

CSIRO + TECH SCHOOLS  
**Bees with Backpacks**  
**Design Challenge**  
**2022**



**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.

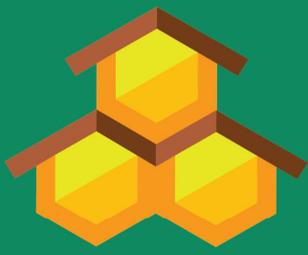


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# CSIRO + TECH SCHOOLS Bees with Backpacks Design Challenge



## 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**

The aim of the design challenge is to help students learn about the science of bees and bee colonies, environmental factors that affect hive health and discover CSIRO smart hive technologies.

Working in collaborative groups, students create a campaign to promote their bee friendly environment and how they are going to help save the bees from extinction.

The CSIRO + Tech Schools Design Challenge is supported with a comprehensive learning program co-designed by Tech Schools, CSIRO 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.

### **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.

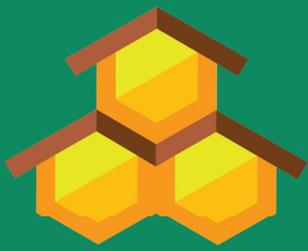
### **Enhances curriculum with STEAM capabilities:**

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

### **Eligibility:**

Secondary students in Years 7-10 + VCAL in partner schools. The number of teams from each school will be approved by their local Tech School in consideration of school size and available resources, fairness and equity.





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## KEY DATES Timeline

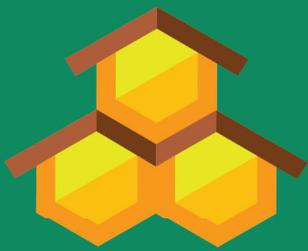
<b>Program launch</b>	Term 2 - Week 5 - 20th May "World Bee Day!"
<b>School Registration &amp; Information sessions</b>	
<b>Submission due date</b>	Term 3 - Week 9
<b>Regional Winners Announced</b>	Term 3 - Week 10
<b>Pitch Workshop</b>	Contact your local Tech School
<b>Regional Pitch Final</b>	Contact your local Tech School
<b>State Pitch Final</b>	Term 4 - October Month Location TBC



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## Submission process

Schools will be required to submit their competition entry to their local Tech School by the due date. Schools will be provided with a link or drop box to submit competition entries.

## STAGE 1 Challenge Submissions

Schools will enter the challenge by registering their school. Schools will then submit their competition entry to their local Tech School by the due date. Schools will be provided with a link or drop box to submit competition entries.

There are 4 criteria for competition judging

1. Campaign idea
2. Prototype of bee friendly environment
3. Presentation
4. A written team reflection

## STAGE 2 Regional Pitch Final

Regional Design Challenge winners will enter a regional pitch final. This will be a live pitch event where teams will present their campaign idea and prototype to representatives from local schools, Tech Schools, and community stakeholders.

## STAGE 3 State Pitch Final

Regional winners will go on to a State Wide pitch final. This will be a live pitch event where teams will present their campaign idea and prototype to representatives from CSIRO, Tech Schools, Beekeepers and community stakeholders.

## Schools need to:

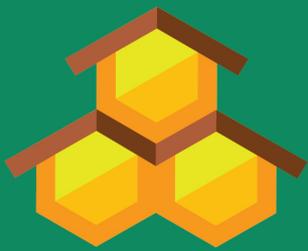
- Contact their Tech School and register for the Design Challenge.
- Provide a member of staff as the key contact and to coordinate student teams and challenge submissions
- Submit team challenge entries by the proposed date from their local Tech School
- Work with Tech Schools to provide feedback and evaluation data.

## Tech Schools will provide schools with support, including:

- Challenge terms and conditions, KEY DATES Timeline, learning and assessment materials and challenge evaluation rubrics.
- Provide the Bees with Backpacks learning modules that provide background information to confidently approach the design challenge. (not essential for competition entry)
- Online challenge support from Tech Schools where needed
- Ongoing contact and support for different aspects of the competition depending upon school needs.



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## Teacher: How to use this document

Once you have registered your school you will have ongoing support from your local Tech School. As the teacher you may work with your student group to create the Bees with Backpacks Design Challenge.

It is optional to use the learning modules that support this challenge. The learning modules are supplied by your local Tech School.

Find the **Design Challenge Planning** document Appendix 1, and use this to work with your student groups. Following this document will ensure the students complete the 4 criteria.

- 1. Campaign idea**  
Campaigns by definition is a "planned course of action to achieve a goal". Campaign examples could be to host an event to to inspire people about bee keeping, it may be a letterbox drop of seeds to plant, it may be a contest or fundraising drive. Group collaboration and teacher input will be important for this aspect.
- 2. Prototype of bee friendly environment**  
Your prototype will demonstrate and display all your knowledge about bees, and it will need to go hand in hand with your campaign.
- 3. Presentation**  
The presentation will be a very important element as it will be how you tell and show the judges your campaign and prototype. Great work and great ideas can be let down by poor presentation so ensure the students give this proper planning, practice and attention.
- 4. A written team reflection**  
As the teacher you may like to ask the students to do an individual reflection. For the challenge they only need to submit a 'Team' reflection. The reflection can be attached to the presentation as a separate document when submitted.

## Design Thinking process

It is recommended 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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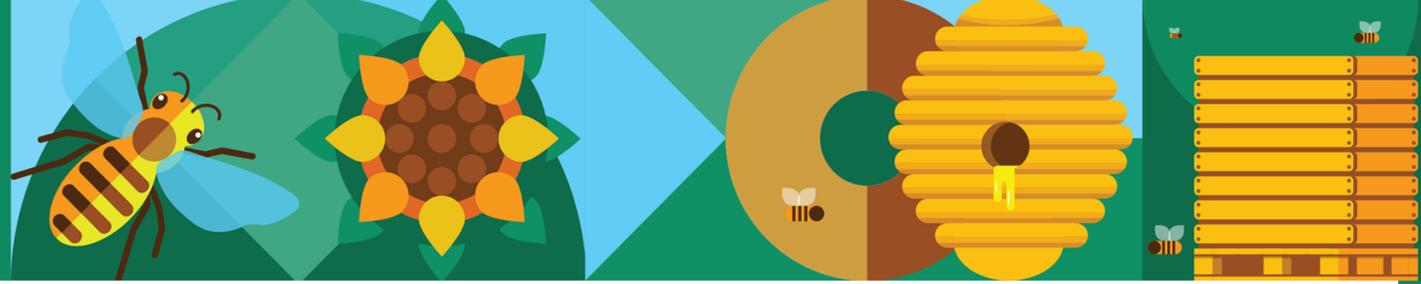
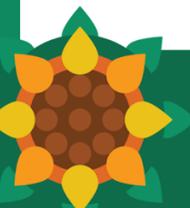


Figure 1: Design Thinking

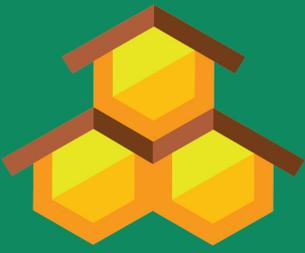


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## Appendix 1: Design Challenge Planning

Team name: \_\_\_\_\_

School name: \_\_\_\_\_

Campaign idea \_\_\_\_\_

Prototype: \_\_\_\_\_

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.

### Your Campaign

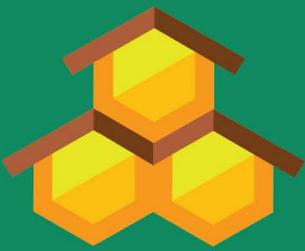
What is your campaign and how are you going to save bees?  
Make a plan of how you are going to communicate and present you campaign idea.



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## Your Presentation

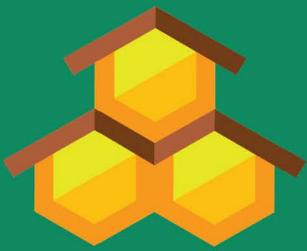
How will you present your campaign and your bee friendly environment? Consider the format such a video, power-points, demonstrations etc. Include creativity, communication style, and a range of technology to effectively demonstrate and communicate your campaign and prototype. Ensure that your presentation makes your campaign impressive and clearly understood.



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## Your Prototype

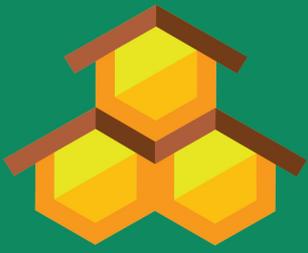
Create a prototype of your bee friendly environment. This needs to be a physical representation of a prototype such as a model. It can be on paper such as a landscape design or it can be a miniature version either physical or digital. It needs to convey the concept in a visual format.



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## TIMEFRAME

Create a time line that you plan to work towards in order to create your campaign and your bee friendly environment. Take into consideration the competition deadlines.

## TEAM COLLABORATION AND EXPECTATIONS

As a team it is important you set expectations of one another and the group as a whole  
How will you manage the workloads to ensure everyone is contributing, has everyone got a job or role to play?



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## Appendix 2: Team Reflection Template

Each team is required to submit a team reflection that responds to the following points. No more than 500 words per reflection point; or 2 x single sided A4 print is needed for this component of the submission.

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

### TEAM ROLES AND DYNAMICS

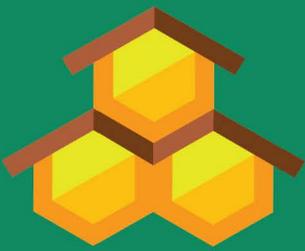
Interview team members to establish how they saw their role during the project. Summarize these responses to create a whole Team Reflection response.




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## SKILLS DEVELOPED, REFINED & LEARNED

Team members should list and describe what skills they have learnt or developed throughout the course of the Design Challenge.

These may include:

- technical skills,
- critical & creative thinking skills,
- teamwork and communication or new knowledge.

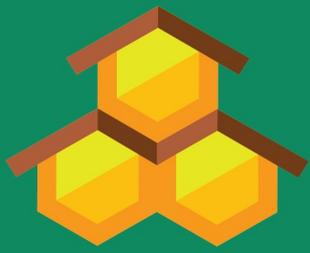
Again, include these responses and summarize how they all worked together to form the great team work your team developed.



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## Interview questions for your team:

- + What worked well?
- + What didn't work?
  - + How did you respond or overcome them?
- + 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 work 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 your aims change over the course of the project?
  - + If so, how did you adapt individually?
  - + If so, how did you adapt as a team?

## Optional inclusions of evidence

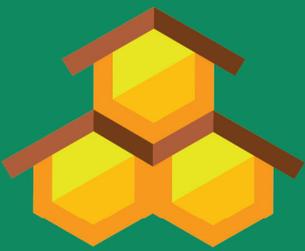
When forming your reflections ensure consider capturing examples of your work. These may be photos, videos, printed or digital copies of works and/or successive versions of prototypes of your concept. You may consider other items which support and inform your reflections.

## Tips for providing feedback

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



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## Design Challenge Terms and Conditions

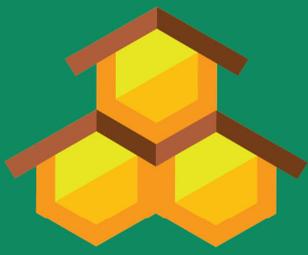
1. By entering the CSIRO + Tech Schools Design Challenge you agree to abide by these Terms and Conditions. If you fail to abide by any of the rules, you and your team may be disqualified from the challenge at the sole discretion of host Tech School.
2. You will enter the CSIRO + TECH SCHOOLS Design Challenge as a team of between 3 and 5 students.  
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.
3. Teams must have submitted a Team Registration by the required date to be eligible to submit any entry. Teams are required to nominate a teacher from their school as coordinator and point of contact.  
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.
4. CSIRO + TECH SCHOOLS Design Challenge entries must be submitted by email along with all required links or files. Entries must be received by your local Tech School prior or on, the closing date.
5. CSIRO + TECH SCHOOLS Design Challenge entries will be retained by local Tech Schools for exhibition and display purposes.
6. CSIRO + TECH SCHOOLS Design Challenge entries will be judged using the Challenge Judging Criteria (Appendix 3). The overall winning school from each Tech School region will be nominated for the Pitch Final.
7. Team in years 7-10 and VCAL are evaluated in accordance with their respective curriculum age and stage, hence students in these year levels compete on an equal footing.
8. CSIRO + TECH SCHOOLS Design Challenge Regional Finalist teams must attend the Pitch Final. Regional Pitch Final entrants will be judged using the Pitch Final Challenge Evaluation Criteria (Appendix 4)
9. CSIRO + TECH SCHOOLS Design Challenge Regional Finalist teams representing each school will be provided with an In Person/Online Pitch Workshop with an industry mentor where they will develop their presentation in preparation for the Pitch Final.
10. Dates for the In Person/Online Pitch Workshop will be arranged by local Tech Schools for regional areas in consultation with shortlisted teams.



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11. Prizes for State Pitch Finalists will be determined by Tech School representatives.
12. The overall CSIRO + TECH SCHOOLS Design Challenge winner will be determined at the In Person/Online Pitch Final as judged by a panel representing the CSIRO, Tech School Directors and other industry partners.
13. The decision of our judges is final and conclusive in all circumstances and no correspondence will be entered into.
14. No part of a prize is exchangeable for cash or any other prize.
15. Local and host Tech Schools reserve the right to amend these rules at any time.

## APPENDICES

- Appendix 1 - Design Challenge Planning Document
- Appendix 2 - Team Reflection Template
- Appendix 3 - Challenge Judging Criteria
- Appendix 4 - Pitch Final judging Criteria

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

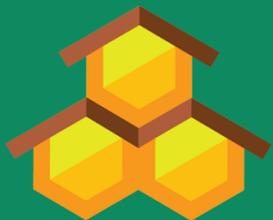
*Contact your local Tech School for information regarding the Bees with Backpacks Design Challenge or contact the host Tech School - Geelong Tech School for more information ph (03) 5225 0511 or email Elly Broadbent at [ebroadbent@gordontafe.edu.au](mailto:ebroadbent@gordontafe.edu.au)*



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**Appendix 3: Design Challenge Judging Criteria**

Team Name: \_\_\_\_\_ School: \_\_\_\_\_

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

Competition Criteria	Evaluation of Performance & Understanding									Comments (based on evidence shown)	
	Not Shown	Low			Medium			High			
<b>Campaign idea</b> Develop a campaign idea to promote a bee friendly environment	Campaign not defined	Simple idea described to promote a bee friendly environment.			Creative idea has been developed to promote a bee friendly environment.			Complex and Innovative idea has been developed in detail to promote the importance of a bee friendly environment.			
		A campaign has been developed with some basic elements to engage public awareness of the bee friendly environment.			A campaign has been developed with creative elements and use of technologies to engage public interest and care in the bee friendly environment.			An integrated campaign has been designed and advanced using innovative technologies to engage public support for the bee friendly environment.			
	N	1	2	3	4	5	6	7	8	9	



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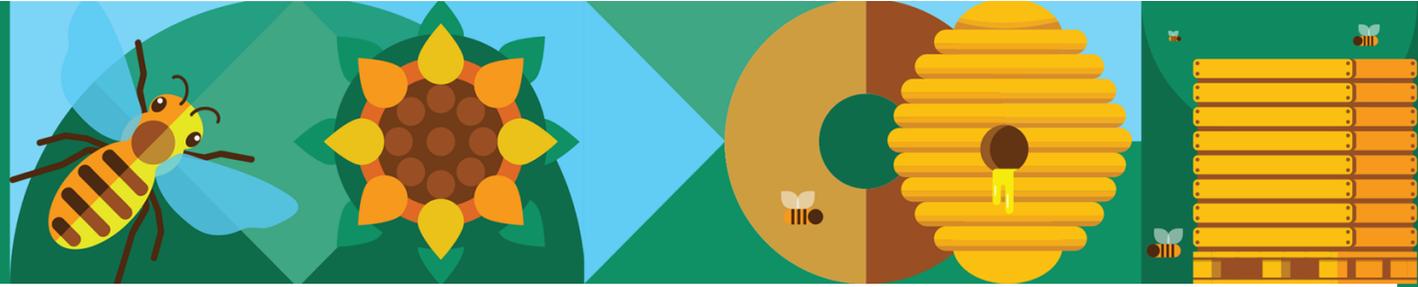


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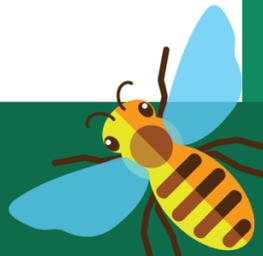
Competition Criteria	Evaluation of Performance & Understanding									Panel Comments (based on evidence shown)	
	Not Shown	Low			Medium			High			
<b>Prototype</b> Create a prototype of a bee friendly environment	Prototype not shown	A simple prototype has been created.  The design of the prototype has been described.			A creative prototype has been developed.  An explanation of design concept and reasoning for the prototype has been outlined.			A complex and transformative prototype has been designed and created.  A comprehensive explanation of the conceptual ideas behind the design and creation of the prototype has been provided.			
		N	1	2	3	4	5	6	7	8	
<b>Presentation</b> Produce a presentation to promote the bee friendly environment campaign and prototype.	Presentation not submitted	Presented the campaign and simply communicated how the prototype could promote a bee friendly environment.  Eye contact was limited, unclear speech  Showed some understanding of the information about bees			Presented campaign idea and clearly communicated how the prototype connects and promotes a bee friendly environment.  Presentation was clear and made eye contact, added some expression.  Demonstrated good knowledge of bees and bee environments			High level communication, confidently and clearly outlined how the prototype enhanced their bee friendly environment.  Excellent articulation, expression and eye contact  Excellent use of resources and display material to demonstrate and convey ideas. Demonstrated an excellent level of knowledge and understanding of bees			
		N	1	2	3	4	5	6	7	8	

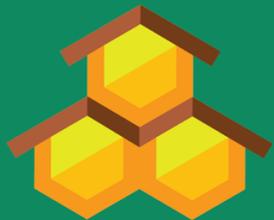


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Competition Criteria	Evaluation of Performance & Understanding									Comments (based on evidence shown)	
	Not Shown	Low			Medium			High			
<b>Reflection</b> Evaluate the effectiveness of teamwork and project management	Reflection not included	A simple overall team reflection included.			Demonstrated a good understanding of teamwork to successfully produce a campaign idea, prototype and presentation.			Demonstrated an excellent understanding of teamwork to successfully produce all the elements of the project: campaign idea, prototype construction and effective presentation.			
		Surface evaluation of process undertaken related to teamwork and project management			Good evaluation of abilities to collaborate problem solve and project manage.			Thorough evaluation the abilities to collaborate, problem solve, and project manage as a team.			
	N	1	2	3	4	5	6	7	8	9	

**Total Score:** \_\_\_\_\_ /36

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

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

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



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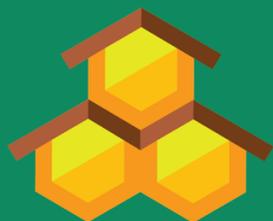
**Appendix 4: Pitch Final Judging Criteria**

Team Name: \_\_\_\_\_ School: \_\_\_\_\_

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

Competition Criteria	Evaluation of Performance & Understanding									Panel Comments (based on evidence shown)	
	Not Shown	Low			Medium			High			
<b>Campaign idea</b>	No campaign included	Concept shows little or no understanding of food security.			Concept shows a solid understanding of food security issues			Concept shows excellent understanding of how food security issues can affect the economy and biosecurity.			
		Pitch provides weak or no support for the claims made in the campaign			Pitch provides consistent facts and examples to support the campaign subject			Pitch provides clear purpose and subject; relevant examples, facts and/or statistics			
		Pitch does not have a clearly defined purpose			Pitch has a somewhat clear purpose and subject			Pitch has clear and concise purpose supported with evidence			
	N	1	2	3	4	5	6	7	8	9	





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Competition Criteria	Evaluation of Performance & Understanding									Panel Comments (based on evidence shown)	
	Not Shown	Novice			Intermediate			Expert			
<b>Presentation of prototype</b>	No prototype was presented	Limited technology is used ineffectively to perform the task.  A limited understanding of purpose and results is demonstrated  Minimal attempt was made to make drawings or prototypes to scale with little explanation.			Application of selected technology is used with some efficiency to perform the task.  Solid understanding of purpose and results is demonstrated  Drawings or prototypes were mostly to scale with fair explanation and description of most parts			Clearly identifies and applies a range of technologies to efficiently create an understanding of the task  In-depth understanding of purpose, application and results is articulated with attention to detail  Drawings or prototypes are to scale and detailed with well-planned explanation and description of all the parts			
		N	1	2	3	4	5	6	7	8	
<b>Presentation skills</b>	No live presentation	Limited eye-contact with the audience and full report is read from notes.  Presentation is delivered in low and/or monotone format causing audience to disengage  Developing presentation skills were demonstrated.			Some eye-contact with the audience and while mostly reading from notes  Presentation is delivered in satisfactory variation of volume and inflection, with some enthusiastic feeling for the topic displayed.  Competent presentation skills were demonstrated raising audience understanding of some points			Eye-contact held audience attention for entire presentation with seldom reference to notes.  Presentation is delivered with fluctuation in volume and inflection to maintain audience attention, with strong enthusiasm about topic consistently displayed.  Highly effective presentation skills were demonstrated significantly raising the audiences understanding			
		N	1	2	3	4	5	6	7	8	
										<b>Total Score:</b> /27	

**Summary Comments:**

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

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

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



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