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	• 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

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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/csintro/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":
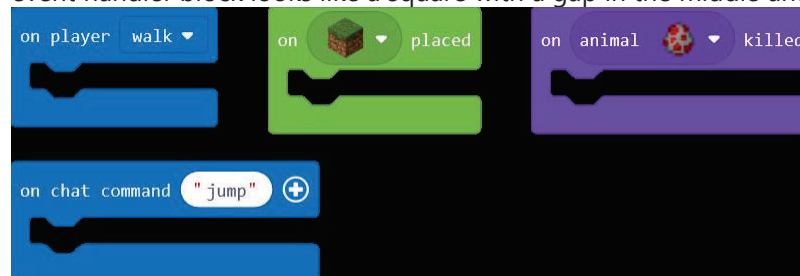	
	    Activity 1 - Yellow Brick Road

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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:
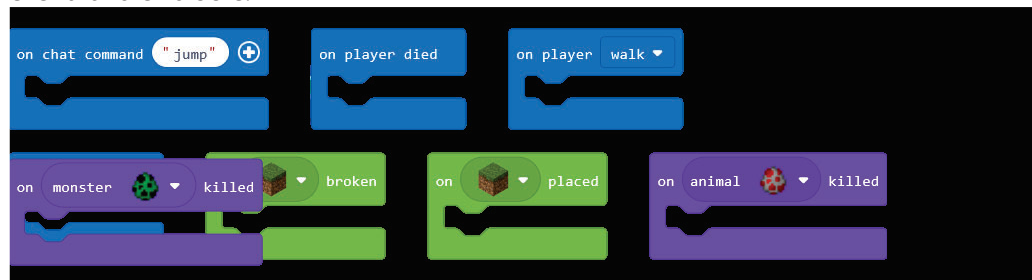
Activity 4 – Seeking Feedback

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 them 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

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PRINTABLES FOR THIS ACTIVITY:

N/A

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	• 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**

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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

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 focused activities.

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Mini Challenge	Choose and prototype one of the 'Real world problems'. (Design 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 Western Sydney Airport and craft a solution using research about the real world situation, sustainability, residential and commercial needs
Success Criteria	• 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)	• 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. (See page 6 for problems) • 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 (http://www.minecraft.liverpool.nsw.gov.au/)
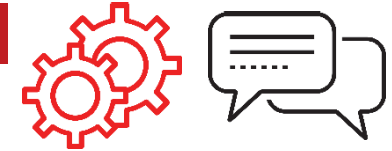
PRINTABLES FOR THIS ACTIVITY:

N/A

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 (http://www.minecraft.liverpool.nsw.gov.au/)
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	• Completed Minecraft design • Completed pitch video • Competed exhibit to school based audience
Learning Activities (include links, content, text, anything needed to build the learning in the template)	Teacher to design tasks based on the problem selected, the relevant syllabus outcomes and the time frame available to their class. Tasks should include: • 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	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. Students need to select the platform for their 2min campaign, Some suggestions include: 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 These are all only suggestions, use whatever platform you and your class are comfortable with.

| 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