Ambarvale High School
STEM (Science, Technology, Engineering and Mathematics)
Stage 4 Program

YEAR 8 – Improving our School (IoS.1)

Unit Length: One Semester (30 periods each 60 minutes, delivered across 10 sessions)

Unit Description: The STEM project will utilise an interdisciplinary model and design thinking pedagogy. Through this project all Year 8 students engage in an evaluation of an aspect of the physical or learning environment at Ambarvale HS, providing a real world connection. The aim will be improvement of one or more aspects of the learning, physical or social environment of the school. In the second semester we replicate the model in a different setting with an external client, Rosemeadow PS, where students meet with stakeholders in that community to identify another need for their STEM project. Students will focus on developing their critical and creative thinking, as well as problem solving in line with 21st century thinking. The project team will create resources to deliver specific skills and content to enable students to define, develop, assess and evaluate their project. Students will help devise the marking criteria for various stages of the design process and will participate in peer marking. Each delivering teacher and faculty will have a physical set of resources and a digital store of resources.

Vocabulary List				
Science	Learning	Environment	Data	Evidence
Technology	Survey	Communication	Presentation	Analysis
Mathematics	Evaluation	Pitch	Team	Reflection
Engineering	Product	Investigation	Research	Graph
Prototype	Design	Questions	Solutions	Tool

Intellectual Quality		Quality Learning Environment		Significance	
IQ1 Deep Knowledge	IQ4 Higher-Order Thinking	QLE1 Explicit quality criteria	QLE4 Social Support	S1 Background Knowledge	S4 Significance
IQ2 Deep Understanding	IQ5 Metalanguage	QLE2 Engagement	QLE5 Student self-regulation	S2 Cultural Knowledge	S5 Connectedness
IQ3 Problematic Knowledge	IQ6 Substantive Communication	QLE3 High Expectations	QLE6 Student direction	S3 Knowledge Integration	S6 Narrative

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Syllabus Outcomes

The outcomes used in this document are from the Board of Studies Teaching and Educational Standards (BOSTES) NSW.
http://www.boardofstudies.nsw.edu.au/syllabus_sc/

TAS	Mathematics	Science
A student: **4.1.1** applies design processes that respond to needs and opportunities in each design project **4.2.1** generates and communicates creative design ideas and solutions **4.2.2** selects, analyses, presents and applies research and experimentation from a variety of sources **4.3.2** demonstrates responsible and safe use of a range of tools, materials and techniques in each design project **4.5.1** applies management processes to successfully complete design projects **4.5.2** produces quality solutions that respond to identified needs and opportunities in each design project **4.6.1** applies appropriate evaluation techniques throughout each design Project	A student: **MA4-1WM** communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols-communicating **MA4-2WM** applies appropriate mathematical techniques to solve problems – problem solving **MA4-3WM** recognises and explains mathematical relationships using reasoning – reasoning **MA4-6NA** solves financial problems involving purchasing goods **MA4-19SP** collects, represents and interprets single sets of data, using appropriate statistical displays	A student: **SC4-4WS** identifies questions and problems that can be tested or researched and makes predictions based on scientific knowledge **SC4-5WS** collaboratively and individually produces a plan to investigate questions and problems **SC4-6WS** follows a sequence of instructions to safely undertake a range of investigation types, collaboratively and individually **SC4-7WS** processes and analyses data from a first-hand investigation and secondary sources to identify trends, patterns and relationships, and draw conclusions **SC4-8WS** selects and uses appropriate strategies, understanding and skills to produce creative and plausible solutions to identified problems **SC4-9WS** presents science ideas, findings and information to a given audience using appropriate scientific language, text types and representations.

Intellectual Quality		Quality Learning Environment		Significance	
IQ1 Deep Knowledge	IQ4 Higher-Order Thinking	QLE1 Explicit quality criteria	QLE4 Social Support	S1 Background Knowledge	S4 Significance
IQ2 Deep Understanding	IQ5 Metalanguage	QLE2 Engagement	QLE5 Student self-regulation	S2 Cultural Knowledge	S5 Connectedness
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Structure: The STEM project will utilise an interdisciplinary model across the Key Learning Areas; Science, Mathematics and TAS. Approximately 120 students will be divided into 8 small groups, which will be referred to as companies. Each company will comprise of up to 5 design teams (maximum of 4 students per team). The program will be delivered in a number of formats. These include; plenary sessions delivered to the entire cohort, training workshops delivered to smaller groups in a variety of configurations pending need and regular company meetings with the company director (teacher supervising each company and overseeing their group of students). Pending student choice of projects, external specialists and experts may be utilised to deliver teaching and learning. A variety of learning spaces will be utilised across the project. The STEM project Team (Board of Directors) will work together to ensure equitable use of each space.

Board of Directors

Company 1	Company 2	Company 3	Company 4	Company 5	Company 6	Company 7	Company 8
4-5 Design Teams	4-5 Design Teams	4-5 Design Teams	4-5 Design Teams	4-5 Design Teams	4-5 Design Teams	4-5 Design Teams	4-5 Design Teams

Background/Prior Knowledge: During 2015 (while in Year 7) all students in this year group engaged in a Project Based Learning Day once per timetable (called "Millennium Madness"). As such, all students have an in depth knowledge of Project Based Learning and have developed strong collaborative and group work skills. Students in Year 7 have also engaged in Agriculture Studies and a variety of TAS subjects. As such, students have also gained thorough knowledge of the school's build environment and infrastructure. Students have engaged in a variety of 21st Century Thinking Pedagogies and are well-placed to utilise a "Design Thinking" Focus as part of the STEM project. Our school has fostered a culture of creating critical thinkers and cross-curricula projects. There is a commitment from each of the 3 faculties involved for STEM to be a strong teaching and learning focus in 2016.

Intellectual Quality		**Quality Learning Environment**		**Significance**	
IQ1 Deep Knowledge	IQ4 Higher-Order Thinking	QLE1 Explicit quality criteria	QLE4 Social Support	S1 Background Knowledge	S4 Significance
IQ2 Deep Understanding	IQ5 Metalanguage	QLE2 Engagement	QLE5 Student self-regulation	S2 Cultural Knowledge	S5 Connectedness
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General Capabilities: *(See Teaching and Learning Program to identify links to General Capabilities)*

Learning Across the curriculum used in this document are from the Board of Studies Teaching and Educational Standards (BOSTES) NSW
http://syllabus.bostes.nsw.edu.au/mathematics/mathematics-k10/learning-across-the-curriculum/

The cross-curriculum priorities:

- *Aboriginal and Torres Strait Islander histories and cultures*
- *Asia and Australia's engagement with Asia*
- *Sustainability*

The general capabilities:

- *Critical and creative thinking*
- *Ethical understanding*
- *Information and communication technology capability*
- *Intercultural understanding*
- *Literacy*
- *Numeracy*
- *Personal and social capability*

Other learning across the curriculum areas:

- *Work and enterprise*

Intellectual Quality		Quality Learning Environment		Significance	
IQ1 Deep Knowledge	IQ4 Higher-Order Thinking	QLE1 Explicit quality criteria	QLE4 Social Support	S1 Background Knowledge	S4 Significance
IQ2 Deep Understanding	IQ5 Metalanguage	QLE2 Engagement	QLE5 Student self-regulation	S2 Cultural Knowledge	S5 Connectedness
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Outcomes Specific section of the syllabus reflecting the topic	Register *Sign, date*	Indicators	Suggested Teaching and Learning Activities Activities which you have chosen to deliver the concepts you want to get across to students	Suggested Resources
Session 1, A student: **4.1.1** applies design processes that respond to needs and opportunities in each design project **4.2.1** generates and communicates creative design ideas and solutions **4.5.1** applies management processes to successfully complete design projects **4.5.2** produces quality solutions that respond to identified needs and opportunities in each design project		Students have an understanding of what STEM is and the purpose of this curriculum model. Students can state what STEM means and they can name at least 3 steps involved in a STEM activity.	**Plenary** – whole year group (hall) – presentation regarding definition of STEM, structure of program, introduction of staff/companies. **Mini STEM challenge** - Break into 7 groups. Communication Games -"You can do what?" See teacher resource folder for instructions. Students to make an object from material provided using creativity. They then need to work with a partner to explain and give instructions so that the partner can create an identical object (without seeing the original object). Students then compare the 2 objects and engage in a discussion around the importance of effective communication and co-operation to complete tasks. Teacher to link to management processes. *Critical and creative thinking* ✿ **Design Thinking** around issues of school improvement related to the Built Environment. (Steps 1-3: Identify issues around the school's built environment, Focus on an exploratory Question, Develop success criteria). **Exit Slip** - Students to use Google form to identify areas of built environment that they would like to focus on.	Presentation – including photos of built environment ***You can do what?*** *STEM Middle School Students by Illinois Valley Community College. Pg10-14* Per group – 1 paper bag that contains; pipe cleaners, coloured paddle pop sticks, string, straws, small amount of blue tac. Teacher – stop watch
Board Meeting, project reflection and planning meeting for staff			Teacher reflections from Session 1. Use of Google form to group students and identify members each company. Preparation of personalised invitations to join it. Discussion around Session 2.	Invitations for students

Intellectual Quality		**Quality Learning Environment**		**Significance**	
IQ1 Deep Knowledge	IQ4 Higher-Order Thinking	QLE1 Explicit quality criteria	QLE4 Social Support	S1 Background Knowledge	S4 Significance
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Outcomes Specific section of the syllabus reflecting the topic	Register *Sign, date*	Indicators	Suggested Teaching and Learning Activities Activities which you have chosen to deliver the concepts you want to get across to students	Suggested Resources
Session 2, A student: **SC4-4WS** identifies questions and problems that can be tested or researched and makes predictions based on scientific knowledge **4.1.1** applies design processes that respond to needs and opportunities in each design project **4.2.1** generates and communicates creative design ideas and solutions **4.5.1** applies management processes to successfully complete design projects **4.5.2** produces quality solutions that respond to identified needs and opportunities in each design project		Students have identified an area of school improvement re: built environment. Students have identified a number of root causes of the problem in their identified area. Students have recorded an entry in their learning log.	**Team Meeting -** students report to team meeting (based on invitation). Discussions around company expectations, including; the way we communicate in a meeting, the way work is documented, how conflict is resolved. Watch Creative Thinking Skills Video on Resource USB. **Mini STEM challenge** – Marble Run (see teacher resource folder for instructions). Students work in groups with provided equipment to make a marble run – a way of moving a marble from one point to the other, passing through a series of obstacles. Students engage in discussion around solving problems and refine ideas from feedback. Students to determine best solutions to identified problems. *Critical and creative thinking* ⚙ **Learning Log –** Quiet personal reflection to demonstrate an understanding of design ideas and solutions to marble run problem, including how group managed process. *Literacy* ✎ **Design Thinking** – Link to previous activity in Session 1 - Determine consequences and root causes of identified issues around Built Environment. Students choose one root cause to work on and develop (this is the identified problem to be tested and researched). **Exit Slip -** Students develop a statement on one post-it note that identified the problem they are working.	VEA – Creative Thinking Skills Video Small notepads to use as learning logs. Box to store students learning log and notes. Post-it Notes ***Marble Run*** *James Dyson Foundation STEM challenges* Per group – cardboard box (A4 photocopy box with lid), sticky tape, 1 marble, scissors
Board Meeting, project reflection and planning meeting for staff.			Teacher reflections from Session 2. Discussion around Session 3.	

Intellectual Quality		**Quality Learning Environment**		**Significance**	
IQ1 Deep Knowledge	IQ4 Higher-Order Thinking	QLE1 Explicit quality criteria	QLE4 Social Support	S1 Background Knowledge	S4 Significance
IQ2 Deep Understanding	IQ5 Metalanguage	QLE2 Engagement	QLE5 Student self-regulation	S2 Cultural Knowledge	S5 Connectedness
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Outcomes Specific section of the syllabus reflecting the topic	Register *Sign, date*	Indicators	Suggested Teaching and Learning Activities Activities which you have chosen to deliver the concepts you want to get across to students	Suggested Resources
Session 3, A student: **4.1.1** applies design processes that respond to needs and opportunities in each design project **4.2.1** generates and communicates creative design ideas and solutions **4.5.1** applies management processes to successfully complete design projects **4.5.2** produces quality solutions that respond to identified needs and opportunities in each design project **4.6.1** applies appropriate evaluation techniques throughout each design Project		Students have determined a number of possible solutions to their identified problem. Students have identified 3 solutions that are worth prototyping in session 4.	**Team Meeting -** students report to team meeting. Review of last meeting and discuss any changes to be made. Watch Todd Sampson, "Redesign my Brain" video on USB. **Mini STEM challenge** – Catapults. Students to watch video regarding developing a catapult. They need to design and make a catapult from materials provided. The projectile will be a marshmallow and students will need to measure distance projected and put results in a group table. *Critical and creative thinking* ✵ **Learning Log –** Quiet personal reflection to demonstrate an understanding of design ideas and solutions to Catapult problem, including how group managed process. *Literacy* ✑ **Design Thinking** –Link to previous activity in Session 2 - Ideate phase – brainstorm ideas (examples: 100 uses of a plastic bag, how do we get teacher X on Ellen). Brainstorm ideas in groups to address root cause problem as identified in session 2 (no idea is off the table/no limits). Evaluate and classify ideas according to similarities; "Could be tricky", "quick fix", "not going to happen". Under each heading move notes into similar grouping. **Exit Slip -** Students determine which 3 solutions they want to prototype in next lesson.	Video on USB – "Todd Sampson – redesign my brain "creative thinking" ***Catapults*** *Video on USB – STEM Catapult Challenge* Per group – wire coat hanger, plastic spoon, rubber bands, small marshmallows, measuring tape Card for students to record 3 solutions
Board Meeting, project reflection and planning meeting for staff.			Teacher reflections from Session 3. Discussion around Session 4.	

Intellectual Quality		**Quality Learning Environment**		**Significance**	
IQ1 Deep Knowledge	IQ4 Higher-Order Thinking	QLE1 Explicit quality criteria	QLE4 Social Support	S1 Background Knowledge	S4 Significance
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Outcomes Specific section of the syllabus reflecting the topic	Register *Sign, date*	Indicators	Suggested Teaching and Learning Activities Activities which you have chosen to deliver the concepts you want to get across to students	Suggested Resources
Session 4, A student: **4.1.1** applies design processes that respond to needs and opportunities in each design project **4.2.1** generates and communicates creative design ideas and solutions **4.2.2** selects, analyses, presents and applies research and experimentation from a variety of sources **4.5.1** applies management processes to successfully complete design projects **4.5.2** produces quality solutions that respond to identified needs and opportunities in each design project **4.6.1** applies appropriate evaluation techniques throughout each design Project		Students have developed each identified prototype in some detail. Students have articulated each prototype to their company/class. Students have given and received feedback around prototype. Students have selected which prototype they will develop further.	**Team Meeting -** students report to team meeting. Review of last meeting and discuss any changes to be made. Watch video "Creative thinking – How to get out of the box and generate ideas" video on USB. **Fish Bowl (joint companies)** – Teachers to role model prototype design process – showing students how to engage in a collaborative discussion. Teachers to demonstrate how to prototype using storyboards, playdough or narratives to present ideas to solutions. **Design Thinking** – Design Teams to prototype 2 of their best 3 options from previous session (Session 3), using 2 pieces of A3 paper to storyboard, playdough, Lego or narrative. **Fish Bowl** – Teachers to role model pitch process. Design Teams to formulate pitch and pitch to each prototype to company group. Pitch to not exceed 1 minute. Group can respond for 2 minutes and then vote taken. Design Teams get 2 minutes to decide which prototype they want to develop further. *Critical and creative thinking* ✿ **Learning Log -** Quiet personal reflection to demonstrate an understanding of design ideas and solutions regarding prototype, including how group managed process. *Literacy* 📑 **Exit Slip** – Design Teams submit their selected prototype with feedback and modifications.	Video TEDX – "Creative thinking – How to get out of the box and generate ideas" A3 Paper Lego Playdough
Board Meeting, project reflection and planning meeting for staff.			Teacher reflections from Session 4. Discussion around Session 5 – use of surveys.	

Intellectual Quality		**Quality Learning Environment**		**Significance**	
IQ1 Deep Knowledge	IQ4 Higher-Order Thinking	QLE1 Explicit quality criteria	QLE4 Social Support	S1 Background Knowledge	S4 Significance
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Session 5, A student: **SC4-5WS** collaboratively and individually produces a plan to investigate questions and problems **SC4-6WS** follows a sequence of instructions to safely undertake a range of investigation types, collaboratively and individually **MA4-19SP** collects, represents and interprets single sets of data, using appropriate statistical displays **4.1.1** applies design processes that respond to needs and opportunities in each design project **4.2.2** selects, analyses, presents and applies research and experimentation from a variety of sources **4.5.1** applies management processes to successfully complete design projects		Students have developed and used a survey/data collection tool to assess feasibility of their prototype and product. Students have identified what data looks like and how can it be used. Students have developed a survey around their chosen prototype and have collected some raw data to use in the next session.	**Team Meeting -** students report to team meeting. Review of last meeting and discuss any changes to be made. **Training –** Use and design of authentic surveys. Teacher Resource in folder and USB. Discussion around types of data that can be collected, question types and structure and how to design a survey. Data sets shown to students and discussion around their meaning and interpretation. *Numeracy* 🖩 *Information and communication technology capability* 💻 **Group Activity –** Develop survey tool and distribute to students/staff. Encourage use of technology. **Learning Log -** Quiet personal reflection to demonstrate an understanding of survey design, including how group managed process. *Literacy* 👆 **Exit Slip –** Students to add post-it note responses to a question posted on butcher paper "What does data look like and how can it be used?"	Support from TSO Butcher's paper post-it notes Post-it Notes
Board Meeting, project reflection and planning meeting for staff.			Teacher reflections from Session 5. Discussion around Session 6.	

Intellectual Quality		**Quality Learning Environment**		**Significance**	
IQ1 Deep Knowledge	IQ4 Higher-Order Thinking	QLE1 Explicit quality criteria	QLE4 Social Support	S1 Background Knowledge	S4 Significance
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Session 6, A student: **SC4-6WS** follows a sequence of instructions to safely undertake a range of investigation types, collaboratively and individually **SC4-7WS** processes and analyses data from a first-hand investigation and secondary sources to identify trends, patterns and relationships, and draw conclusions **MA4-1WM** communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols **MA4-2WM** applies appropriate mathematical techniques to solve problems **MA4-3WM** recognises and explains mathematical relationships using reasoning **MA4-6NA** solves financial problems involving purchasing goods **MA4-19SP** collects, represents and interprets single sets of data, using appropriate statistical displays		Students have critically reflected on their collected data to inform decision making. Students have actively provided feedback to each other.	**Team Meeting -** students report to team meeting. Review of last meeting and discuss any changes to be made. **Training –** Review what is data and how can it be used. Use Exit Slip information from previous session to start discussion. Different tables and graphs shown and discussion around why, how and when each it used. Mathematical terminology is a focus. This may be delivered as a whole year group plenary session depending on need. *Numeracy* 🖩 **Group Activity –** Students to think critically about data from their own survey in terms of presentation of data and how it will inform and shape their prototype design. Students to choose a mathematical technique to display data. They also need to explain their findings using mathematical reasoning. *Critical and creative thinking* ⚙ *Information and communication technology capability* 💻 **Small Group Activity** – 2 Design Teams to work together and share their findings re: data from survey and feedback from team and justify changes to design. **Exit Slip –** Design Team A to report on Design Team B's prototype using 2 stars and a wish protocol.	Scaffold around 2 stars and a wish feedback strategy Card for 2 stars and a wish
Board Meeting, project reflection and planning meeting for staff.			Teacher reflections from Session 6. Discussion around Session 7.	

Intellectual Quality		**Quality Learning Environment**		**Significance**	
IQ1 Deep Knowledge	IQ4 Higher-Order Thinking	QLE1 Explicit quality criteria	QLE4 Social Support	S1 Background Knowledge	S4 Significance
IQ2 Deep Understanding	IQ5 Metalanguage	QLE2 Engagement	QLE5 Student self-regulation	S2 Cultural Knowledge	S5 Connectedness
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Outcomes Specific section of the syllabus reflecting the topic	Register *Sign, date*	Indicators	Suggested Teaching and Learning Activities Activities which you have chosen to deliver the concepts you want to get across to students	Suggested Resources
Session 7, A student: **SC4-5WS** collaboratively and individually produces a plan to investigate questions and problems **4.1.1** applies design processes that respond to needs and opportunities in each design project **4.2.2** selects, analyses, presents and applies research and experimentation from a variety of sources **4.3.2** demonstrates responsible and safe use of a range of tools, materials and techniques in each design project **4.5.1** applies management processes to successfully complete design projects **4.5.2** produces quality solutions that respond to identified needs and opportunities in each design project **4.6.1** applies appropriate evaluation techniques throughout each design Project		Students have been exposed to a variety of methods of presenting design ideas. Students collaborate and decide upon best design tool for their prototype/product.	**Team Meeting -** students report to team meeting. Review of last meeting and discuss any changes to be made. **Training –** one person per design team to attend a training session around Google sketch-up, model-making, perspective drawing or spreadsheets. Students to record notes/thoughts in learning log. *Information and communication technology capability* 💻 **Group Activity -** The design teams to regroup and share their learning around each tool. Each session will provide an easy to use guide for groups. Groups will make a decision around the tools that they will use to build/develop and present their final prototype/product. **Exit Slip –** Design Teams have agreed tool/s and justification. *If an opportunity arises for an external expert to join in this session to provide further feedback it will be incorporated into program. Example: University experts to co-deliver activities.*	Eckersley's rep to support equipment Summary sheets for each session
Board Meeting, project reflection and planning meeting for staff.			Teacher Reflections from Session 7. Discussion around Session 8.	

Intellectual Quality		**Quality Learning Environment**		**Significance**	
IQ1 Deep Knowledge	IQ4 Higher-Order Thinking	QLE1 Explicit quality criteria	QLE4 Social Support	S1 Background Knowledge	S4 Significance
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Outcomes Specific section of the syllabus reflecting the topic	Register *Sign, date*	Indicators	Suggested Teaching and Learning Activities Activities which you have chosen to deliver the concepts you want to get across to students	Suggested Resources
Session 8 **SC4-8WS** selects and uses appropriate strategies, understanding and skills to produce creative and plausible solutions to identified problems **4.1.1** applies design processes that respond to needs and opportunities in each design project **4.2.1** generates and communicates creative design ideas and solutions **4.2.2** selects, analyses, presents and applies research and experimentation from a variety of sources **4.3.2** demonstrates responsible and safe use of a range of tools, materials and techniques in each design project **4.5.1** applies management processes to successfully complete design projects **4.5.2** produces quality solutions that respond to identified needs and opportunities in each design project		Students co-create teaching and learning goals. Students are engaged in the design process to create their prototype/product.	**Team Meeting -** students report to team meeting. Review of last meeting and discuss any changes to be made. Co-created goals set for end of session regarding status of product. **Group Activity -** The design teams to work on projects. This includes creation of a spreadsheet to identify costings, displaying data from surveys and creating a folio to demonstrate work. Depending on individual projects this may also include using google Sketch-up to create floor plans and lay outs of classrooms or outdoor spaces. Students may also make physical models if needed. Teachers to use prompts and feedback strategies to motivate students. *Information and communication technology capability* 💻 *Numeracy* 🖩 **Exit Slip** – Tick a box against co-created list of goals for the session.	Resourcing may be specific to product design.
Board Meeting, project reflection and planning meeting for staff			Teacher Reflections from Session 8. Discussion around Session 9.	

Outcomes Specific section of the syllabus reflecting the topic	Register *Sign, date*	Indicators	Suggested Teaching and Learning Activities Activities which you have chosen to deliver the concepts you want to get across to students	Suggested Resources
Session 9, A student: **SC4-8WS** selects and uses appropriate strategies, understanding and skills to produce creative and plausible solutions to identified problems **4.1.1** applies design processes that respond to needs and opportunities in each design project **4.2.1** generates and communicates creative design ideas and solutions **4.2.2** selects, analyses, presents and applies research and experimentation from a variety of sources **4.3.2** demonstrates responsible and safe use of a range of tools, materials and techniques in each design project **4.5.1** applies management processes to successfully complete design projects **4.5.2** produces quality solutions that respond to identified needs and opportunities in each design project		Students co-create teaching and learning goals. Students are engaged in the design process to create their prototype/product.	**Team Meeting -** students report to team meeting. Review of last meeting and discuss any changes to be made. Co-created goals set for end of session regarding status of product. Focus here is on presentation of product. **Group Activity -** The design teams to finalise work on projects. This includes creation of a spreadsheet to identify costings, displaying data from surveys and creating a folio to demonstrate work. Depending on individual projects this may also include using google Sketch-up to create floor plans and lay outs of classrooms or outdoor spaces. Students may also make physical models if needed. Teachers to use prompts and feedback strategies to motivate students. *Numeracy* 🖩 *Information and communication technology capability* 💻 **Exit Slip** – Tick a box against co-created list of goals for the session.	
Board Meeting, staff project reflection, planning meeting			Teacher Reflections from Session 8. Discussion around Session 9.	

Intellectual Quality

IQ1 Deep Knowledge IQ4 Higher-Order Thinking
IQ2 Deep Understanding IQ5 Metalanguage
IQ3 Problematic Knowledge IQ6 Substantive Communication

Quality Learning Environment

QLE1 Explicit quality criteria QLE4 Social Support
QLE2 Engagement QLE5 Student self-regulation
QLE3 High Expectations QLE6 Student direction

Significance

S1 Background Knowledge S4 Significance
S2 Cultural Knowledge S5 Connectedness
S3 Knowledge Integration S6 Narrative

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Outcomes Specific section of the syllabus reflecting the topic	Register *Sign, date*	Indicators	Suggested Teaching and Learning Activities Activities which you have chosen to deliver the concepts you want to get across to students	Suggested Resources
Session 10, A student: **SC4-9WS** presents science ideas, findings and information to a given audience using appropriate scientific language, text types and representations. **MA4-3WM** a student recognises and explains mathematical relationships using reasoning – reasoning **MA4-19SP** collects, represents and interprets single sets of data, using appropriate statistical displays **4.2.1** generates and communicates creative design ideas and solutions **4.3.2** demonstrates responsible and safe use of a range of tools, materials and techniques in each design project **4.5.1** applies management processes to successfully complete design projects **4.6.1** applies appropriate evaluation techniques throughout each design Project		Students co-create success criteria for presentations/pitch. Students present pitch to class. Students are engaged in providing feedback for each other using the identified success criteria.	**Team Meeting -** students report to team meeting. Review of last meeting and discuss any changes to be made. Co-created assessment criteria. **Training –** public speaking/pitching with props and use of persuasive language for a particular audience. Show video from the Gruen Transfer and discuss elements of persuasive language. Group to develop marking criteria to assess everyone's pitch. *Literacy* 👋 **Group Activity –** developing a pitch to persuade company. Groups to develop a presentation to persuade the audience to invest in their prototype. **Group Activity –** delivery of pitch to company. **Exit Slip –** Use of co-created marking criteria to select most persuasive pitch. *Opportunity to further develop literacy skills in persuasive writing.*	Video – "The Gruen Transfer" selected videos from "The Pitch"
Board Meeting, project reflection and planning meeting for staff.			Teacher Reflections from Session 10.	

UNIT REGISTRATION and EVALUATION

Rate each question as Good/OK/Bad and provide feedback in the comments section

Registration/Evaluation Questions	☺ Good ☺ Ok ☹ Bad	Comment
1. Was the time allocated for the unit appropriate?		
2. Were the aims of the unit achievable?		
3. Do the unit outcomes adequately reflect the syllabus?		
4. Do the unit outcomes assist in determining whether students have met the objectives of the course?		
5. Does the unit cater for a variety of student needs, interests and abilities?		
6. Does the unit include a variety of teaching and learning activities?		
7. Does the unit adequately integrate QT/Literacy/Numeracy/ICT strategies?		
8. Are the resources for this unit adequate?		
9. Are the assessment tasks/procedures adequate for this unit?		
10. Do the assessment tasks/procedures assess a range of knowledge and skills?		
11. Did you enjoy teaching this unit?		
12. Did the students enjoy learning throughout this unit?		
13. Were there opportunities for student reflection in this unit?		

Teacher's Initials: _____   Head Teacher's Initials: _____

Stage 4 Integrated STEM Program, Ambarvale High School

Were there any variations to the outlined program? Give details and reasons.

_____

_____

_____

_____

Are there any changes you would like to make to the unit?

_____

_____

_____

_____

Date Commenced: _____   Date Completed: _____

Teacher's Signature: _____   Head Teacher's Signature: _____