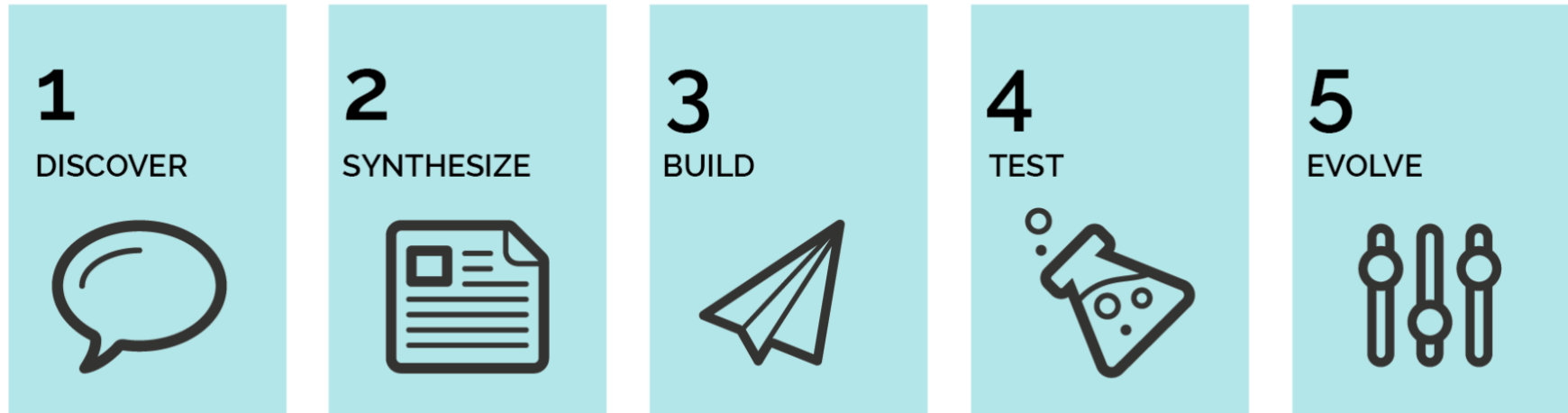
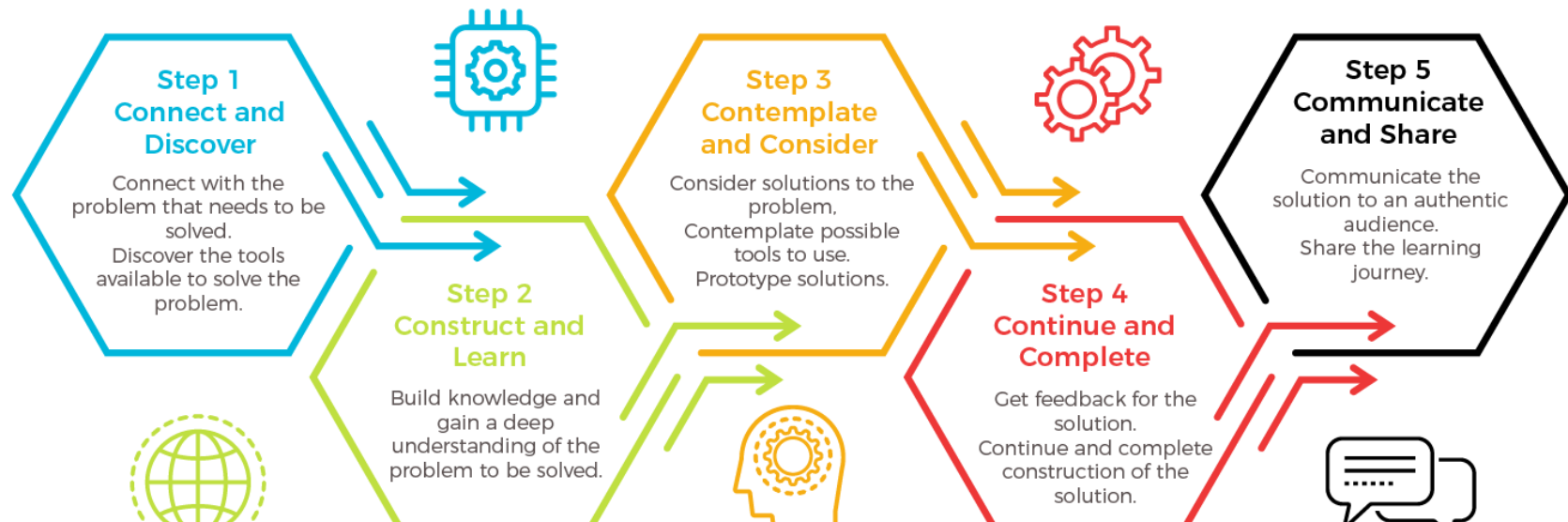
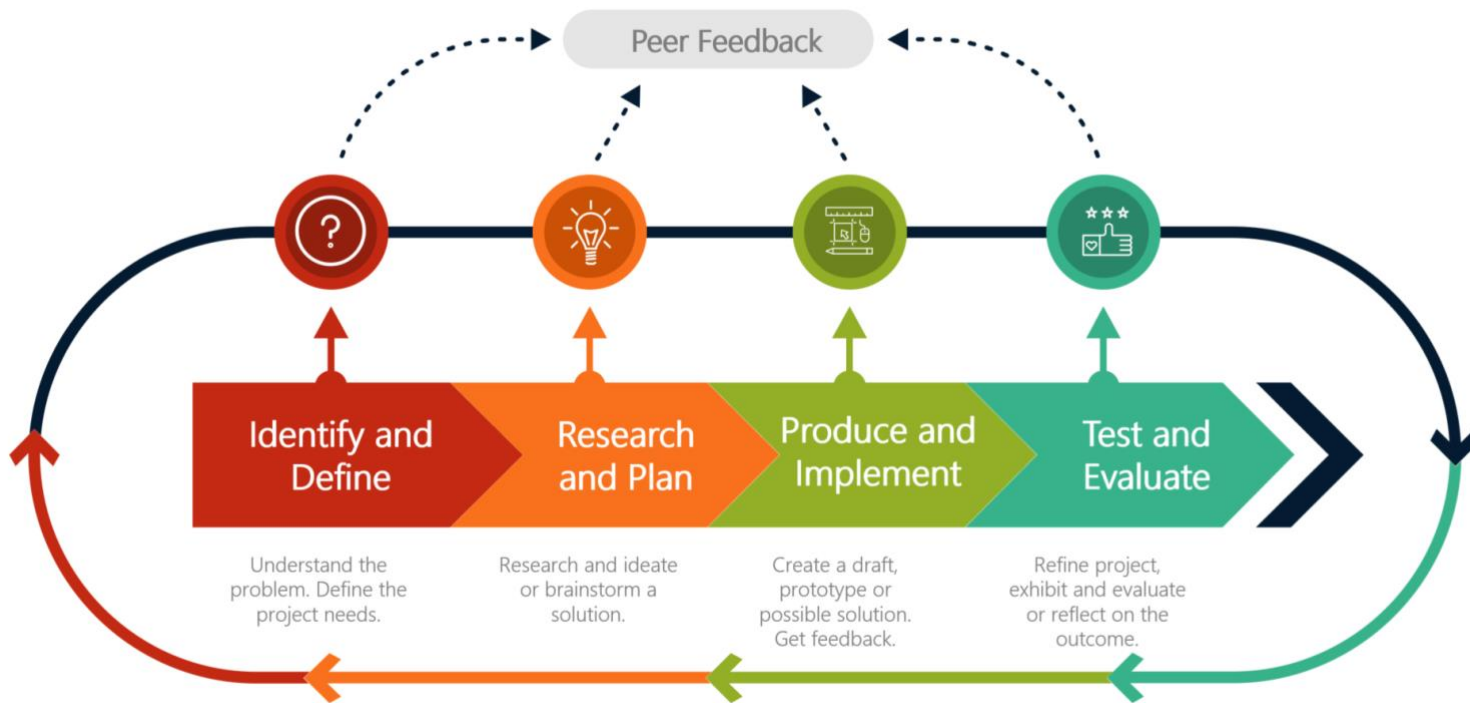


WESTERN SYDNEY AIRPORT MINECRAFT COMPETITION



STEM Solutions Pedagogy





CREATING LEARNING CHALLENGES – THE FLOW

DISCOVER

Play and discover what you can do with the software

Research possible learning challenges

Look into syllabus areas

Curate resources from existing supplied information from town planning documents

Gain understanding into competition requirements

SYNTHESIZE

Project formation

Project breakdown and refinement

Syllabus mapping against chosen problem

BUILD

Mini challenge completion or modification

Learning activity flow

Use template to create draft learning challenge

Build the draft flow of learning, testing as you go

TEST

Discuss your challenge with a peer or class

Gather evidence of the learning as you see it

Practice delivery of pitch

Consult with expert connections

Get feedback from teachers, students and community

EVOLVE

Make changes as suggested during test

Polish learning challenge in online space

Share with community

Review feedback online

RESEARCH

Place links and information you find during your research below

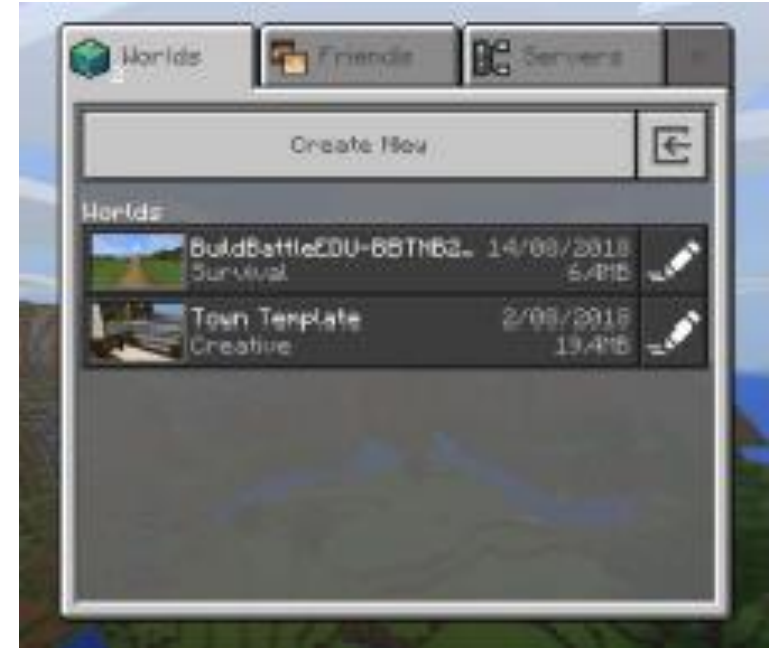
SUPPLIED RESOURCES

- Getting Access to NSW Education Minecraft Education Edition Licences - <https://education.nsw.gov.au/technology/guides-and-forms/technology-for-school-users/learning-and-collaboration-tools/minecraft-education-edition>
- For schools outside the public system <https://education.minecraft.net/get-started/download/>
- For iPad schools <https://education.minecraft.net/ipad/>
- CS MakeCode - <https://minecraft.makecode.com/courses/csintrou>
- Build Battle - <https://education.minecraft.net/lessons/build-battle-edu/>
- Code Builder Connection - <https://schoolsequella.det.nsw.edu.au/file/0942f3d7-e0a7-4b69-a7f3-aa622c7373f0/1/FutureTech.zip/FutureTech.html>
- Embedded Code Builder option <https://education.minecraft.net/blog/download-the-code-builder-update-to-learn-coding-in-minecraft/>
- Embedded Code Builder option <https://minecraftereducation.zendesk.com/hc/en-us/articles/360001429323-Code-Builder-in-Minecraft-Education-Edition-version-1-7-1->

Minecraft Support

1. **Accessing Minecraft** - Minecraft Education Edition is a licence based application. The NSW Department of Education has purchased licences for staff and students to use. In order to access these licences, access the Minecraft Education Edition NSW DoE Website and follow instructions. You should do this well before you need students to access the platform.

2. **Installing Minecraft** – Follow the instructions on the DoE website to find out how to install Minecraft on school computers. On BYOD teacher or student laptops, students should access and download the free software from this link.
3. **Accessing Code Connection** –
 - a. In this learning challenge students will use a plugin to Minecraft. This will help them to 'code' in Minecraft. Again, the DoE website has instructions for installing on school computers, and BYOD teacher and student devices can download and install via this link. (see Code Connection button) .
 - Code connection is now embedded into Minecraft EDU and does not require an additional plugin when using 'Make Code' or 'Tynker'. option <https://education.minecraft.net/blog/download-the-code-builder-update-to-learn-coding-in-minecraft/>
 - b. Watch this video to see more on using the Code Connector plugin. Here is another how-to guide for installing and setting up Code Connector. All students will need to do this too. A final support guide for the Code Connector can be found at this link. <https://education.minecraft.net/get-started/download/>
 - c. Many, if not all, of your students will know how to play Minecraft. Those who have never played can be paired up with friends to learn. They will catch on quick and enjoy the experience.
4. **Computation Thinking Concepts in this Learning Challenge** – This link explains all theory taught to students through the course.

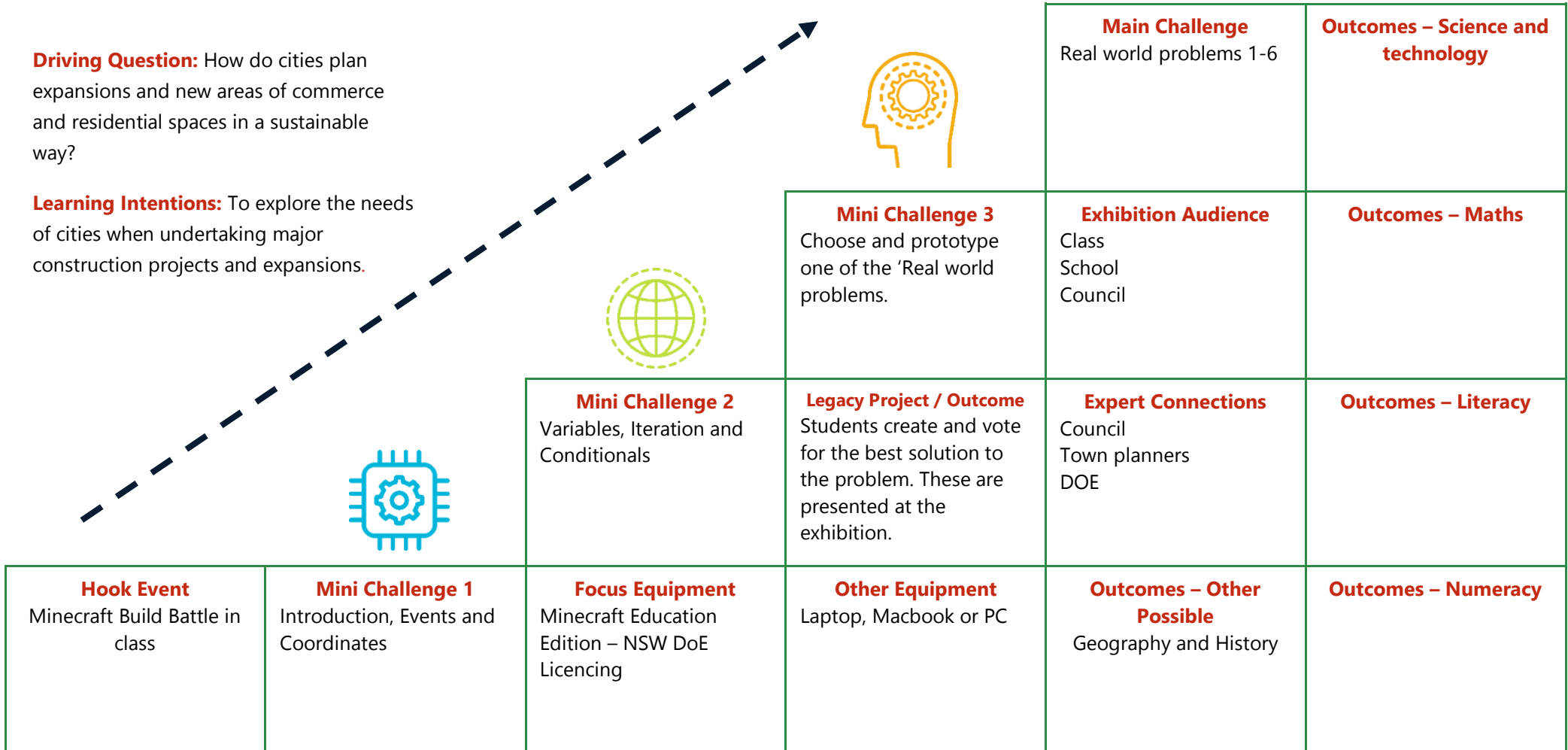


Problems	Passions	People	Places	Projects
<ul style="list-style-type: none"> - Access - Licences - Complex information - Supply of completed plans - Knowledge gap 	<ul style="list-style-type: none"> - My place - Minecraft - Making - Building - Problem solving - Competition 	<ul style="list-style-type: none"> - Council - Town planners - Architects - Students - Teachers - Experts 	<ul style="list-style-type: none"> - Western Sydney development area - Schools - Community locations - Council - Museum - Online locations 	<ol style="list-style-type: none"> 1. How would you build a sustainable airport? 2. Could Western Sydney Airport become the most connected place in Australia? 3. How will an airport of the future operate? 4. With 8 million people in Sydney (in the future) how should they live? What would their houses be like? How would they move around? Where would they work? 5. How could the airport – and, in particular, the Aerotropolis – change this? What should form part of it? How can we create 200,000 new jobs in the Western City? 6. When it opens in 2026 five million passengers each year are expected to use Western Sydney Airport. How would you ensure the usage of the airport grew substantially? Where would visitors stay?



Driving Question: How do cities plan expansions and new areas of commerce and residential spaces in a sustainable way?

Learning Intentions: To explore the needs of cities when undertaking major construction projects and expansions.



SYLLABUS OUTCOMES

The following outcomes are relevant to ALL SIX of the possible projects. After you select the project that your class will be undertaking you will need to select appropriate outcomes that apply to the specific problem. Include as many subject areas as possible. Science and Technology outcomes and content are mandatory.

K -10 Mathematics			
Syllabus	Stage	Outcome	Outcome Code
Mathematics	3	selects and applies appropriate problem-solving strategies, including the use of digital technologies, in undertaking investigations	MA3-2WM
Mathematics	3	gives a valid reason for supporting one possible solution over another	MA3-3WM
Mathematics	3	selects and uses the appropriate unit and device to measure lengths and distances, calculates perimeters, and converts between units of length	MA3-9MG
Mathematics	3	selects and uses the appropriate unit to calculate areas, including areas of squares, rectangles and triangles	MA3-10MG
Mathematics	3	locates and describes position on maps using a grid-reference system	MA3-17MG
Mathematics	3	uses appropriate methods to collect data and constructs, interprets and evaluates data displays, including dot plots, line graphs and two-way tables	MA3-18SP
Syllabus	Stage	Content	
Mathematics	3	Whole numbers 2 <ul style="list-style-type: none"> • Investigate everyday situations that use integers; locate and represent these numbers on a number line <ul style="list-style-type: none"> ○ interpret integers in everyday contexts, eg temperature 	
Mathematics	3	Addition and subtraction 2 <ul style="list-style-type: none"> • Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving addition and subtraction with whole numbers <ul style="list-style-type: none"> ○ solve addition and subtraction word problems involving whole numbers of any size, including problems that require more than one operation, eg 'I have saved \$40 000 to buy a new car. The basic model costs \$36 118 and I add tinted windows for \$860 and Bluetooth connectivity for \$1376. How much money will I have left over? 	
Mathematics	3	Multiplication and Division 2 <ul style="list-style-type: none"> • estimate solutions to problems and check to justify solutions 	

		<ul style="list-style-type: none"> • use a table or similar organiser to record methods used to solve problems • recognise symbols used to record speed in kilometres per hour, eg 80 km/h • solve simple problems involving speed, eg 'How long would it take to travel 600 km if the average speed for the trip is 75 km/h?'
Mathematics	3	<p>Patterns and Algebra 2</p> <ul style="list-style-type: none"> • Introduce the Cartesian coordinate system using all four quadrants • recognise that the number plane (Cartesian plane) is a visual way of describing location on a grid • recognise that the number plane consists of a horizontal axis (x-axis) and a vertical axis (y-axis), creating four quadrants • plot and label points, given coordinates, in all four quadrants of the number plane • plot a sequence of coordinates to create a picture • identify and record the coordinates of given points in all four quadrants of the number plane • recognise that the order of coordinates is important when locating points on the number plane, eg (2, 3) is a location different from (3, 2)
Mathematics	3	<p>Length 2</p> <ul style="list-style-type: none"> • Convert between common metric units of length <ul style="list-style-type: none"> ○ convert between metres and kilometres ○ convert between millimetres, centimetres and metres to compare lengths and distances ○ explain and use the relationship between the size of a unit and the number of units needed to assist in determining whether multiplication or division is required when converting between units, eg 'More metres than kilometres will be needed to measure the same distance, and so to convert from kilometres to metres, I need to multiply'
Mathematics	3	<p>Position</p> <ul style="list-style-type: none"> • Use a grid-reference system to describe locations • find locations on maps, including maps with legends, given their grid references • describe particular locations on grid-referenced maps, including maps with a legend, eg 'The post office is at E4'
Mathematics	3	<p>Data 2</p> <ul style="list-style-type: none"> • Interpret secondary data presented in digital media and elsewhere <ul style="list-style-type: none"> ○ interpret data representations found in digital media and in factual texts ○ interpret tables and graphs from the media and online sources, eg data about different sports teams • identify and describe conclusions that can be drawn from a particular representation of data • critically evaluate data representations found in digital media and related • discuss the messages that those who created a particular data representation might have wanted to convey • identify sources of possible bias in representations of data in the media by discussing various influences on data collection and representation, eg who created or paid for the data collection, whether the representation is part of an advertisement

- identify misleading representations of data in the media, eg broken axes, graphics that are not drawn to scale

K – 10 English

Syllabus	Stage	Outcome	Outcome Code
English	3	communicates effectively for a variety of audiences and purposes using increasingly challenging topics, ideas, issues and language forms and features	EN3-1A
English	3	uses an integrated range of skills, strategies and knowledge to read, view and comprehend a wide range of texts in different media and technologies	EN3-3A
English	3	thinks imaginatively, creatively, interpretively and critically about information and ideas and identifies connections between texts when responding to and composing texts	EN3-7C

Geography K - 10

Syllabus	Stage	Outcome	Outcome Code
Geography	3	describes the diverse features and characteristics of places and environments	GE3-1
Geography	3	explains interactions and connections between people, places and environments	GE3-2
Geography	3	compares and contrasts influences on the management of places and environments	GE3-3
Geography	3	acquires, processes and communicates geographical information using geographical tools for inquiry	GE3-4

Geographical inquiry skills

Acquiring geographical information	Stage 3	<ul style="list-style-type: none"> • develop geographical questions to investigate and plan an inquiry • collect and record relevant geographical data and information, using ethical protocols, from primary data and secondary information sources, for example, by observing, by interviewing, conducting surveys, or using maps, visual representations, statistical sources and reports, the media or the internet
Processing geographical information	Stage 3	<ul style="list-style-type: none"> • evaluate sources for their usefulness • represent data in different forms, for example plans, graphs, tables, sketches and diagrams • represent different types of geographical information by constructing maps that conform to cartographic conventions using spatial technologies as appropriate • interpret geographical data and information, using digital and spatial technologies as appropriate, and identify spatial distributions, patterns and trends, and infer relationships to draw conclusions
Communicating geographical information	Stage 3	<ul style="list-style-type: none"> • present findings and ideas in a range of communication forms as appropriate • reflect on their learning to propose individual and collective action in response to a contemporary geographical challenge and describe the expected effects of their proposal on different groups of people

Geographical tools			
Maps	Stage 3	<ul style="list-style-type: none"> large-scale maps, small-scale maps, sketch maps, political maps, topographic maps, flowline maps maps to identify location, latitude, direction, distance, map references, spatial distributions and patterns 	
Graphs and statistics	Stage 3	<ul style="list-style-type: none"> pictographs, data tables, column graphs, line graphs, climate graphs multiple graphs on a geographical theme statistics to find patterns 	
Spatial technologies	Stage 3	<ul style="list-style-type: none"> virtual maps, satellite images, global positioning systems (GPS) 	
Visual representations	Stage 3	<ul style="list-style-type: none"> photographs, aerial photographs, illustrations, flow diagrams, annotated diagrams, multimedia, web tools 	
K-6 Science and Technology			
Design and Production Skills Continuum			
Identifying and defining	Stage 3	<ul style="list-style-type: none"> examine and critique needs, opportunities or modifications using a range of criteria to define a project define a need or opportunity according to functional and aesthetic criteria consider availability and sustainability of resources when defining design needs and opportunities investigate materials, components, tools, techniques and processes required to achieve intended design solutions (ACTDEP024) examine and determine functional requirements to define a problem 	
Researching and planning	Stage	<ul style="list-style-type: none"> research, identify and define design ideas and processes for an audience consider functional and aesthetic needs in planning a design solution develop, record and communicate design ideas, decisions and processes using appropriate technical terms consider sustainability of resources when researching and planning design solutions manage projects within time constraints develop solutions through trialling and refining using iterations 	
Producing and implementing	Stage	<ul style="list-style-type: none"> develop project plans that consider resources when producing designed solutions individually and collaboratively (ACTDEP028) implement digital solutions as visual programs involving branching, iteration and user input (ACTDIP020) work collaboratively to share, appraise and improve ideas to achieve design purposes identify, organise and perform strategic roles within a group to solve a problem acquire, store, access and validate different types of data, and use a range of software to present, interpret and visualise data 	

Testing and evaluating	Stage	<ul style="list-style-type: none"> • negotiate criteria for success, based on defined needs, sustainability and aesthetics • develop appropriate and fair processes to test a designed solution according to criteria • evaluate design ideas, processes and solutions according to criteria for success (ACTDEP027) • explain how students' solutions and existing information systems meet current and future local community needs (ACTDIP021) 	
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Thinking Skills

Design thinking – DesT

Design thinking is a process where a need or opportunity is identified and a design solution is developed. The consideration of economic, environmental and social impacts that result from designed solutions are core to design thinking. Design thinking methods can be used when trying to understand a problem, generate ideas and refine a design based on evaluation and testing.

Systems thinking – SysT

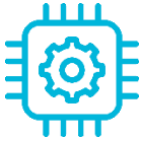
Systems thinking is an understanding of how related objects or components interact to influence how a system functions. Students are provided with opportunities to recognise the connectedness of, and interactions between phenomena, people, places and events in local and wider contexts and consider the impact of their decisions. Understanding the complexity of systems and the interdependence of components is important for scientific research and for the creation of solutions to technical, economic and social issues.

Learning Across the Curriculum

Sustainability

Science and Technology provides students with opportunities to develop an awareness of sustainable practices, careful and responsible management of natural resources to ensure that they are available for future generations. Sustainability content is focused on renewable resources, the protection of environments and requires consideration of environmental, social, cultural and economic systems and their interdependence. Students are encouraged to consider sustainability and develop an appreciation of the impact that design solutions can have on the Earth's resources. Sustainability education is futures-oriented, creating a more ecologically and socially just world through informed choices. Actions that support more sustainable patterns of living require students to participate critically and act creatively in determining more sustainable ways of living.

Place any other syllabus linkages below, particularly including the relevant K-6 Science and Technology Outcomes, Content and Skills.



MINI CHALLENGE 1

Build the learning necessary for a student to achieve the mini challenge. All learning should work towards achievement in that step of the STEM Solutions Pedagogy. This challenge should incorporate Connect and Discover, and Construct and Learn focussed activities.

Mini Challenge	Introduction, Events, and Coordinates - Getting started coding in Minecraft.
Formative Assessment	Student create their first Minecraft code and reflect on the process
Learning Intentions	Students will work in teams to build demonstrations of their understanding of a given topic provided by the teacher in any course or grade. Students learn computational thinking focusing on events and coordinates
Success Criteria	<ul style="list-style-type: none">• Students build and share a Minecraft design, demonstrating their skill and expertise in the Minecraft Edu platform• Student install Code Connector and use the Minecraft MakeCode site• Students create a simple MakeCode for Minecraft project• Students learn to use coordinates in the Make Code projects• Students seek feedback on their designs from their peers• Students reflect on their learning

Learning Activities
(include links, content,
text, anything needed to
build the learning in the
template)

Part 1 – Build Battle

Our first activity for this unit will be a Build Battle. For this activity, your teacher will tell you a theme for which you have to build. You will be given blocks of land to build on to which you will be assigned. You will have a time limit to build your creations, then you will showcase your build to peers. Your class will vote for the best build, and if you are lucky, your teacher may give the winners a prize of some kind.

Part 2 – Introduction to Minecraft Education Edition Code Connector

The Department of Education Minecraft website has instructions for installing on school computers, and BYOD teacher and student devices can download and install via this link. (see Code Connection button) . Watch this video to see more on using the Code Connector plugin. Here is another how-to guide for installing and setting up Code Connector. All students will need to do this too.

From this point forward we will use the Minecraft MakeCode Site for our coding.

<https://minecraft.makecode.com/courses/csintr/coordinates/activity-3>

Part 3 – Events – Theory and Activities

Watch this video (<https://www.youtube.com/watch?v=7xqot4oA2vo&feature=youtu.be>)

An event in computer science is an action or occurrence that is detected by a computer. For example, when someone clicks the button on their mouse, it generates a “mouse click event” for the computer. In real life, there are also events that might be associated with an action, like cause and effect. Here are some examples:

Event - Action

It starts raining - People open umbrellas

The bell rings - Students go to class

The power button is pressed - The computer turns on

The mouse button is clicked - An application opens

Can you think of some other events and what they might cause to happen? Discuss with your class.

In programming, an event handler is a part of your program that runs when a specific event happens (it “handles” the event). In MakeCode, an event handler block looks like a square with a gap in the middle and usually starts with the word “on”:



Activity 1 - Yellow Brick Road

Let's code our first mod. Follow the instructions at this link to create a path as you walk. You'll be creating Yellow Brick Roads in no time at all! <https://minecraft.makecode.com/courses/csintro/events/activity-1>

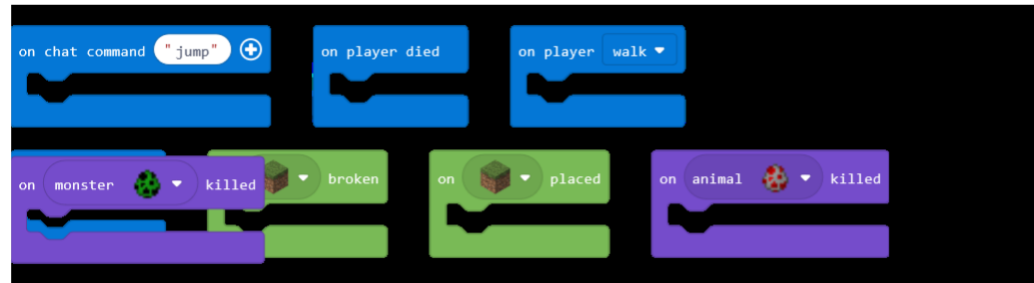
Activity 2 - Sing a Song of Sixpence

In our next activity you will level up and create code that changes cakes to parrots when broken. Follow the steps at this link.

<https://minecraft.makecode.com/courses/csintro/events/activity-2>

Activity 3 – What will you make?

In this project, your challenge is to come up with a simple MakeCode for Minecraft project that uses one or more of the following eventhandler blocks:



Activity 4 – Seeking Feedback

Once you have completed your first independent project, share it with a friend for feedback. When giving feedback to a friend use the following prompts:

- Wow – I really like how you....
- Wonder – I wonder if it would work better if

Activity 5 - Reflecting on Events:

Use the following questions to write a reflective learning journal entry:

- What problem did you solve, or why did you decide to create this project?
- What kind of event and event handler did you decide to use?
- What does your program do? Describe how your program works (what the cause and effect are).

Part 4 – Coordinates – Theory and Activities

Watch this video (<https://youtu.be/yh17EFWbKeo>)

In Minecraft, it's important to know where you are in the world, where your agent is, and where all kinds of things from diamond mines, to woodland mansions, to underground spawners are. In Survival mode, it's even more important to be able to get back to a safe place when the sun starts to go down, or to remember the location of points of interest so you can find them again if your inventory is full and you need to come back.

Even if you are already familiar with moving around in Minecraft, you might not have used coordinates, except perhaps to teleport. In order to use many of the MakeCode blocks effectively, you need to understand Minecraft coordinates, which are also known as positions.

Follow this link <https://minecraft.makecode.com/courses/csintro/coordinates/overview> to learn more about coordinates and how you can use them when coding in Minecraft.

Activity 1 - Create a Compass Rose

Let's practice using coordinates in Minecraft to create a simple compass rose that points to the four cardinal directions within a Minecraft world. You can then use this as the basis for creating more individualized and detailed compass roses. Follow this link <https://minecraft.makecode.com/courses/csintro/coordinates/activity-1> to get started.

Activity 2 – Auto Farmer

In this activity, you will become farmers who must herd sheep in Minecraft, but of course you will use a bit of code to make it happen! Let's create some sheep and then automatically put them in their pen. Follow this link for instructions.

<https://minecraft.makecode.com/courses/csintro/coordinates/activity-3>

Activity 3 – What will you make?

For this activity, create one or more commands that alter the landscape in some way. Here are some ideas:

- In a set area, replace all blocks of a certain type with something new (for example, replace all grass with lava).
- Create an "instant swimming pool" filled with water or... lava!
- Create a way to instantly tunnel through a mountain or portions of the nether.
- Create a way to literally "move mountains."
- Make a rainbow.

Get started at this link <https://minecraft.makecode.com/courses/csintro/coordinates/project>

Activity 4 - Reflecting on events:

Use the following questions to write a reflective learning journal entry:

- How did you come up with this idea? What problem are you trying to solve and why?
- What did you decide to alter in the landscape?
- What does your program do?
- Describe how your program alters the landscape.
- Include at least one screenshot of the result of your program.

Notes:

PREPARING FOR THIS ACTIVITY:

Part 1 - Build Battle prep - One you have accessed licences and installed the app, it's time to import the 'Build Battle' World. Access this download here. To import the world, download the file from this link, <https://onedrive.live.com/?cid=bf7439534acfe4fa&id=BF7439534ACFE4FA%21146376&authkey=%21AOWpqs70MsHbph0> and import into Minecraft via the instructions below.

1. Open Minecraft and sign in > Play > Click on the Arrow to the right of 'create new' > navigate to where you downloaded the Build Battle file > ok and the world will open.

2. After uploading a world to Minecraft once, next time you open Minecraft and choose play Build Battle will be listed and ready to click and play.
3. Open server and let students in via the instructions you would have learnt during the compulsory tutorials needed to get the licences.
4. Split students into groups of approximately 4.
5. Give students a theme for the build battle and a timeframe (15 minutes maximum) in which they must complete their build. Is there a topic they have been studying in another KLA, eg medieval Japan, Egyptian history, Greek empires, a building in the school, your town or suburb, anything for which they can build something thematic?
6. Fly to each build platform and allocate a group of students to that platform. They will know how to teleport friends there etc.
7. Once the time is up and the build is done, as a class you should move between platforms for them to showcase their work.
8. Ask students to use the camera to take photos of their build. The photos can then be downloaded via the portfolio to be kept in a journal or such. Here is a video to show how to do this. https://www.youtube.com/watch?v=z_5tyHcQIN0

Part 2 – Walk through the process of using the code connector and MakeCode Minecraft. For stage 4 students, there is a Javascript option in MakeCode that would be useful for students who are comfortable with and ready to move on from block coding. The Technology mandatory Syllabus does mandate general programming language (aka Javascript) so use of this should be encouraged. Some students may struggle at first though, so using Block coding will help support success for these students.

<https://minecraft.makecode.com/courses/csintro/coordinates/activity-3>

Part 3 and 4 – Follow the instruction on the linked pages. Suggest students work through at their own pace.

Use whatever platform best suits your class for the reflection writing

PRINTABLES FOR THIS ACTIVITY:

N/A



MINI CHALLENGE 2

Build the learning necessary for a student to achieve the mini challenge. All learning should work towards achievement in that step of the STEM Solutions Pedagogy. This challenge should incorporate Contemplate and Consider activities.

Mini Challenge	Exploring and creating Variables, Iterations and Conditionals while coding Minecraft
Formative Assessment	Students create code and reflect on their learning progress
Learning Intentions	Students learn computational thinking focusing on variables, iterations and conditionals
Success Criteria	<ul style="list-style-type: none">• Students use multiple types of variable to keep track of information in Minecraft.• Students use loops and iterations to create a staircase.• Students use conditionals to solve or automate a Minecraft problem of their choice• Students reflect on their learning.

Learning Activities
(include links, content,
text, anything needed to
build the learning in the
template)

Part 1 – Variables – Theory and Activities

Let's explore the concept of a variable, an important way to store information and make your programs more flexible and adaptable. Most schools have lockers for students to keep their books in. Variables are a lot like lockers: variables are places in which computers keep things. Computers need containers in which to keep numbers, text, and other information so that later they can make decisions. The code tells the computer when to look in these lockers and what to look for.

Watch this video (<https://www.youtube.com/watch?v=pNjI3S4G04w&feature=youtu.be>)

Read more about Variables before completing the activities at this link. (<https://minecraft.makecode.com/courses/csintro/variables/overview>)

Activity 1 – Chicken Storm

In this activity, you will use a variable to determine the number of chickens to spawn in Minecraft, and you'll make these chickens fall from the sky like a storm of chickens! Follow the instructions at this link

(<https://minecraft.makecode.com/courses/csintro/variables/activity-4>)

Activity 2 – Wordsmith

In this activity, you will use variables to show your creativity with words. You will join two words together to create a new compound word. By using variables, you can store two words and then - in code - combine them. The cool part will be spelling out your new word in Minecraft. Get started by clicking this link. (<https://minecraft.makecode.com/courses/csintro/variables/project>)

Activity 3 – What will you make?

Create an original MakeCode project that uses multiple variables of at least two different types, to keep track of information in Minecraft. Also, find a way to use a chat command with a parameter (this can be in the same project or in a different project). Follow the instructions and ideas at this link (<https://minecraft.makecode.com/courses/csintro/variables/project>)

Activity 4 - Reflection - Answer the following in your learning journal:

- What type of information did you choose to keep track of?
- What problems did you encounter? How did you solve them?
- How did you use variables in your project, and what were their types?
- What did you name your variables and why?
- What was something new that you learned for this project? Describe how you figured it out.
- Include at least one screenshot of your project.

Part 2 – Iterations – Theory and Activities

Watch this video (<https://www.youtube.com/watch?v=yGkQr0xvkiM&feature=youtu.be>)

For this activity you'll explore ways to make things repeat. You might repeat actions in a program to have a certain effect, or you might use repetition to accomplish the same task in a smaller number of steps. You'll meet the Agent, your own personal robot who can accomplish tasks for you like building a farm, and you'll create some original dance moves so your Agent can get down and dance on the floor

Learn about Iterations at this link (<https://minecraft.makecode.com/courses/csintro/iteration/overview>) before moving onto the activities below.

Activity 1 – Introduction to the Agent

For this lesson about loops, you will be using the agent in Minecraft. So you will be learning about loops but also getting familiar with how the agent works. Learn about the agent and complete the activity at this link.

(<https://minecraft.makecode.com/courses/csintro/iteration/activity-1>)

Activity 2 – Help your agent farm

You want to start farming with your robot agent, but you have a few errors in the instructions. Using loops, it would be nice to teach the agent to build a couple of rows of tilled soil where crops could be planted. Can you debug this code and figure out where the problems are? Follow the instructions at this link. (<https://minecraft.makecode.com/courses/csintro/iteration/activity-3>)

Activity 3 – What will you make?

For this independent project, choose one of the following options. You can build any of these styles of staircases, but remember to use loops in your code to help do it. These instructions will get you started.

(<https://minecraft.makecode.com/courses/csintro/iteration/project>)

Activity 4 - Reflection – Answer the following in your reflection journal

- What type of staircase did you choose to build: Straight, Spiral, or Diagonal? Why?
- What problems did you encounter? How did you solve them?
- How did you use loops in your staircase?
- Describe one point where you got stuck. Then discuss how you figured it out.
- Include at least one screenshot of your staircase.

Part 3 – Conditionals – Theory and Activities

Watch this video (<https://youtu.be/Naa3z3AT47Q>)

An important part of programming is telling the computer WHEN to perform a certain task. For this, we use something called ‘conditionals’, because a certain Condition or Rule has to be met before an action is performed.

Learn about the use of Conditionals in programming at this link. (<https://minecraft.makecode.com/courses/csintro/conditionals/overview>)

Activity 1 – Agent Tree Chopper

Chopping trees for wood is hard work but necessary in Minecraft if you want to craft objects and tools in Survival mode. But you can automate this chore through code with the help of our agent! Let’s teach the agent how to chop down a tree of any height and return back down to the ground. Follow this link (<https://minecraft.makecode.com/courses/csintro/conditionals/activity-2>) to get your agent chopping.

Activity 2 – All mine!

In this activity, you’ll create a basic mining agent that automatically destroys blocks in front of it and collects everything. You’ll use conditional statements to test for precious minerals. You’ll find the instructions at this link.

(<https://minecraft.makecode.com/courses/csintro/conditionals/activity-3>)

Activity 3 – What will you make?

For the independent project, work with another student to create a project together that uses one or more blocks from the Logic Toolbox drawer. Think about problems you encounter in a Minecraft world and try to come up with solutions for them. Follow the instructions at this link. (<https://minecraft.makecode.com/courses/csintro/conditionals/project>)

Activity 4 - Reflection – Answer the following in your reflection journal

- What Minecraft problem did you decide to solve? What does your program do?
- How did you use conditional statements in your project?
- Discuss one (or more) ways that working with a partner was different from just doing the project by yourself.
- Describe one point where you got stuck. Then discuss how you figured it out.
- Include at least one screenshot of your agent in action.

Notes:

PREPARING FOR THIS ACTIVITY:

- The activities in this mini challenge are all from the same resource. Work through as suggested. For extension work, you can always complete the tasks not in the challenge that exist on the site.

PRINTABLES FOR THIS ACTIVITY:

N/A



MINI CHALLENGE 3

Build the learning necessary for a student to achieve the final challenge. All learning should work towards achievement in that step of the STEM Solutions Pedagogy. This challenge should incorporate Continue and Complete focussed activities.

Mini Challenge	Choose and prototype one of the 'Real world problems'. (Design the solution and prototype possible solutions)
Formative Assessment	Design and make process Designs in both Minecraft and other methods Gather and respond to external feedback (someone outside of your classroom)
Learning Intentions	Students explore a real world problem related to the Liverpool Aerotropolis and craft a solution using research about the real world situation, sustainability, residential and commercial needs
Success Criteria	<ul style="list-style-type: none">• Students are able to articulate their ideas• Students can develop possible solutions to problems and demonstrate the design thinking process• Show the teacher evidence of reiteration and reflection
Learning Activities (include links, content, text, anything needed to build the learning in the template)	<ul style="list-style-type: none">• Teacher to design tasks based on the problem selected, the relevant syllabus outcomes and the time frame available to their class.• The students will reflect on the experiences that they have had with Minecraft during Mini Challenge one and two. The students and teacher will choose one of the 'Real world problems' to design and implement their solution created in Minecraft Edu. https://schoolsnsw.sharepoint.com/:w:/s/AerotropolisMinecraftChallenge/ES2uhKiWleJHgM6GLAjFUd4B4VisbJaslgvclNQEhexfMg?e=ubfofz• These prototypes can take the shape of designs, drawings and Minecraft builds.

Notes:

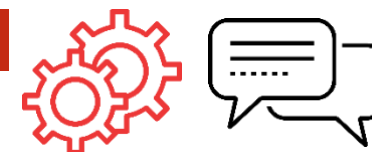
PREPARING FOR THIS ACTIVITY:

- Access and assess all the background information supplied by Liverpool council to support students in their designs

PRINTABLES FOR THIS ACTIVITY:

N/A

MAIN CHALLENGE



All learning should work towards achievement in that step of the STEM Solutions Pedagogy. This challenge is the major challenge for the unit and should bring together all components into one solution and exhibition.

Main Challenge	Build working solution in Minecraft Edu and create a video pitch for your solution to be submitted to the competition.
Assessment	Completed 2 minute pitch for submission to the Western Sydney Airport Minecraft Competition
Learning Intention	To complete a complex design solution in Minecraft, based on feedback and reflection. To produce a 2 minute video using footage of the Minecraft design that has a voice over explaining your solution and design decisions.
Success Criteria	<ul style="list-style-type: none"> Completed Minecraft design Completed pitch video Completed exhibit to school based audience
Learning Activities (include links, content, text, anything needed to build the learning in the template)	<p>Teacher to design tasks based on the problem selected, the relevant syllabus outcomes and the time frame available to their class. Tasks should include:</p> <ul style="list-style-type: none"> Completion of a final Minecraft design Creation of a 2min Kick starter style pitch by planning, storyboarding, rehearsing and creating the video. An exhibition to wider school community and peers for all class entries in order to select the best video to be submitted to the Liverpool Council competition
Exhibition	<p>All completed entries need to be exhibited to the wider school community. This event could be an assembly or evening event, but must include time for the audience to vote on the best video. Teacher might like to have students create their own judging criteria for this exhibition or use the supplied rubric that will be used by the judges.</p> <p>Students need to select the platform for their 2min campaign, Some suggestions include:</p> <p>https://spark.adobe.com/ Video slide show https://www.powtoon.com/home/? Animated https://prezi.com/ Gliding slideshow https://office.live.com/start/PowerPoint.aspx Powerpoint online https://www.adobe.com/products/premiere-rush.html Video editor</p> <p>These are all only suggestions, use whatever platform you and your class are comfortable with.</p>

Exhibition Prep	These tasks will depend on the form the exhibition will take. Where possible have the students organise and run this event.

PREPARING FOR THIS ACTIVITY:

- Ensure that all students are familiar with the supplied judging rubric.

PRINTABLES FOR THIS ACTIVITY:

N/A

MARKING CRITERIA FOR MAIN CHALLENGE

One Point Marking Criteria

Concerns Areas that need work	Criteria Sound Level of Achievement	Advanced Evidence that work is exceeding expectations
Students tried to use design thinking to engage in critical and creative thinking and attempted to solve a complex problem.	Students successfully used design thinking to engage in critical and creative thinking that solved a complex problem.	Students used design thinking to produce an outstanding creative solution to a complex problem.
Students attempted to use planning, organising, monitoring and managing skills to complete a project.	Students display the skills to plan, organise and monitor activities and processes as they manage a project to completion.	Students expertly use skills to plan, organise and monitor activities and processes as they manage a project to completion.
Students attempted to reflect on their learning, trying to give valid reasons for supporting one solution over another, as well as sharing and evaluating information.	Students reflect on their learning, giving valid reasons for supporting one solution over another, as well as sharing and evaluating information.	Students show deep insight as they reflect on their learning, giving valid reasons for supporting one solution over another, as well as sharing and evaluating information.
Students attempted to use Minecraft to create a solution to a complex problem.	Students use Minecraft to create a solution to a complex problem.	Students expertly use Minecraft to create an innovative solution to a complex problem
Students attempted to produce a sustainable solution to their problem that considers the needs of both the community and the environment.	Students produce a sustainable solution to their problem that considers the needs of both the community and the environment.	Students produced a sustainable solution to their problem that clearly meets and balances the needs of both the community and the environment.
Students attempted to create a useable solution to an authentic real world problem	Students create a useable solution to an authentic real world problem.	Students create an innovative useable solution to an authentic real world problem.
Students attempt to plan and deliver a fun pitch and presentation that engages the audience.	Students plan and deliver a fun pitch and presentation that engages the audience.	Students plan and deliver a fun, innovative pitch and presentation that is deeply engaging to the audience.