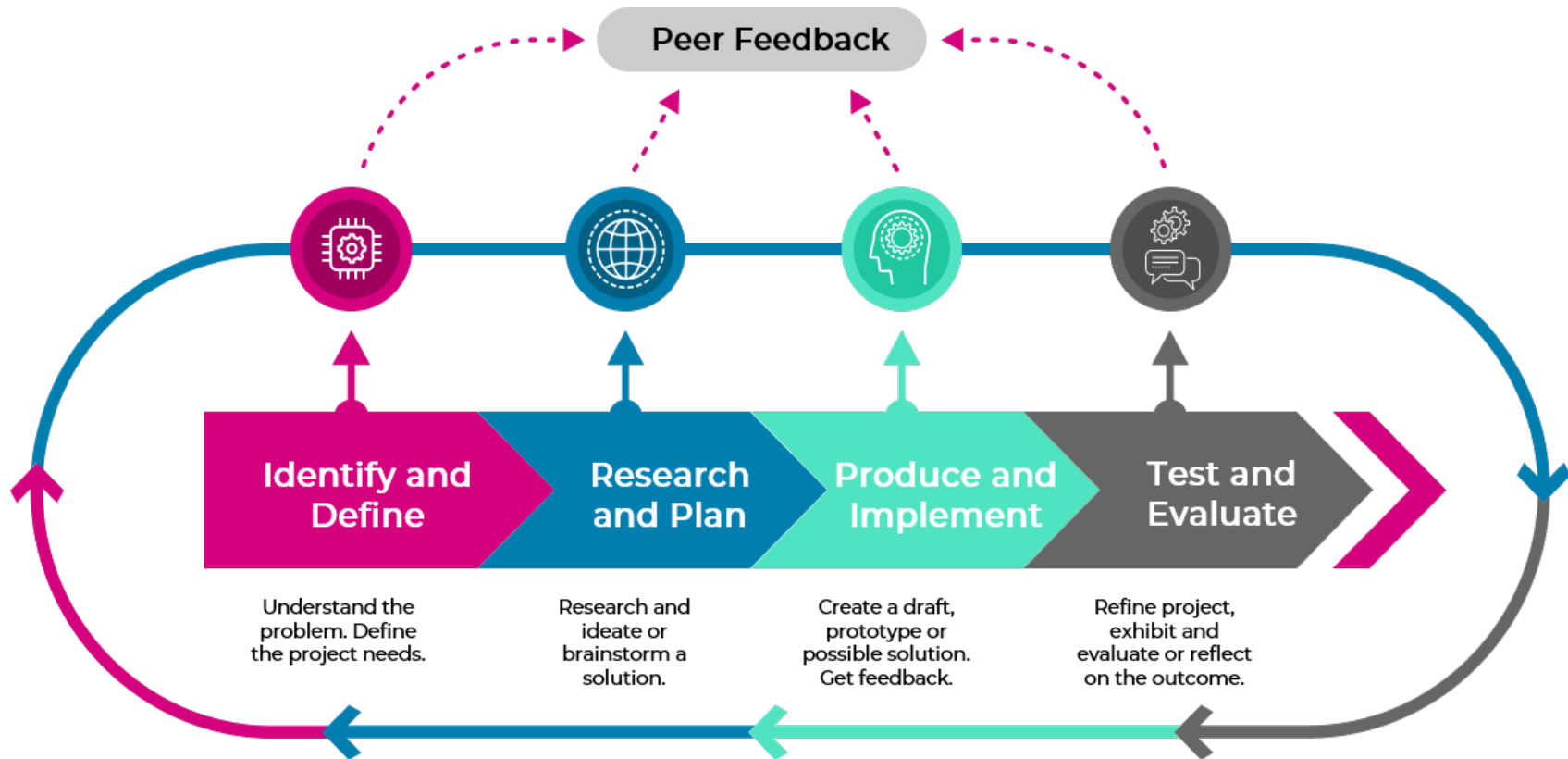


# Sydney Metro Inquiry

## In Conversation With Sydney Metro



Designed with the NSW Curriculum and Design Thinking in mind. The diagram above shows the flow of learning aligned to Design process skills in the NSW Science and Technology Syllabuses.

## CREATING LEARNING CHALLENGES – THE WORKFLOW FOR WRITING A LEARNING CHALLENGE

### DISCOVER

Play and discover what you can do with equipment

Research possible learning challenges

Look into syllabus areas

Curate resources from existing educational support sites for specific equipment

Gain understanding into teacher needs in this equipment

Complete a 5P for an idea or theme

### SYNTHESIZE

Project formation

Project breakdown and refinement

From the 5P complete a Project on a Page / Project overview doc

Syllabus mapping

### BUILD

Mini challenge creation

Learning activity flow

Use template to create draft learning challenge

Build the draft flow of learning, testing as you go

### TEST

Test your challenge with a peer or school

Take videos of the learning as you see it

Upload videos to common area for sharing

Consult with curriculum specialists

Get feedback from teachers and students

### EVOLVE

Make changes as suggested during test

Refine learning challenge in online space

Share with community

Review feedback online

## RESEARCH

Record links and information that you find during your research below. This will help other teachers to prepare for the learning Challenge.

### The student Podcaster

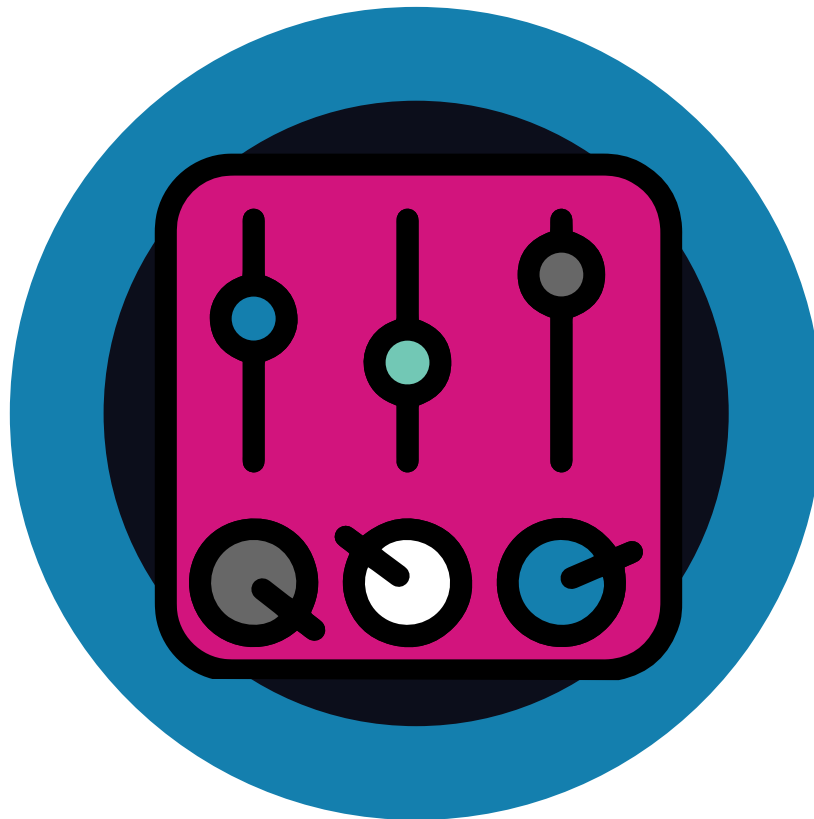
<https://schoolsnsw.sharepoint.com/sites/STEMShareLibrary/SitePages/The-Student-Podcaster.aspx>

For non-DoE teachers

<https://t4l.schools.nsw.gov.au/resources/teaching-and-learning-resources/the-student-podcaster.html>

### Sydney Metro

<https://www.sydneymetro.info/>



# Stage 2 English, Geography, History, Science and Technology – What can we learn from an expert through conversation?

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Hilltop Road Public School has an enrolment of approximately 800 students and caters to the needs of a low socioeconomic status (SES) and high non-English-speaking-background (NESB) community. The school has a 1:1 laptop program where the students all have their own computer to be utilised in their learning daily. The school has a focus on speaking and listening and building the articulation and communication skills of all students.

## What can we learn from an expert through conversation?

Stage 2 – duration 7 lessons

### Unit context

This unit was written by Brett Kent of Hilltop Road Public School. The unit is aligned to © NSW Education Standards Authority (NESA) syllabuses specifically the Geography K-10 Syllabus (2015), History K-10 Syllabus (2012), the Science and Technology K-6 Syllabus (2017) and English K-10 Syllabus (2012). It was created and trialled as part of a peer-to-peer mentoring program at the school that allowed for this to be taught to a class of stage two students by both the school technology mentor and the classroom teacher, to build the capacity of the teachers involved. This is part of a professional development program on inquiry based learning for primary and secondary school teachers. The professional development courses were part of a pilot partnership between the NSW Government's Sydney Metro transport agency and Western Sydney University. Facilitated by Western Sydney University's Education Knowledge Network, the professional development program aimed to develop teacher expertise in inquiry-based learning using a real-life example of a major infrastructure project in delivery stage. Sydney Metro is Australia's biggest public transport project.

## 5P Process for planning for Real STEM Projects

Problems	Passions	People	Places	Projects
What problems do students have with this topic?	what passions in general, when learning, about this topic	what people could you tap into to help you with this project and topic?	what places could you visit (physically or through virtual links) as you complete this topic?	List a number of possible projects that could be done.
<ul style="list-style-type: none"> <li>- How can we gather knowledge through conversation?</li> </ul>	<ul style="list-style-type: none"> <li>- Technology</li> <li>- Trains</li> <li>- Mining (Minecraft)</li> </ul>	<ul style="list-style-type: none"> <li>- Teachers</li> <li>- Students</li> <li>- Western Sydney Uni Contacts</li> <li>- Sydney Metro Experts</li> </ul>	<ul style="list-style-type: none"> <li>- School</li> <li>- Online (VC)</li> </ul>	<ul style="list-style-type: none"> <li>- Enquiry points</li> <li>- Voice recordings</li> <li>- Voice to text</li> <li>- Video Conference</li> <li>- Audio and Video Recording</li> <li>- Podcast</li> </ul>

**Driving Question:**

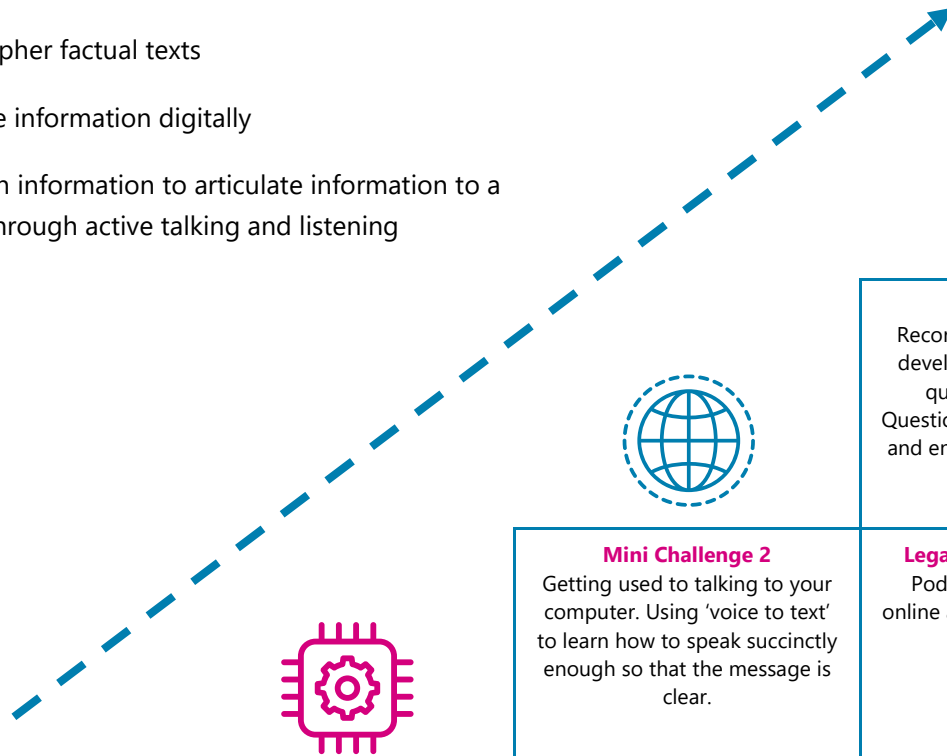
What can we learn from an expert through conversation?

**Learning Intentions:**

To read and decipher factual texts

Record and share information digitally

Share and explain information to articulate information to a group of peers through active talking and listening



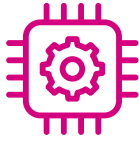
<p><b>Hook Event</b> Sydney Metro videos and introduction to the 'info' website.</p>	<p><b>Mini Challenge 1</b> Gathering interesting facts and background knowledge about the Sydney Metro.</p>	<p><b>Focus Technology Equipment</b> Student Laptops School Desktops Office Software (Word, Teams) Online tools Adobe Software (Audition) Mics etc.</p>	<p><b>Other Equipment</b> N/A</p>	<p><b>Outcomes – Literacy</b> EN2-1A EN2-2A</p>	
<p><b>Mini Challenge 2</b> Getting used to talking to your computer. Using 'voice to text' to learn how to speak succinctly enough so that the message is clear.</p>		<p><b>Legacy Project / Outcome</b> Podcast episode that lives online and can be listened to by other students.</p>	<p><b>Expert Connections</b> Western Sydney University Sydney Metro experts</p>		
<p><b>Mini Challenge 3</b> Recording conversations and developing 'un-Google-able' questions. Refining the Questions to ensure consistency and encourage the narrative to be explored.</p>		<p><b>Exhibition Audience</b> Parents Teachers School Website</p>	<p><b>Outcomes – HSIE</b> HT2-2 HT2-5 GE2-2 GE2-3</p>		
<p><b>Main Challenge</b> Interviewing experts from the Sydney Metro via video conference. Pulling the audio out of the recording and developing it into a long form podcast episode.</p>		<p><b>Outcomes – Science and Technology</b> ST2-1WS-S ST2-2DP-T</p>			

## SYLLABUS OUTCOMES

K-6 Science and Technology		
<b>Knowledge and understanding</b>		
Digital Technologies	<ul style="list-style-type: none"> <li>questions, plans and conducts scientific investigations, collects and summarises data and communicates using scientific representations</li> </ul>	ST2-1WS-S
Design and Production	<ul style="list-style-type: none"> <li>selects and uses materials, tools and equipment to develop solutions for a need or opportunity.</li> <li>organise and perform strategic roles within a group to solve a problem.</li> <li>investigate and research materials, components, tools and techniques to produce design solutions (ACTDEP014)</li> <li>recognise that numbers, text, images, sounds, animations and videos are all forms of data when stored or viewed using a digital system (ACTDIK008)</li> <li>investigate how the same data can be represented in different ways, eg codes and symbols.</li> <li>collect, access and present different types of data using simple software to create information and solve problems.</li> </ul>	ST2-2DP-T
History		
<b>History</b>		
Using a range of sources, describe and explain how and why ONE area, eg transport, work, education, entertainment and daily life, has changed		
Stage 2	describes and explains how significant individuals, groups and events contributed to changes in the local community over time	HT2-2
Stage 2	applies skills of historical inquiry and communication	HT2-5
Stage 2	describes and explains the significance of people, groups, places and events to the development of Australia	HT3-1
Geography		
<b>Geography</b>		
Investigate the settlement patterns and demographic characteristics of places and the lives of the people who live there, for example: (ACHGK019)		

	<ul style="list-style-type: none"> <li>▪ Examination of the varying settlement patterns and demographics of places</li> <li>▪ Identifies how people influence places (ACHGK029) and contribute to sustainability for example, roads and services, building development applications.</li> <li>▪ Examination of a local planning issue; the different views about it and a possible action in response to it.</li> </ul>	
Stage 2	describes the ways people, places and environments interact	GE2-2
Stage 2	examines differing perceptions about the management of places and environments	GE2-3
English		
Stage 2	<p>identifies the effect of purpose and audience on spoken texts, distinguishes between different forms of English and identifies organisational patterns and features.</p> <ul style="list-style-type: none"> <li>▪ discuss ways in which spoken language differs from written language and how spoken language varies according to different <u>audiences</u>, <u>purposes</u> and <u>contexts</u></li> <li>▪ identify purposes for listening in a variety of formal and informal situations</li> <li>▪ enhance presentations by using some basic oral presentation strategies, eg using notes as prompts, volume and change in emphasis</li> </ul>	EN2-6B
Stage 2	<p>communicates in a range of informal and formal contexts by adopting a range of roles in group, classroom, school and community contexts.</p> <ul style="list-style-type: none"> <li>▪ understand the ways in which spoken language differs from written language when adopting a range of roles</li> <li>▪ interpret ideas and information in spoken texts and listen for key points in order to carry out tasks and use information to share and extend ideas and information</li> </ul>	EN2-1A
Stage 2	<p>plans, composes and reviews a range of texts that are more demanding in terms of topic, audience and language.</p> <ul style="list-style-type: none"> <li>▪ identify key elements of planning, composing, reviewing and publishing in order to meet the demands of composing texts on a particular topic for a range of <u>purposes</u> and <u>audiences</u></li> <li>▪ experiment and share aspects of composing that enhance learning and enjoyment</li> <li>▪ discuss issues related to the responsible use of digital communication</li> <li>▪ discuss aspects of planning prior to writing, eg knowledge of topic, specific vocabulary and language features</li> <li>▪ experiment with visual, <u>multimodal</u> and digital processes to represent ideas encountered in texts</li> </ul>	EN2-2A





## 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. Write your instructions as if you are talking to students. Introducing students to the technology and gaining basic skills is good at this stage.

<b>Mini Challenge</b>	Introduction to Sydney Metro 'Hook' event.
<b>Formative Assessment</b>	Finding and sourcing information from a digital source.
<b>Learning Intentions</b>	To read and decipher factual texts Record and share information digitally Share and explain information to articulate information to a group of peers
<b>Success Criteria</b>	I can read information from a factual text and determine what the key points are I can record/ type information as a record of the finding from active research I can tell people verbally about my research and discuss why I found it interesting or important
<b>Learning Activities</b>	<p>Introduce students to what 'Sydney Metro' is, by showing them the Sydney Metro website (<a href="https://www.sydneymetro.info/about">https://www.sydneymetro.info/about</a>) and providing students with the opportunity to record/discuss their 'wonderings' with a partner and as a class.</p> <p>In small groups, get students to investigate/research and gather 2-3 interesting facts and pieces of background information about the Sydney Metro and record their interesting facts/pieces of background information using a digital platform.</p> <p>Engage in a 'check-in' discussion with each group and provide the opportunity for each group to share their findings back to the class with a brief explanation of what they have found/discovered.</p> <p>As students are reporting back, teacher to collaboratively record these interesting facts/pieces of background information, to create a whole class brainstorm/bank of ideas. Once all groups have shared/contributed to the discussion, draw students' attention to the facts that are similar and those that are different. Ask students, after seeing/hearing everyone's facts, if they have any addition 'wonderings'.</p> <p>Inform students that these facts/pieces of information are going to be used to formulate questions that will be asked to a Sydney Metro Industry Expert.</p>

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PREPARING FOR THIS ACTIVITY:

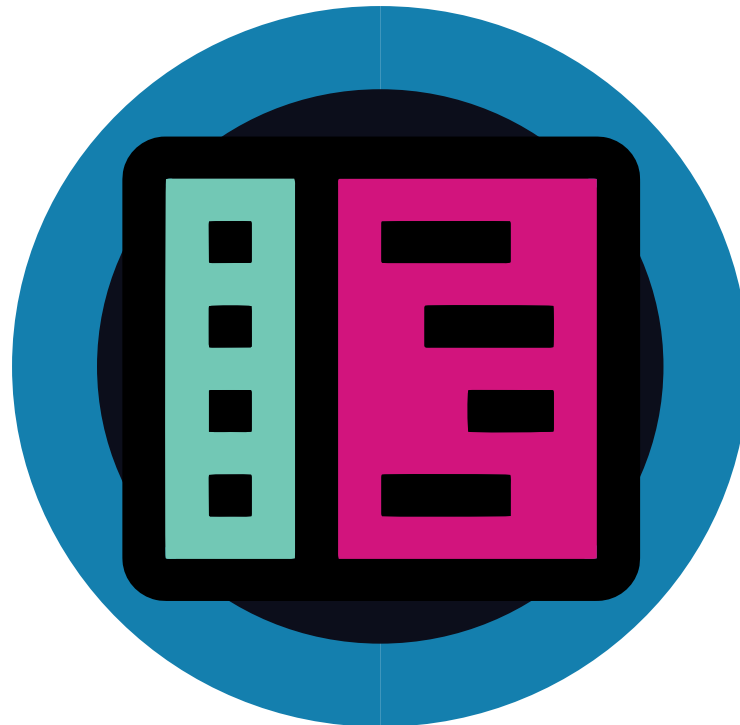
**Sydney Metro**

<https://www.sydneymetro.info/>

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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. Write your instructions as if you are talking to students. Namely, exploring the problem to be solved. This may not be so technology focussed.

<b>Mini Challenge</b>	Voice control and recordings
<b>Formative Assessment</b>	Speaking succinctly and clearly. Reviewing the interpretation that the software makes of the spoken words.
<b>Learning Intentions</b>	Considering phrasing and the formation of sentences to ensure that the words and sentences we say are clear and concise.
<b>Success Criteria</b>	I can speak clearly and deliberately to allow my computer to understand me.
<b>Learning Activities</b>	<p>Re-cap previous session and discuss with students why it is important to ensure when communicating with others that a clear and accurate message is portrayed. Explain that this is achieved by ensuring that we use a clear, communicative voice and that our ideas are succinct.</p> <p>Introduce students to the 'Voice to Text' function in Microsoft word. Using their interesting facts/pieces of background information they gathered from the previous lesson, model how to use this function and demonstrate to students what the playback audio sounds like when it is not articulated in a precise and accurate manner vs when the audio is recorded in an articulated and precise manner. Ask students to identify what the different portrayals (not articulate and precise vs articulate and precise) sounded like and what each of them communicated.</p> <p>So that students can learn to articulate themselves and think clearly about their spoken sentences, in small groups, provide students with the opportunity to practice recording their facts gathered from the previous lesson using the 'Voice to Text' function.</p> <p>Once students have recorded themselves, have them listen back to their 'Voice to Text' audio recordings and provide them with the opportunity to share their recordings with another group, eliciting peer feedback.</p> <p>Get students to consider how their facts and inquiry ideas can be formed into a 'leading question' that encourages the interviewee (Sydney Metro Industry Expert) to 'tell a story' (narrative).</p> <p>Model to students what an example of this looks like, using a previous example.</p> <p>In their groups, get students to practice formulating questions. Teacher to conference with each group. Once all groups have had the opportunity to conference with the teacher, students record their questions using 'Windows voice recorder' and listen back to the recordings to ensure that they are articulate and clear. Provide students with the opportunity to share their recordings with the class and discuss the formation of the questions and the clarity of sentences used.</p>

Notes:

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PREPARING FOR THIS ACTIVITY:

**Using 'voice to text'**

<https://www.youtube.com/watch?v=2mutBUjeAeA>

**Using 'Windows voice recorder'**

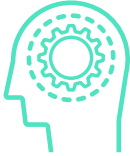
<https://web.microsoftstream.com/video/892d11b4-a595-457d-93f0-6518147066af>

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PRINTABLES FOR THIS ACTIVITY:

N/A





### MINI CHALLENGE 3

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. Write your instructions as if you are talking to students. Often prototyping and feedback session before refining projects works well.

<b>Mini Challenge</b>	Question development and recording techniques
<b>Formative Assessment</b>	Forming questions on a whole class Jamboard
<b>Learning Intentions</b>	To work collaboratively and cooperatively to form questions. The students jointly construct the questions and form their ideas to explore the intention of the language that is used and how the questions are formed.
<b>Success Criteria</b>	I can turn a fact/ something interesting into a leading question I can consider the questions and collaboratively modify them to form Un-Googleable versions.
<b>Learning Activities</b>	<p>Ask students if they know what a Podcast is? Explain to students that a podcast is a way of gaining knowledge about a whole range of different topics whilst at the same time fulfilling the purpose of providing entertainment to an audience/listener. Provide students with an opportunity to listen to an extract of a Podcast (selected base upon a contextualised idea).</p> <p>Discuss with students the differences between a 'Google-able' and an 'un-Google-able' question. Explain that a 'Google-able' question is one that you can simply type into a search engine and find an answer. Whereas an 'un-Google-able' question is one that requires a lot more researching/investigating/collaborative discussion to arrive at an answer.</p> <p>Jointly construct an example of an 'un-Google-able' question. Refine the questions posed from the previous session to ensure consistency and encourage the concept of a narrative to be explored.</p> <p>Students jointly construct questions that explore the language that will lead the interview and encourage the telling of stories (un-Google-able questions). Discuss the wording of the questions, ensuring to explain to students that the intention of these questions is to ask of the experience from the experts. Questions are intended to 'not' have clear and definite answers by using sentence starters, for example:</p> <ol style="list-style-type: none"> <li>1. Can you tell me about X?</li> <li>2. What was it like X?</li> <li>3. How did you feel about X?</li> <li>4. Is there anything interesting that you found about X?</li> <li>5. What was the most challenging part of X?</li> </ol> <p>Get students to add their ideas and questions to a 'Jam board' so that this can then be viewed and discussed by the whole class. The Jam Board is an effective tool to use as students can see the work/thinking of their peers, hence promoting thought and collaborative discussion.</p>

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PREPARING FOR THIS ACTIVITY:

**Sydney Metro**

<https://www.sydneymetro.info/>

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PRINTABLES FOR THIS ACTIVITY:

N/A



## MAIN CHALLENGE

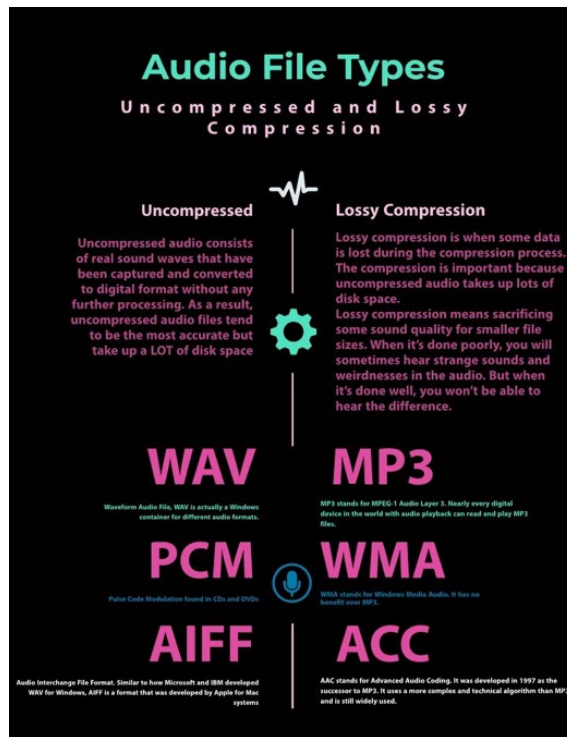


Build the learning necessary for a student to achieve the challenge. All learning should work towards achievement in that step of the STEM Solutions Pedagogy. Write your instructions as if you are talking to students. This Main Challenge should complete with an exhibition and reflection.

<b>Main Challenge</b>	Interview, edit and Publish
<b>Assessment</b>	Conducting the interview, listening to the responses, editing the audio based on what they can hear.
<b>Learning Intention</b>	To engage in active listening to help us to understand what is being said and further our understanding
<b>Success Criteria</b>	<p>I can ask experts questions and respond to what they are talking about</p> <p>I can listen to the interview and edit the audio.</p> <p>I can add additional information to help my audience to enjoy the story</p>
<b>Learning Activities</b>	<p>As a class visit the following website/video and discuss the importance of using how different microphones capture different audio qualities:  <a href="https://web.microsoftstream.com/video/6f3126e1-131a-481e-a487-f20db309e83a">https://web.microsoftstream.com/video/6f3126e1-131a-481e-a487-f20db309e83a</a></p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="472 758 1122 1217"> <p>Where is the sound coming from and what is it bouncing off?</p> <ul style="list-style-type: none"> <li><span style="color: green;">█</span> Direct sound</li> <li><span style="color: blue;">█</span> Wall reflections</li> <li><span style="border: 1px solid white; display: inline-block; width: 10px; height: 10px;"></span> Double wall reflections</li> </ul> </div> <div data-bbox="1249 742 2007 1265"> <h3 style="text-align: center;">Ambient Noise and Echoes</h3> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>With lots of hard surfaces in a small room. The sound will bounce off everything</p> </div> <div style="width: 30%;"> <p>With some acoustic boards or sound proofing they will capture some of the reflections and echos. Curtains, blankets and cushions are all things you can use.</p> </div> <div style="width: 30%;"> <p>Large rooms allow for the sound to travel before it bounces. The bigger the room the further the sound will have to travel before it gets back to the microphone. This is the cause of echoes.</p> </div> </div> </div> </div> <p>As a class, students conduct the interview with an industry expert (facilitated by the teacher), ensuring that each group is provided with the opportunity to ask the industry expert their questions (this is important as each groups questions/responses will be used by each group to learn how to save, edit and collaborate their audio files in preparation for inclusion into the class podcast).</p>

Once the interview is completed, model how to download, save and edit the audio recorded files using the following SharePoint slide deck:

<https://schoolsnsw.sharepoint.com/sites/STEMShareLibrary/SitePages/Audio-recording.aspx>



Provide students with time to finalise the edits on their recorded files.

### Editing and compiling the audio

Students use a shared google drive folder that has all of the recordings and files uploaded. It is important to ensure that the audio from the interview is available as both a 'full length' and as each 'individual' question broken into sections.

Additionally, it is important to ensure that the audio files are not edited or trimmed before they are shared with the students (only separated into sections) to allow the students to listen deeply to a few minutes of audio, rather than finding a section from within the long form interview. This will allow the student the opportunity to edit and remove unnecessary sections and add in additional recordings to assist in the story telling aspects of the podcast.



	<p><b>Edits and cuts are made with Adobe Audition (How to guide)</b>  <a href="https://web.microsoftstream.com/video/ab70bf07-c0ea-4f5f-bfee-bf19371d3244">https://web.microsoftstream.com/video/ab70bf07-c0ea-4f5f-bfee-bf19371d3244</a></p>
<b>Exhibition</b>	<p>Once all students have edited their questions, the teacher will facilitate the production of piecing the separate audio files back together. Students are provided with the opportunity to share their podcast. A few ideas/ways to achieve this include:</p> <p><b>Broadcast</b> – Broadcast to the school via the PA (Public Announcement) system. Most schools have a way of broadcasting music, bells and messages. This same system could be used to broadcast student audio content to the school community.</p> <p><b>Share on demand</b> – Create episodes and content that can be consumed on demand. This is when you put the content on a website, the school server, class site etc. this allows the audience to listen to the content whenever they like. You can even have the audio file available to download, that way anyone can add it to their device and library content.</p> <p><b>Embedded into another piece of work</b> – The audio that you create can, and is often, added to other work. This can be in the form of a: 'click here' to listen to the sounds within a written piece of work, sound added to a video, sound effects on a website, the into to a game etc. Google, Microsoft and Apple platforms all allow sound files to be added.</p>

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**PREPARING FOR THIS ACTIVITY:**

**How different Microphones behave**

<https://web.microsoftstream.com/video/6f3126e1-131a-481e-a487-f20db309e83a>

**Adobe Audition edits and cuts .**

<https://web.microsoftstream.com/video/ab70bf07-c0ea-4f5f-bfee-bf19371d3244>

**Download and edit the audio from the recording**

<https://schoolsnsw.sharepoint.com/sites/STEMShareLibrary/SitePages/Audio-recording.aspx>

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**PRINTABLES FOR THIS ACTIVITY:**

N/A