. Multiple CSIRO + TECH SCHOOLS Design Challenge team entries can be submitted by eligible schools (with maximum number to be determined in consultation with host Tech-Schools), but each requires a separate Team Registration.
6. CSIRO + TECH SCHOOLS Design Challenge entries must be submitted by email along with all required links or files. Entries must be received by your host Tech School prior to the closing date no later that Friday the 10th September, 2021



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## CSIRO + TECH SCHOOLS Bees with Backpacks Design Challenge



7. CSIRO + TECH SCHOOLS Design Challenge entries are only valid when each of the following components are submitted:

- a. images of the team's bee friendly environment prototype
- b. links or digital files for the team's campaign presentation (with passwords and share drive file access enabled if required)
- c. a written team reflection on each stage of the project design process using the template provided (Appendix 1).

8. Teams are permitted to seek advice or mentoring from industry; however, they must acknowledge any assistance of this nature in their presentation and Project Design Process and Team Contribution Template.

CSIRO + TECH SCHOOLS Design Challenge entries remain the intellectual property (IP) of student teams, but by entering the challenge, host Tech Schools are accorded permission to reproduce, promote and display student work in hard copy and electronic formats. Tech Schools, CSIRO or project partners will not commercialise student IP.

9. CSIRO + TECH SCHOOLS Design Challenge entries will be retained by host Tech Schools for exhibition and display purposes for a period of up to 6 months after the challenge closes. A written reflection on each stage of the challenge design process using the template provided (Appendix 1)

10. CSIRO + TECH SCHOOLS Design Challenge Stage 2 entries will be judged using the Challenge Evaluation Criteria (Appendix 2). The overall winning school from each Tech School region will be nominated for the Pitch Final. Each Tech School may also nominate one 'innovation to market' team who have submitted an entry with evident commercial viability. Teachers should note that there is only one entry category. Team in years 7+8, 9+10 and VCAL are evaluated in accordance with their respective curriculum age and stage, hence students in these year levels compete on an equal footing.

11. CSIRO + TECH SCHOOLS Design Challenge Regional Finalist teams must attend the online Pitch Final. Stage 3 entries will be judged using the Pitch Final Challenge Evaluation Criteria (Appendix 3)

12. CSIRO + TECH SCHOOLS Design Challenge Regional Finalist teams representing each Tech School are required to attend an online Pitch Workshop with an industry mentor where they will develop their presentation in preparation for the Pitch Final.

13. Dates for the Pitch Workshop will be arranged by host Tech Schools in consultation with shortlisted teams.

Prizes for State Pitch Finalists are as follows:

First Prize (School) TBC (students) TBC

Second Prize TBC

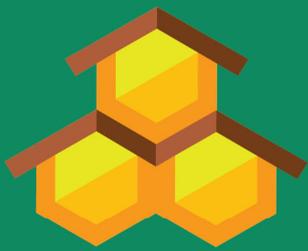
Third prize TBC



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14. The overall CSIRO + TECH SCHOOLS Design Challenge winner will be determined at the Online Pitch Final judged by a panel representing the CSIRO, Tech School Directors and other industry partners.
15. The decision of our judges is final and conclusive in all circumstances and no correspondence will be entered into.
16. No part of a prize is exchangeable for cash or any other prize.
17. Host Tech Schools reserve the right to amend these rules at any time.

### APPENDICES

- Appendix 1 - Challenge Design Process and Team Reflection Template
- Appendix 2 - Stage 2 Challenge Evaluation Criteria
- Appendix 3 - Stage 3 Pitch Final Evaluation Criteria

*NB: It is not a requirement to do the Bees with Backpacks Core Program to enter the Competition, however it may assist for online classroom delivery.*

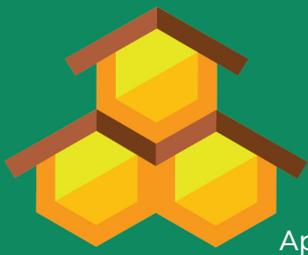
*To contact the school for a Teacher Delivery Guide and Student Workbook go to <https://www.geelongtechschool.vic.edu.au/> or contact Paul D'Orio Email: [pdorio@gordontafe.edu.au](mailto:pdorio@gordontafe.edu.au) ph 03 5225 0736*



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# CSIRO + TECH SCHOOLS Bees with Backpacks Design Challenge

Appendix 1: TEAM REFLECTION TEMPLATE



## Introduction

**The CSIRO + Tech Schools Bees with Backpacks Design Challenge asks young people in Years 7-10 +VCAL to work together to study food security, bees and bee behaviour to design a local habitat to increase bee activity**

You are required to submit a Team Reflection with your entry which will help the shortlist panel evaluate how you have worked as a team (See *Team Reflection Criteria* in **Appendix 2 - Stage Competition Evaluation Criteria**) The Team Reflection should outline the contribution of each team member and your reflection on the skills and knowledge you have developed. This template will allow you to record the evidence you will need to include when making your final submission. Your team is encouraged to document the processes as you go through them but to document them only toward the end of your project or when you think you have finished with that step.

## How to use this document

Use the Overall document to enter the competition and attach the required elements for your entry. Complete the Team Reflection and include this in your submission. The best way to utilize these is to review them at the start of the project, keep track of useful observations, documents and pictures and then use these to present a concise summary of your reflections for your final entry. Your team needs to submit a Team Reflection in the format shown as Appendix 1.

## Design Thinking process

The CSIRO + Tech Schools Bees with Backpacks Design Challenge advises to use a process called Design Thinking. Design thinking is process for creative problem solving with a human-centred core. It encourages organisations, teams and individuals to focus on the people they are creating for rather than the specific technical or operational utility of the solution. There are many different ways to express Design Thinking. Figure 1 on the next page shows one such description of Design Thinking.

Design thinking is not a linear process, you don't simply do one step then the next step then the next step until you finish. As the diagram shows Design Thinking is an iterative process with each step linked to all of the others. You may research, empathise, define, ideate, prototype and test only to find that your solution doesn't exactly work. This is not a failure by the way. You may need to go back to any of the previous steps and revisit them. You may find in the course of creating your solution you are constantly moving backwards and forwards between the steps. We're not going to give you much more than that in this document but Tech School staff, industry mentors and your teachers will be able to guide you through these steps.



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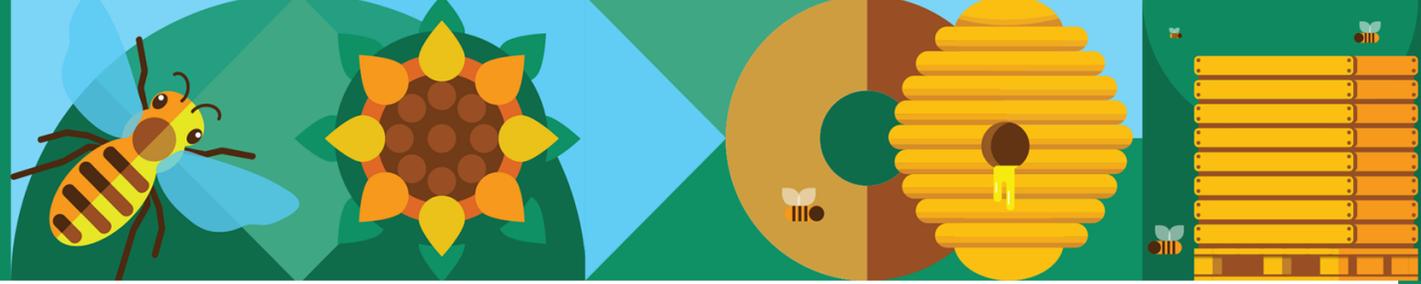
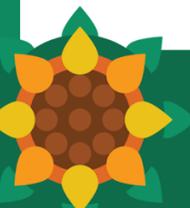


Figure 1: Design Thinking

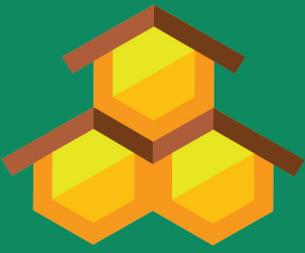


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# CSIRO + TECH SCHOOLS Bees with Backpacks Design Challenge



## Overall

**Team:** \_\_\_\_\_

**School:** \_\_\_\_\_

**Prototype:** Bee Friendly Habitat

Use this page and the next to help you plan and achieve project milestones. You do not need to submit these pages with your competition entry.

### PROJECT OUTLINE & AIMS

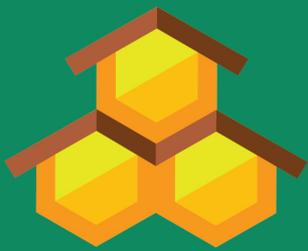
What is the project and what are you aiming to achieve? You will use these to develop aims for each of your other stages



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## TIMEFRAME

Within the timeframe of the competition what are the milestone dates you want to achieve. A milestone is a date when you would like to have a part of the project completed (for instance your first milestone will be submitting your project proposal two weeks after the Immersion Day; you may like to match them to each of the stages of design thinking.

## EXPECTATIONS

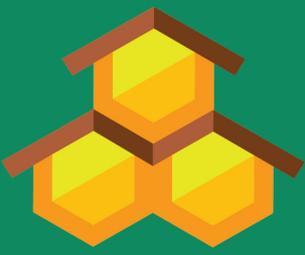
As a team it is important you set expectations of one another and the group as a whole. How will you manage workloads to ensure everyone is lifting their weight; how will you treat your teachers and other mentors or people who will assist you; will you set regular times throughout the week to meet or be more ad-hoc?



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## Appendix 1: Team Reflection Template

Each team is required to submit a team reflection that responds to the following reflection points. Maximum 500 words per reflection point; or 2 x single sided A4 print or digital pages including embedded images. Complete this template and submit with your entry.

**Team:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Prototype:** Bee Friendly Habitat

### TEAM ROLES AND DYNAMICS

Each team member should complete a reflection with their thoughts on how they saw their role during the project. Your reflections should focus on you and your interaction with the team, and the team as a whole.

### SKILLS DEVELOPED, REFINED & LEARNED

Team members should list what skills they have learned or developed over the project. These may be technical skills, critical & creative thinking skills, teamwork and communication or new knowledge. Also consider how you are building on the skills you are learning in class.



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## Questions you may like to consider

- + What worked well?
- + What didn't work?
  - + How did you respond?
- + What surprised you?
- + How did you use the research and empathy stages in later stages?
- + What was your craziest idea?
  - + Did you pursue it?
  - + Why / Why not?
- + How did you function as a team?
- + What new skills did you learn?
- + What skills did you build on and develop?
- + Did you achieve all of your aims?
  - + Did they change over the course of the project?
  - + If so, how did you adapt individually and as a team?

## Examples of evidence

When forming your reflections ensure you are capturing examples of your work. These may be photos, videos, printed or digital copies of works and/or successive versions of prototypes of your concept. You may consider other items which support and inform your reflections.

## Providing feedback

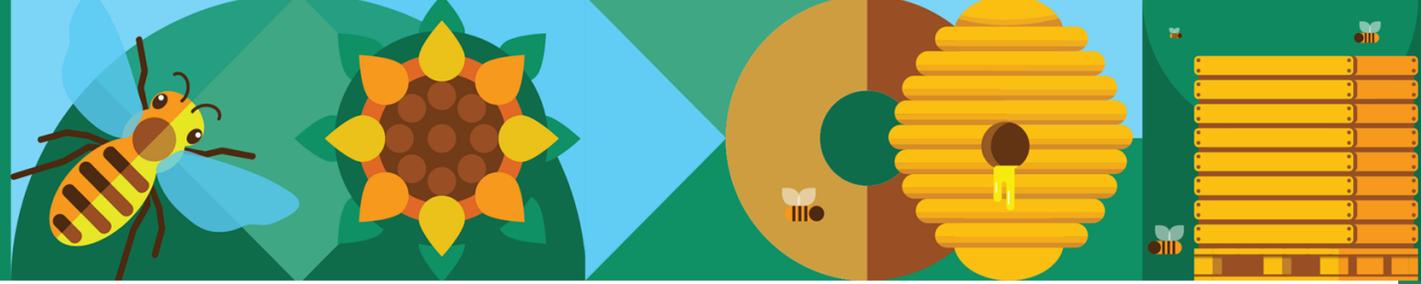
When completing your reflections, you may wish to share thoughts and comments with your team-members. When providing and receiving feedback consider the following:

- + Kind Specific and Helpful
- + Hold your ideas lightly
- + Be mindful when giving and receiving feedback
  - + Have an open heart
  - + Give your undivided attention and actively listen
- + Be hard on content but soft on people





# CSIRO + TECH SCHOOLS Bees with Backpacks Design Challenge



## APPENDIX 2: Stage 2 - Years 7 + 8 Regional Competition Evaluation Criteria

This design challenge enables students to explore the issue of bees and food security to design, create and promote a bee friendly environment for an urban garden. Students submit a prototype of their idea along with a campaign to promote their bee innovations.

**Team:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Campaign Description:** \_\_\_\_\_

Competition Criteria	Evaluation of Performance & Understanding					
	Not Shown	Novice	Intermediate		Expert	
<b>Empathise and Define</b> Teams identify and present the food security needs of a user or group of users Design and Technologies VCDSCD049 Science VCSSU090 Critical and Creative Thinking VCCCTQ032	No evidence of use needs is shown	identifies the user or community food security need  recognises that the use of natural resources and the development of science and technology can have social and environmental impacts	explores the individual user and community food security needs  explains how the use of natural resources and the development of science and technology can have social and environmental impacts	3  4	researches, analyses and evaluates the end-user and community food security needs  evaluates how the use of natural resources and the development of science and technology can have social and environmental impacts and proposes a management strategy	5
		N	1	2	3	4

Competition Criteria	Evaluation of Performance & Understanding					
	Not Shown	Novice	Intermediate		Expert	
<b>Ideate</b> Teams develop a range of bee friendly environment ideas that would meet the needs of their users  Design and Technologies VCDSCD050 Critical and Creative Thinking VCCCTQ034 VCCCTM042	No evidence of ideation was shown.	lists a few ideas that meet some user needs using creative thinking processes  identifies or researches other possible designs	generates several ideas that meet the needs of users utilizing creative thinking processes, then selects the most suitable ideas  acquires data through research to improve the design or modifies existing designs	3  4	generates an extensive range of ideas that meet user needs using creative thinking processes and uses critical thinking to select the most suitable ideas  synthesises data from a range of researched sources to improve the design or modifies forms in nature to solve a problem or create new designs	5
		N	1	2	3	4

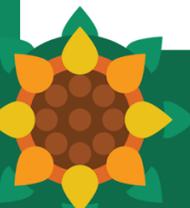


# CSIRO + TECH SCHOOLS Bees with Backpacks Design Challenge



Competition Criteria	Evaluation of Performance & Understanding					
	Not Shown	Novice	Intermediate		Expert	
<p><b>Prototype</b> Teams create a prototype of their bee friendly environment design solution</p> <p><i>Design and Technologies</i> VCDSCD051 <i>Science</i> VCSIS108</p>	No prototype was shown	<p>safely manipulates technologies and materials to produce a prototype</p> <p>considers how research could help them build their prototype</p>	<p>safely and independently manipulates technologies and materials to produce a quality prototype</p> <p>effectively researches using the Internet, observations, simulations or experiments to help build their prototype</p>	<p>safely, independently and innovatively manipulates technologies and materials to produce a high-quality prototype and considers alternatives to reduce waste or time</p> <p>develops strategies and techniques for effective research such as using the Internet, observations, simulations or experiments to help build their prototype and evaluates their strengths and limitations</p>		
	N	1	2	3	4	5

Competition Criteria	Evaluation of Performance & Understanding					
	Not Shown	Novice	Intermediate		Expert	
<p><b>Communicate</b> Teams create a digital campaign to promote their bee friendly environment design solution</p> <p><i>Media Arts</i> VCAMAM036 <i>Design and Technologies</i> VCDSTS044</p>	No pitch video was submitted	<p>presents a digital campaign element utilising a media feature to enhance the presentation</p> <p>the campaign presents the user needs and their choice of technologies and materials to present their designed solution</p>	<p>presents a digital campaign utilising media features such as camera angle, framing and embedded digital content to convey meaning and enhance the presentation</p> <p>the campaign explains how they identified user needs, the choice of technologies or materials, the input of the individuals in the group and new opportunities for their designed solution</p>	<p>presents a digital campaign that creatively utilises multiple production and editing features such as camera angle, framing, colour filters, text, sound and embedded digital content to effectively convey meaning and enhance the pitch presentation</p> <p>the campaign evaluates how they identified user needs, the specific input of the individuals in the group, opportunities for their designed solution and how technologies and materials influenced their design</p>		
	N	1	2	3	4	5



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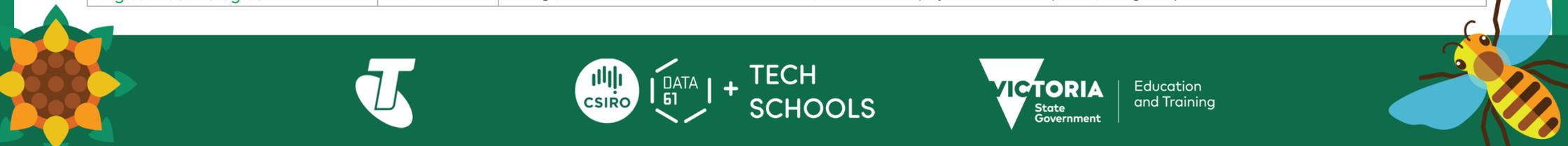


# CSIRO + TECH SCHOOLS Bees with Backpacks Design Challenge



Competition Criteria	Evaluation of Performance & Understanding					
	Not Shown	Novice	Intermediate		Expert	
<b>Reflect</b> Teams reflect and evaluate on the processes used to develop their design and the effectiveness of teamwork and project management <b>Science</b> VCSIS111 <b>Digital Technologies</b> VCDTDI039 <b>Personal and Social Capability</b> VCPSCO037 VCPSCO0421	No project reflection was submitted	outlines methods used to solve the user problem and notes that improvements could be made  description of teamwork and evidence that they followed instructions for collaborative group work	describes the effectiveness of methods used to solve the user problem and explores different improvements to be made  evidence of effective teamwork and project management processes which followed timelines and sequences for completing tasks on time with assistance			evaluates the effectiveness of methods used to solve the user problem with evidence such as test data and investigates different improvements to be made  evidence of excellent teamwork and independent project management which followed timelines and sequences for completing tasks on time
	<b>N</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

Strand	Code	Descriptor
Design and Technologies	VCDSCD049	Critique needs or opportunities for designing and investigate, analyse and select from a range of materials, components, tools, equipment and processes to develop design ideas
	VCDSCD050	Generate, develop and test design ideas, plans and processes using appropriate technical terms and technologies including graphical representation techniques
	VCDSCD051	Effectively and safely use a broad range of materials, components, tools, equipment and techniques to produce designed solutions
	VCDSTS044	Investigate the ways in which designed solutions evolve locally, nationally, regionally and globally through the creativity, innovation and enterprise of individuals and groups
Critical and Creative Thinking	VCCCTQ032	Consider how to approach and use questions that have different elements, including factual, temporal and conceptual elements
	VCCCTQ034	Synthesise information from multiple sources and use lateral thinking techniques to draw parallels between known and new solutions and ideas when creating original proposals and artefacts
	VCCCTM042	Consider how problems can be segmented into discrete stages, new knowledge synthesised during problem-solving and criteria used to assess emerging ideas and proposals
Media Arts	VCAMAM036	Plan, structure and design media artworks for a range of purposes that engage audiences using media elements, technologies and production processes
Science	VCSSU090	Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations
	VCSIS108	Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed
	VCSIS111	Use scientific knowledge and findings from investigations to identify relationships, evaluate claims and draw conclusions
Personal and Social Capability	VCPSCO037	Reflect on their effectiveness in working independently by identifying enablers and barriers to achieving goals
	VCPSCO041	Perform in a variety of team roles and accept responsibility as a team member and team leader, assessing how well they support other members of the team
Digital Technologies	VCDTDI039	Manage, create and communicate interactive ideas, information and projects collaboratively online, taking safety and social contexts into account





# CSIRO + TECH SCHOOLS Bees with Backpacks Design Challenge



## APPENDIX 2: Stage 2 - Years 9 + 10 Regional Competition Evaluation Criteria

This design challenge enables students to explore the issue of bees and food security to design, create and promote a bee friendly environment for an urban garden. Students submit a prototype of their idea along with a campaign to promote their bee innovations.

**Team:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Campaign Description:** \_\_\_\_\_

Competition Criteria	Evaluation of Performance & Understanding					
	Not Shown	Novice	Intermediate		Expert	
<b>Empathise and Define</b> Teams identify and present the food security needs of a user or group of users  Design and Technologies VCDSCD060 Science VCSSU115 Critical and Creative Thinking VCCCTQ043	no evidence of use needs is shown	identifies the user or community food security need	explores the individual user and community food security needs		researches, analyses and evaluates the user and community food security needs	
		recognises that technology and science can be applied to the study of bees	explores how the application of technology and science can improve knowledge of bees in an environmental system	researches and evaluates how the application of technology and science can improve knowledge of bees in an environmental system to make predictions		
	<b>N</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

Competition Criteria	Evaluation of Performance & Understanding					
	Not Shown	Novice	Intermediate		Expert	
<b>Ideate</b> Teams develop a range of bee friendly environment ideas that would meet the needs of their users  Design and Technologies VCDSCD061 Critical and Creative Thinking VCCCTQ044	no evidence of ideation was shown.	describes how criteria such as functionality, structure and aesthetics have contributed to the design idea	explores how features of materials and technologies can contribute to meeting criteria such as functionality, structure and aesthetics in the design idea		evaluates the benefits and constraints of materials and technology features in meeting criteria such as functionality, structure and aesthetics in the design idea	
		lists a range of ideas before selecting a final idea	explores a range of ideas using creative thinking strategies before selecting a final idea	compares and evaluates a range of ideas using creative thinking and critical thinking strategies and reflects on how the ideas have changed before selecting a final idea		
	<b>N</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>



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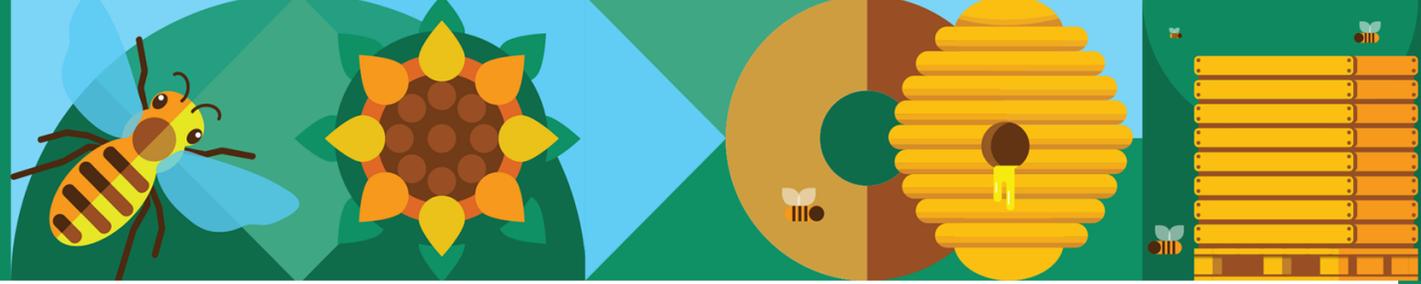


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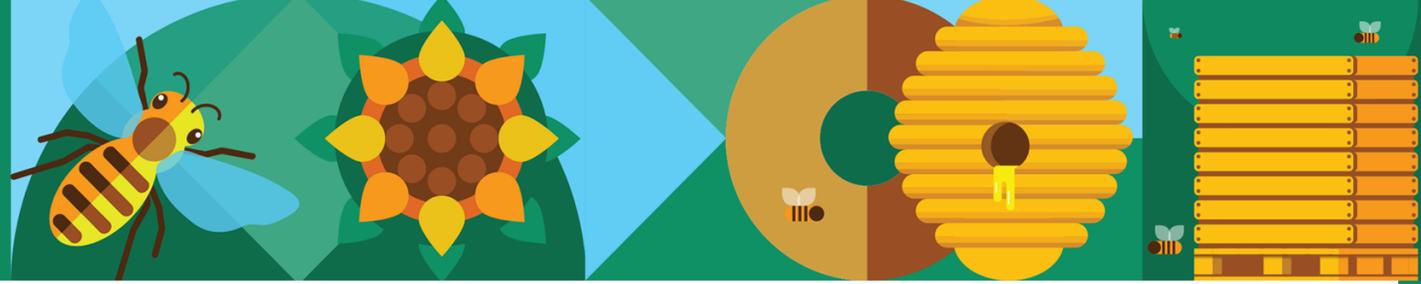


Competition Criteria	Evaluation of Performance & Understanding					
	Not Shown	Novice		Intermediate		Expert
<b>Prototype</b> Teams create a prototype of their bee friendly environment design solution  Design and Technologies VCDSCD062 Science VCSIS136 Critical and Creative Thinking VCCCTM053	no prototype was shown	safely manipulates technologies and materials to produce a prototype		safely and independently manipulates technologies and materials to produce a quality prototype		safely, independently and innovatively manipulates technologies and materials to produce a high-quality prototype and considers alternatives to reduce waste or time
		applies specific skills relevant to equipment and technology used		records information on the specific skills applied to relevant equipment and technology to achieve intended results for the prototype		records information on the specific skills applied to relevant equipment and technology to achieve intended results for the prototype, improvements made, and future improvements planned for the design
	N	1	2	3	4	5

Competition Criteria	Evaluation of Performance & Understanding					
	Not Shown	Novice		Intermediate		Expert
<b>Communicate</b> Teams create a digital campaign to promote their bee friendly environment design solution  Media Arts VCAMAM042 Design and Technologies VCDSTS054	no pitch video was submitted	presents a digital campaign element utilising a media feature to enhance the presentation		presents a digital campaign utilising media features such as camera angle, framing and embedded digital content to convey meaning and purpose to the audience		presents a digital campaign that creatively utilises multiple production and editing features such as camera angle, framing, colour filters, text, sound and embedded digital content to convey meaning, purpose and style to engage the audience
		outlines how the choice of technologies, materials and concept for their design solves the user's or community's problem		explains how the choice of technologies, materials and concept for their design solves the user's or community's problem and contributes to a preferred future		evaluates how the choice of technologies, materials and concept for their design solves the user's or community's problem and contributes to a preferred future with evidence of research
	N	1	2	3	4	5



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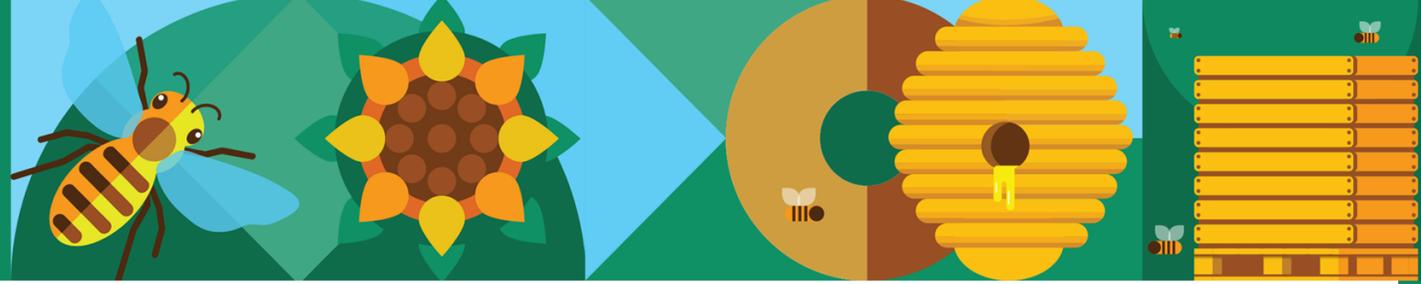
Competition Criteria	Evaluation of Performance & Understanding					
	Not Shown	Novice		Intermediate		Expert
<b>Reflect</b> Teams reflect on their learning and possible impacts of their solution. They evaluate the effectiveness of teamwork and project management  Science VCSSU116 Personal and Social Capability VCPSCSE045 VCPSCSO050	no project reflection was submitted	outlines how designing a bee friendly environment has influenced their own views of food security		describes how designing a bee friendly environment has influenced their own view of food security and can influence community views of the problem		evaluates how designing a bee friendly environment has influenced their own view of food security and can promote further research and community action regarding the problem
		outlines the contribution of team members to the overall completion of the project		explains how roles for team members were created and tasks divided for the success of the project and how this could be improved		evaluates how roles for team members were created and tasks divided for the success of the project and how this could be improved with examples and suggested strategies
	<b>N</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

Strand	Code	Descriptor
Design and Technologies	VCDSCD060	Critique needs or opportunities to develop design briefs and investigate and select an increasingly sophisticated range of materials, systems, components, tools and equipment to develop design ideas
	VCDSCD061	Apply design thinking, creativity, innovation and enterprise skills to develop, modify and communicate design ideas of increasing sophistication
	VCDSCD062	Work flexibly to safely test, select, justify and use appropriate technologies and processes to make designed solutions
	VCDSTS054	Critically analyse factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved
Critical and Creative Thinking	VCCCTQ043	Investigate the characteristics of effective questions in different contexts to examine information and test possibilities
	VCCCTQ044	Suspend judgements to allow new possibilities to emerge and investigate how this can broaden ideas and solutions
	VCCCTM053	Investigate the kind of criteria that can be used to rationally evaluate the quality of ideas and proposals, including the qualities of viability and workability
Media Arts	VCAMAM042	Develop and refine media production skills to integrate and shape the technical and symbolic elements in images, sounds and text to represent a story, purpose, meaning and style
Science	VCSSU115	Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries
	VCSSU136	Select and use appropriate equipment and technologies to systematically collect and record accurate and reliable data, and use repeat trials to improve accuracy, precision and reliability
	VCSSU116	The values and needs of contemporary society can influence the focus of scientific research
Personal and Social Capability	VCPSCSE045	Analyse the significance of independence and individual responsibility in the completion of challenging tasks
	VCPSCSO050	Evaluate own and others contribution to group tasks, critiquing roles including leadership and provide useful feedback to peers, evaluate task achievement and make recommendations for improvements in relation to team goals





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## APPENDIX 2: Stage 2 - VCAL Regional Competition Evaluation Criteria

This design challenge enables students to explore the issue of bees and food security to design, create and promote a bee friendly environment for an urban garden. Students submit a prototype of their idea along with a campaign to promote their bee innovations.

**Team:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Campaign Description:** \_\_\_\_\_

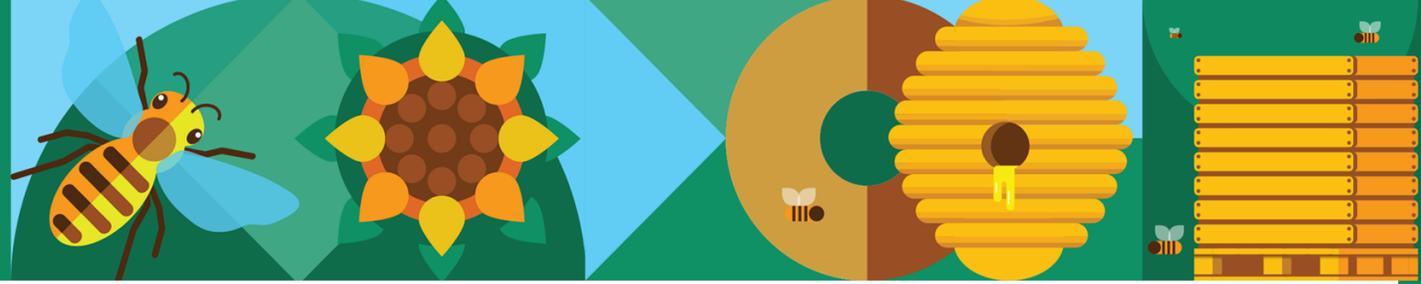
Competition Criteria	Evaluation of Performance & Understanding			
	Not Shown	Novice	Intermediate	Expert
<p><b>Empathise and Define</b> Teams present the food security needs of a user or users</p> <p><i>Personal Development Skills</i> 012, 022, 032 <i>Unit 2</i> Learning Outcome 1 <i>Literacy Skills</i> 011, 021, 031 <i>Reading Learning</i> Outcome 7</p>	no evidence of user needs shown	identifies the user or community food security need  refers to knowledge gained from reading about the issue to define the problem	researches and analyses the food security need of a user or a community  demonstrates understanding of the issue from reading by citing relevant information to define the problem	researches, critically analyses and evaluates the food security need of a user or a community  demonstrates critical understanding of the issue by referencing information from a report to define the problem

Competition Criteria	Evaluation of Performance & Understanding			
	Not Shown	Novice	Intermediate	Expert
<p><b>Ideate</b> Teams develop a range of bee friendly environment ideas to meet the needs of their users and plan for the project</p> <p><i>Literacy Skills</i> 012, 022, 032 <i>Oracy</i> Learning Outcome 4 <i>Work Related Skills</i> 012, 022, 032 <i>Unit 2</i> Learning Outcome 1</p>	no evidence of ideation was shown	negotiates with team members to generate ideas with a clear point of view  works collaboratively to explore possible solutions to the user's problem, and plans for required technology and team roles needed	collaboratively generates ideas and discusses a range of alternative ideas  works in a team to analyse possible solutions to the user's problem, plans for required technology and allocates team roles and responsibilities	collaboratively explores, compares and evaluates a range of ideas to generate a solution to the user's problem  researches to evaluate possible solutions to the user's problem and explores opportunities for the self-directed project including aims, required technologies and milestones



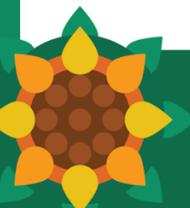


# CSIRO + TECH SCHOOLS Bees with Backpacks Design Challenge



Competition Criteria	Evaluation of Performance & Understanding			
	Not Shown	Novice	Intermediate	Expert
<p><b>Prototype</b> Teams create a prototype of their bee friendly environment design solution</p> <p>Numeracy 011, 021, 031 Unit 1 Learning Outcome 4 Work Related Skills 012, 022, 032 Unit 2 Learning Outcome 4</p>	no prototype was shown	<p>creates a prototype from a plan with estimates of length, area or volume</p> <p>uses appropriate technologies to produce a simple prototype</p>	<p>creates a prototype by interpreting a detailed plan with estimates of length, area or volume</p> <p>uses a range of resources and technologies to produce a quality prototype</p>	<p>creates a prototype by interpreting a comprehensive plan with estimates of cost, time, length, area or volume</p> <p>collaboratively organises resources and uses technologies to produce a high-quality prototype and makes adjustments based on feedback</p>

Competition Criteria	Evaluation of Performance & Understanding			
	Not Shown	Novice	Intermediate	Expert
<p><b>Communicate</b> Teams create a digital campaign to promote their bee friendly environment design solution</p> <p>Personal Development Skills 012, 022, 032 Unit 2 Learning Outcomes 3 (FND, INT), 4 (SEN) Literacy 012, 022, 032 Oracy Learning Outcome 2</p>	no pitch video was submitted	<p>the digital campaign presents the designed solution to the user's problem using appropriate media technologies</p> <p>the team presents information on the user needs, technologies and the design thinking process used to solve the problem</p>	<p>the digital campaign presents the designed solution to the user's problem using a variety of features of media technologies</p> <p>the team explains how they identified user needs, key outcomes, technologies and team skills used for the design thinking stages, as well as providing an evaluation of the solution</p>	<p>the media campaign presents the process of designing a solution to the user problem using appropriate language, tone and a variety of features of media technologies</p> <p>the campaign evaluates how they identified user needs, key outcomes, technologies and team skills used for each stage of the design thinking process and an evaluation of the designed solution including possible improvements</p>



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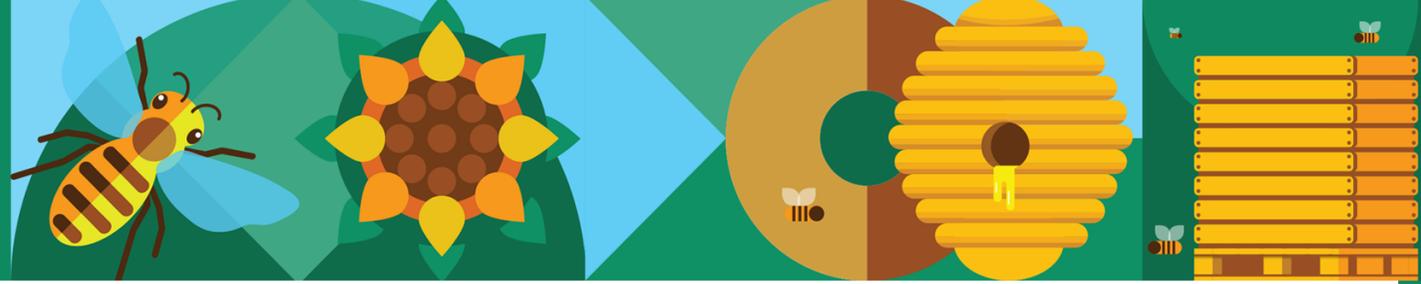


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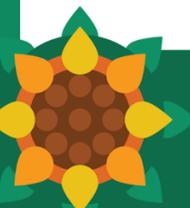




# CSIRO + TECH SCHOOLS Bees with Backpacks Design Challenge



Competition Criteria	Evaluation of Performance & Understanding			
	Not Shown	Novice	Intermediate	Expert
<p><b>Reflect</b> Teams reflect and evaluate on the processes used to develop their design and the effectiveness of teamwork</p> <p><i>Personal Development Skills</i> 012, 022, 032 Unit 2 Learning Outcome 5</p> <p><i>Work Related Skills</i> 012, 022, 032 Unit 2 Learning Outcome 5</p>	no project reflection was submitted	<p>reflects on their personal participation as well as the effectiveness of the team for achieving goals</p> <p>reviews the design thinking process, use of technology and the development of transferrable employment skills to solve the user's problem</p>	<p>reflects on their own contribution to the project and evaluates strategies for group cohesion and factors impacting on the achievement of goals</p> <p>explains the design thinking process, use of technology and the development of transferrable employment skills to solve the user's problem</p>	<p>evaluates their own and team member's involvement in the project, and critically reflects on conflict resolution skills and decision-making skills used to reach desired outcomes</p> <p>evaluates the design thinking process, transferrable employment skills and technology used to solve the user's problem and identifies possible improvements</p>

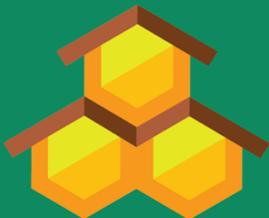


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**Bees with Backpacks  
 Design Challenge**



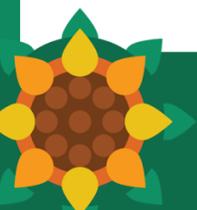
### APPENDIX 3: Stage 3 - Online Pitch Final Competition Evaluation Criteria

Following Stage 2 the winning State team will be determined according to the following criteria:

**Team:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Campaign Description:** \_\_\_\_\_

Competition Criteria	Evaluation of Performance & Understanding						Panel Comments (based on evidence shown)
	Not Shown	Novice		Intermediate		Expert	
<b>Prototype Viability and functionality</b> (live or video demonstration)	No demonstration was provided.	Concept demonstrates some understanding of food security issues. Pitch may reveal misconceptions in fact, data or methods, or may not help create bee friendly environments.		Concept shows solid understanding of food security issues. Pitch is consistent with facts, data and methods that lead to the creation of bee friendly environments.		Concept shows excellent understanding of how food security issues can affect the economy and bio-security. Pitch makes sophisticated use of facts, data and methods that lead to the creation of bee friendly environments.	
		The demonstration illustrated some functionality of the bee friendly environments and indicated how they could be applied to an urban context		The demonstration illustrated the technical functionality of the bee friendly environment and made clear the potential impact on the community.		The demonstration illustrated the technical functionality of the bee friendly environment and made strong and apparent links to its potential application in the community.	
	0	2	4	6	8	9	10



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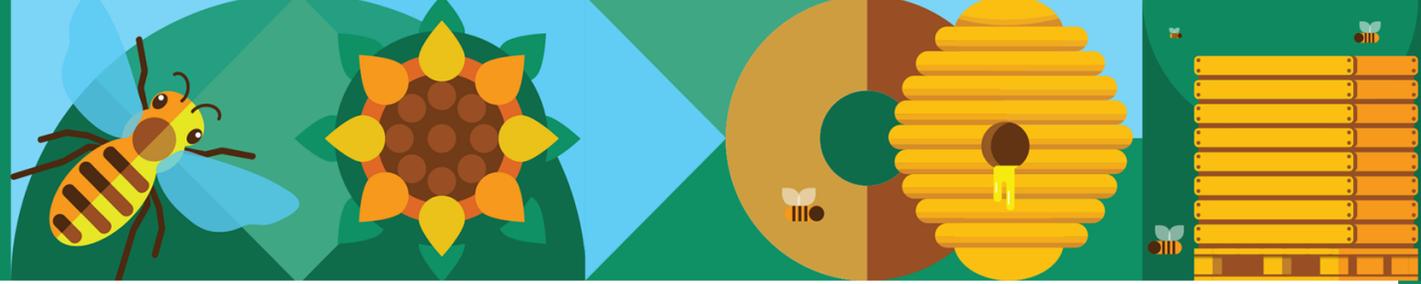


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Competition Criteria	Evaluation of Performance & Understanding						Panel Comments (based on evidence shown)				
	Not Shown	Novice		Intermediate		Expert					
<b>Live Presentation</b>	No live pitch or presentation was provided	The presentation was reasonably clear, and articulate. It gave some insight into the team's research and their agency in designing and developing their prototype solution.	The presentation noted some features, advantages and benefits of the prototype or the campaign in context of the urban food sustainability.	The presentation demonstrated developing communication skills.	The presentation was clear, articulate and engaging. It gave a solid overview of the team's research into the issue and their agency in designing and developing their prototype solution.	The presentation noted the key features, advantages and benefits of the prototype and campaign in context of urban food sustainability.	The presentation demonstrated effective communication skills.	The presentation was very clear, articulate, highly engaging and creative. It gave strong insight into the team's research and analysis of the issue and their agency in designing and developing their prototype solution.	The presentation detailed the key features, advantages and benefits of the prototype and campaign in context of urban food sustainability.	The presentation demonstrated highly effective communication skills.	
		<b>0</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>9</b>	<b>10</b>			
<b>Responses to Panel and Audience Questions</b>	No responses were provided to Panel & Audience Questions	The team's responses to questions indicated a sound knowledge of food security and bee friendly environments.	The responses somewhat helped to illustrate how Enterprise skills were valuable to the team's design processes.	The team's responses to questions indicated a good knowledge of food security and bee friendly environments and explained their potential to address urban food sustainability issues.	The responses clearly helped to illustrate how Enterprise skills were valuable to the team's design processes.	The team's responses to questions indicated a very strong knowledge of food security and bee friendly environments and detailed their potential to address urban food sustainability issues.	The responses extensively illustrated how Enterprise skills were valuable to the team's design processes.				
		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>				
								<b>Total Score:</b>	<b>/25</b>		

**Summary Comments:**

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**Award:** \_\_\_\_\_

**Signed Panel Chair:** \_\_\_\_\_

**Date:** \_\_\_\_\_

