



Designing and Developing Lessons

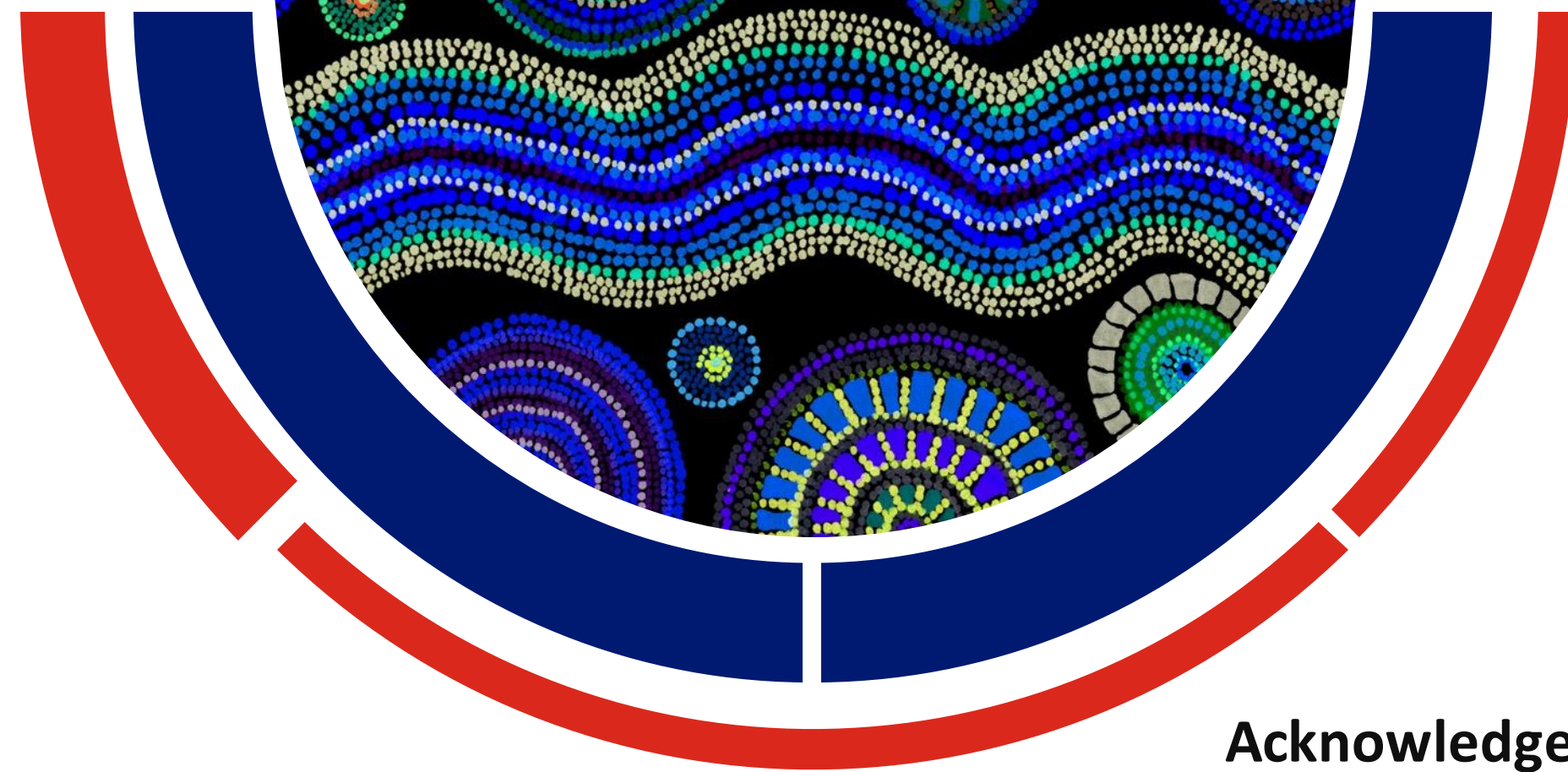
Developing units of work and including the Digital Literacy Capability

Access the presentation here:



<https://bit.ly/EDF2079>





Acknowledgement of Country

The ACS would like to acknowledge the traditional custodians of all the lands from which we join. We pay our respects to the Elders past, present and emerging and extend that respect to other Indigenous Australians present.

Meet Catherine

ACS ICT Educators' Specialist



I was a Primary School teacher for 12 years and a Technology and Learning Lead role for 5 years

I studied at Monash University to get my postgraduate degree specialising in Education Technologies.

I lead the ACS ICT Educators national program to support the implementation of the Digital Technologies Curriculum across Australia.

I am the co vice president of DLTV – the digital technologies subject for Victoria.

Trends in education

Trends in Secondary School



They are teaching out of their expertise and field



They aren't provided units of work and lessons. Many are just working week by week



Digital Technologies teachers in the past have been the ones to teach the Digital Literacy Capability



They aren't aware of the subject associations that exist for their subject matter

Your pedagogy

Pedagogy



Educators

Knowing our students
Knowing our pedagogy



Curriculum

Honor the Curriculum
Know what requirements
we need to fulfill



Technology

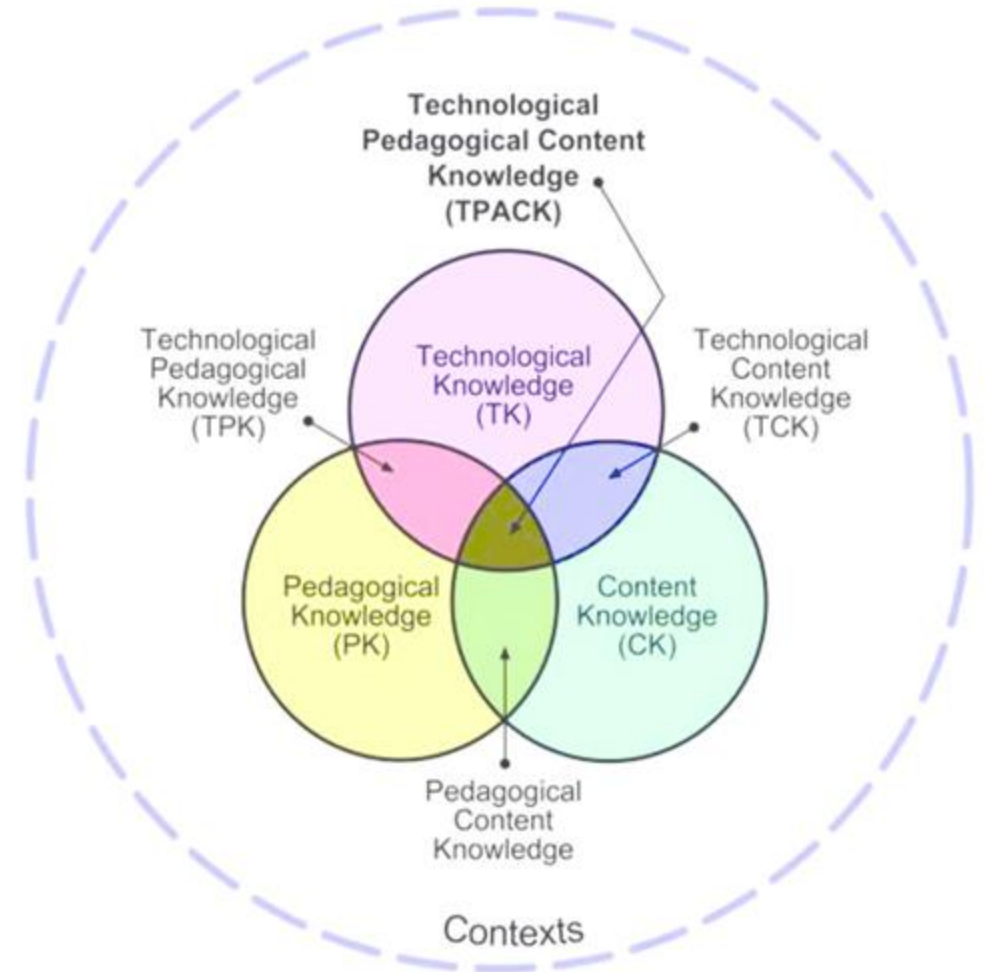
Allows you to evaluate the technology for your
purpose. Choose the right tool for the task

TPACK



TPACK is a way of describing how technology pedagogy and content fit together to enable powerful learning.

The TPACK model highlights that an idea for using ICT in classrooms must have a sound curriculum and pedagogical fit.



TPACK in 2 minutes



Bloom's Taxonomy

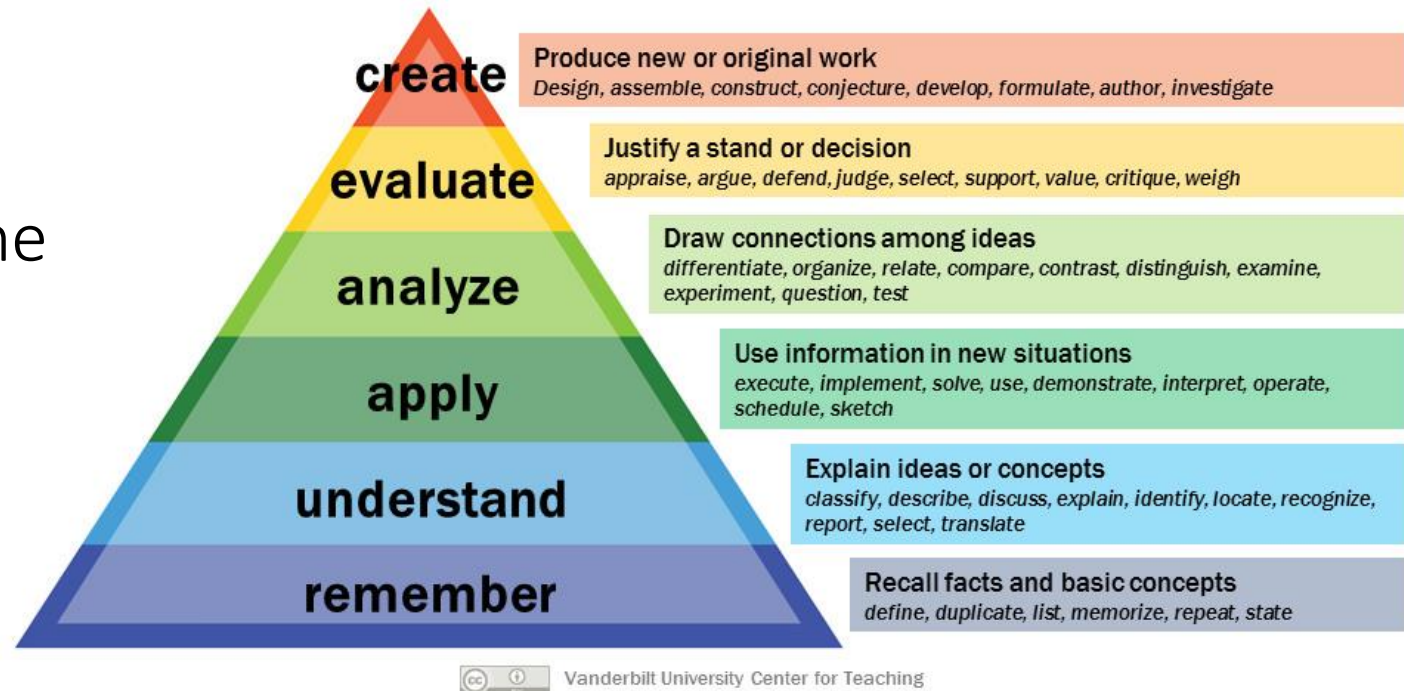


Bloom's is a framework to help categorise learning goals.

Bloom's is used to help develop the structure of knowledge.

The verbs are used to construct success criteria and learning intention statements.

Bloom's Taxonomy



Who I am



I love technology

I was always looking for technology. I'd give it a go in the classroom. I would be honest with my students and tell them I wasn't sure what would happen



Inquiry Based Learning

My teaching was focused on inquiry based learning and connecting multiple curricula



Student driven learning

I called it 'organised chaos' but students would drive their own investigation. They all completed a project but the journey was different



Technology

I had to find technology that allowed my students to learn at their own pace and provide them content knowledge so they could apply it

Real world connections

Real World Connections



Inspiring our students to see a purpose to learn the content – ‘why are we learning this?’



Make the learning authentic for your students



Not concerned with the curriculum yet. Focus on ideas that excite you



Look at your school and outer community and find ways to connect your subject

**‘How can I use these in
my teaching?’**

Block by Block



More information

<https://www.blockbyblock.org>

Summary

Block by Block is a nonprofit organization that uses Minecraft as a tool to help people in the community have a voice on how to design and shape community spaces.

Project Daniel & 3D Printers



More information

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



Summary

An American built an arm for Daniel. The arm was created using 3D Printers. The local people were trained on how to create more arms.

Drones Stop Poaching



More information

<https://mashable.com/archive/drones-stop-rhino-poachers>

<https://www.nbcnews.com/news/world/air-shepherd-uses-drones-stop-elephant-rhino-poachers-africa-n335801>

Summary

Park rangers in Africa stop poaching using programmed drones that locate where the animals are and poachers are likely to strike.

TikTok and 3D Printers



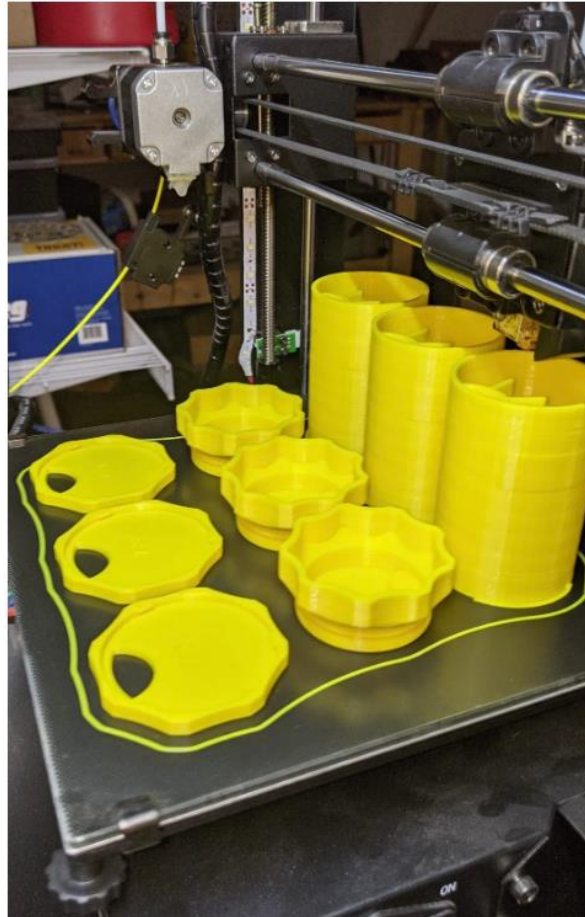
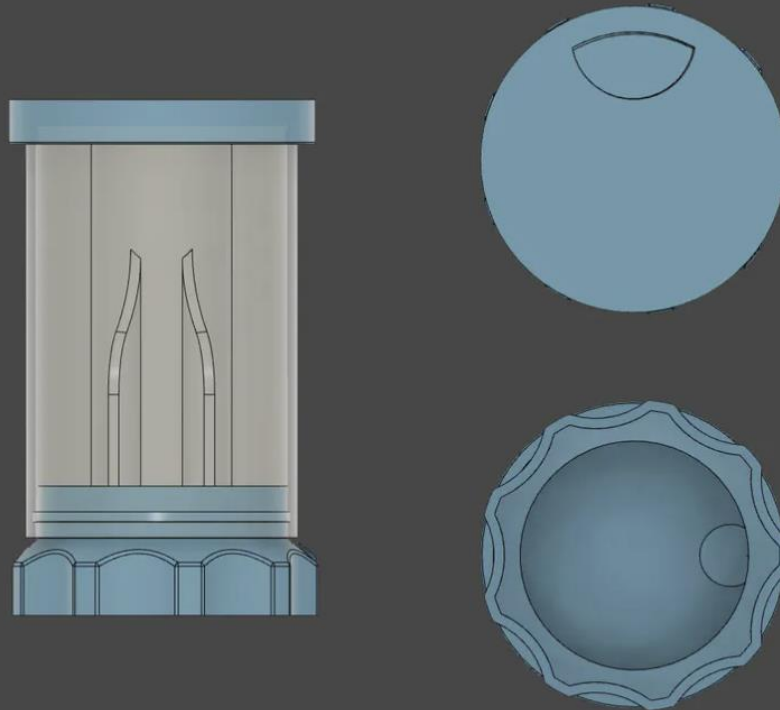
More information

<https://www.theverge.com/2021/1/23/22244673/parkinsons-tiktok-crowdsourced-pill-bottle>

Summary

TikTok was used as a platform to help a man dispense Parkinson's Disease pill easily. Social media brought skilled people together and now the design is open source, helping everyone.

Pill Bottle Prototype 1 - Brian Alldridge



Agriculture Farming Robot



Solar panels are placed at the top to collect solar energy for the machine

More information

<https://www.bridgestone.com/bwsc/stories/article/2019/06/17-7.html>

Summary

An Australian design to help farms plough crops more effectively. There are sensors that help locate the crops!

Planning

Preparing Scope and Sequence



Snapshot of the year to understand what evidence and content you need to collect for reports



Evaluate your year – see what worked well and what you can improve on



Gives you direction for the year. Rather than relying on weekly planner



Won't be perfect the first time but you can see the content descriptions that have been taught

Creating a Scope and Sequence



YEAR LEVEL:	TERM 1	TERM 2	TERM 3	TERM 4
KEY CONCEPTS <ul style="list-style-type: none"> What is the focus/big question that will drive the term? 	Focus:	Focus:	Focus:	Focus:
SHORT OVERVIEW <ul style="list-style-type: none"> What's happening in the term? What will the students achieve? 	Summary:	Summary:	Summary:	Summary:
CURRICULUM <ul style="list-style-type: none"> Where do the concepts sit within each term? 	Curriculum Focus:	Curriculum Focus:	Curriculum Focus:	Curriculum Focus:
ASSESSMENT <ul style="list-style-type: none"> What is the assessment? What part of the achievement standard/content descriptions will be the focus? What content descriptions will be the focus? 	Assessment: Achievement Standard: Content Descriptions:	Assessment: Achievement Standard: Content Descriptions:	Assessment: Achievement Standard: Content Descriptions:	Assessment: Achievement Standard: Content Descriptions:
RESOURCES <ul style="list-style-type: none"> What resources will help you teach the Curriculum? 				

Creating a Scope and Sequence

YEAR LEVEL:

KEY CONCEPTS

- What is the focus/big question that will drive the term?

SHORT OVERVIEW

- What's happening in the term?
- What will the students achieve?

CURRICULUM

- Where do the concepts sit within each term?

ASSESSMENT

- What is the assessment?
- What part of the achievement standard/content descriptions will be the focus?
- What content descriptions will be the focus?

RESOURCES

- What resources will help you teach the Curriculum?



1

Overview

2

Curriculum &
assessment

3

Resources

TERM 1	TERM 2	TERM 3	TERM 4
<p>Summary Students will identify and describe how data transmission occurs when using digital applications. Students will recognise cybersecurity threats and discover ways in which they can protect from those risks. Students will construct a reference guide guiding others on how to implement cybersecurity measures.</p>	<p>Summary Students will recognise the broad range of cultures represented in school and the manifest cultural holidays and significant events which occur each year. Students will record and recall key cultural festivals for the multicultural student cohort including dates, traditions and food using applications such as Excel. They will investigate a short list of digital tools to evaluate their strengths and weaknesses in collating and presenting key cultural data. Then students will select the most suitable digital tool and apply its functionality when competing the cultural calendar project.</p>	<p>Summary Students will storyboard and then wireframe the user experience story/journey for their Cultural Calendar application. Students will incorporate Multi Factor Authentication (MFA) into the login/accessibility of their application, leveraging the learning from term one. Students will select one world cultural festival represented in their student cohort and apply user instructions to produce a prototype/minimum viable product (MVP) version of the Cultural Calendar in a prescribed software application.</p>	<p>Summary Students will identify a feature from their storyboard which is not implemented adequately in their software application build. Students will recall and practice the steps to refining their software application through using programming language. Students will use the acquired skills to upgrade the functionality of their application.</p>
<p>Key Concepts</p> <ul style="list-style-type: none"> • Digital systems – evaluating cybersecurity safety applications, i.e. when why and how to use. • Data and Information – applying process steps from user guides for cybersecurity applications. • Collaboration – group work in discovering, identifying, and applying the knowledge of the term. • Creating Digital Solutions – creating a user guide: i.e. forming a set of instructions to perform a task then following a set of instructions on how to create a teach-anybody guide. 	<p>Key Concepts</p> <ul style="list-style-type: none"> • Digital Systems – data collation tools (e.g. Excel), calendar applications (e.g. Google Calendar). • Data and Information – researching and collating relevant cultural information – images and expositions. • Online collaboration – evaluating data collations solutions and creating the <i>Cultural Calendar</i>. • Creating Digital Solutions – applying their research data to software to create their <i>Cultural Calendar</i>. 	<p>Key Concepts</p> <ul style="list-style-type: none"> • Digital Systems – recalling the steps to producing storyboards and wireframes. • Data and Information – applying selected data to the creation of storyboards and wireframes. • Online collaboration – producing a prototype of a working digital app. • Creating Digital Solutions – producing a prototype of a working digital app. 	<p>Key Concepts</p> <ul style="list-style-type: none"> • Digital Systems – implementing programming language to modify their software application prototype • Data and Information – applying programming language rules to solve a build requirement • Creating Digital Solutions – creating a new, improved feature in their application through the use of bespoke means (programming language).
<p>Content descriptions</p> <ul style="list-style-type: none"> • AC9TDI8K02 • AC9TDI8P13 • AC9TDI8P14 <p>Achievement standards Develop and modify creative digital solutions. Decompose real-world problems. Evaluate alternative solutions against user stories and design criteria. Explain how data is transmitted and secured in networks, identify cyber security threats. Students manage their digital footprint.</p> <p>Assessment pieces Creating a Teach You user guide. Students will organise a set of instructions into an ordinal reference guide. Creating a risks vs solutions matrix. Students will populate a proforma which captures the cybersecurity risks they have learned and matches them to identified solutions.</p>	<p>Content descriptions</p> <ul style="list-style-type: none"> • AC9TDI8P04 • AC9TDI8P01 • AC9TDI8P11 • AC9TDI8P12 <p>Achievement standards Decompose real-world problems. Evaluate alternative solutions against user stories and design criteria. Select appropriate hardware for particular tasks.</p> <p>Assessment pieces Students will collate the key information for cultural festivals represented by the diversity backgrounds of their school cohort. The Cultural Calendar will provide visual and expositional details of the festivals and synch with a calendar app to provide reminders of key dates. Students will evaluate and select digital tools to use in their project when collating cultural data. Students will evaluate and select digital tools to present their data.</p>	<p>Content descriptions</p> <ul style="list-style-type: none"> • AC9TDI8P07 • AC9TDI8P11 • AC9TDI8P12 <p>Achievement standards</p> <ul style="list-style-type: none"> • Develop and modify creative digital solutions. • Decompose real-world problems. • Evaluate alternative solutions against user stories and design criteria. • Acquire interpret and model data with spreadsheets and represent data with integers and binary. • Select and use a range of digital tools efficiently and responsibly to create, locate and share content. • Select and use a range of digital tools efficiently and responsibly to plan, collaborate on and manage projects. <p>Assessment pieces Producing a prototype/minimum viable product (MVP) version of the Cultural Calendar in a prescribed software application. Students will use the content they have researched, stored and refined to inform their storyboarding and wireframe. Students will use section of the storyboard and wireframe to create a prototype section of a software application using a prescribed software build tool.</p>	<p>Content descriptions</p> <ul style="list-style-type: none"> • AC9TDI8P09 <p>Achievement standards Design and trace algorithms and implement them in a general-purpose programming language.</p> <p>Assessment pieces Identifying a feature in their storyboard which requires bespoke coding (programming language) to implement in the prescribed software application. Modifying their prototype section of a software application to implement the feature using code (programming language).</p>
<p>Resources</p> <ul style="list-style-type: none"> • Process guide for modelling the Teach You asset. • Pro forma for students to complete the risks vs solutions matrix. • Case studies content for examples of cybercrime. • User guides for cybersecurity solutions – e.g., MFA. These are further referenced in the lesson plans. 	<p>Resources</p> <ul style="list-style-type: none"> • Selection criteria guides for selecting data solutions • Cultural insights guides explaining specified cultural festivals • Process guides for completing an Agile project of data collation and presentation 	<p>Resources</p> <ul style="list-style-type: none"> • User guides and templates for storyboarding • User guides and templates for wireframing • User guides for app production software 	<p>Resources</p> <ul style="list-style-type: none"> • Sandpit / practice environment for coding • Code cheat sheet • User guides for app production software, focused on bespoke code driven modifications

Creating a Unit of Work



Create timeline of development of skills



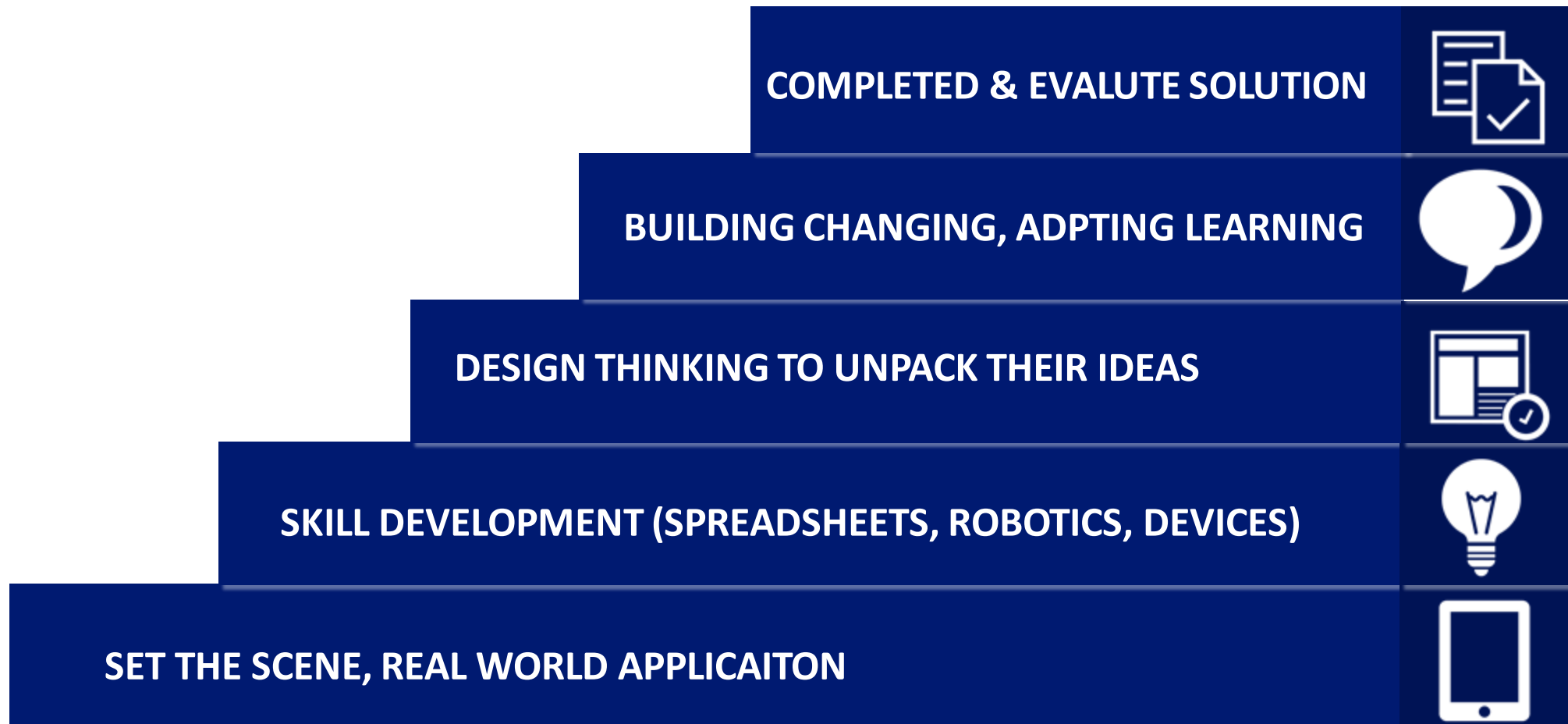
What is the end project you want them to complete and how will you get them to the end product



Create a connection with real world – allows students to explore real world problems (start or end)

Creating a Unit of work

Graphic organiser – staircase



Creating a Unit of work

OVERVIEW

- What does the unit entail?
- What is the main assessment piece or work students will complete?
- How does that relate back to the curriculum?

KEY LEARNINGS

- What are the key questions you will ask?
- What are the key learnings the students will take away from the unit?
- What is the key vocabulary that students will be using throughout the unit?

LESSONS

- What is the lesson topic?
- How does this align with the curriculum?
- What is the learning intention and success criteria?
- What do you want the students to learn?
- How will they demonstrate their learning?

ASSESSMENT

- How does the unit align to the Achievement Standards?
- How have students demonstrated their learning?
- How can you link what they have learnt with the Content Description and achievement standard?

1

Overview

2

Key learnings

3

Resources &
Assessment

Using Minecraft to Enhance Communities



Use the organisation Block By Block as the real-world inspiration



Students design a new community space – this could be around the community or on school grounds



Design on paper then transfer to create



Curriculum focus online collaboration, evaluation of existing solutions and coding (optional)

Enhancing Communities with Minecraft



Unit Overview

This unit of work has been created to demonstrate how a global non-profit organisation has utilised the features of Minecraft to help under privileged communities. Students will use the ethos of the organisation as a catalyst to design and virtually build a community that will benefit the needs of an identified group of people. The chosen community can be one for local friends and family or reach another community on a global scale.

Other Curriculum Targeted Areas

Other curriculum areas can be targeted and assessed within this unit.

Other areas of interest may include:

- Design and Technology
- Mathematics (Data)

Further investigation into these areas is required to ensure they align with the following activities. Activities may need to be modified to ensure content descriptions and achievement standards are met.

Australian Curriculum Alignment

The following sessions have been created using the Australian Curriculum: Digital Technologies Curriculum. Tasks may need to be modified to ensure state Digital Technologies Curriculum content descriptions and achievement standards are met. ACS has support and documents to help align this unit to other Digital Technology Curricular.

Session

'Session' has been used to define the order of tasks to complete the unit. It does not define a set time required to complete the task. Time allocated to complete a session is the teacher's discretion. This allows for flexibility for the teacher to drive the duration of the task and make modifications if necessary. Sessions can be merged into one set period or sessions may run over multiple periods.

Enhancing Communities with Minecraft



Key Preparation

Minecraft is the chosen platform to complete this unit of work. The right platform will depend on the school's resources and access to digital technology. Investigation into other platforms may be required if Minecraft is not suitable.

It is encouraged to explore and understand basic functions within the chosen digital platform. Full knowledge and upskilling is not required. By providing skill development for the students (see Session 3) students will familiarise themselves with the capabilities and functions within the platform.

ACS Resources

Resources have been created to help teachers and students unpack and understand topics found within the Digital Technologies Curriculum. These give brief explanations of the topic and the expectations to teach the topic at the curriculum year level. It is intended the information is presented in a way that will set the foundation for further research.

ACS ICT Educators Community

ACS has resources to support the teaching of the Digital Technologies Curriculum from Foundation to Year 10. Access the community and resources by joining for free via: <https://www.acs.org.au/ict-educators.html>

Key Understandings

- Describe how digital technology has been used to help communities.
- Use Minecraft to design a solution to a problem in a community.
- Use Minecraft to explore how coding can be integrated into their design to further enhance functions within Minecraft.

Key Questions

- How is Minecraft used to help real life communities around the world?
- How can you use Minecraft to redesign an area in our local community to benefit our members?
- How can you incorporate code into your design to enhance any features to automatically move/change?

Key Vocabulary

Collaborative projects, online protocols, design thinking, Minecraft, computational thinking, algorithms, flowcharts, programming, iteration, branching, user input, flowchart, digital solutions.

Enhancing Communities with Minecraft



Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
1.	Online Collaboration	<p>Learning Intention Students will identify a set of protocols to follow when working in online spaces.</p> <p>Success Criteria I can generate a list of dos and don'ts and explain why they are important protocols to follow. When working in online spaces, I am an active member of my team and the workload is shared evenly between us.</p>	Discuss the similarities and differences of working in the classroom and online and the importance of continually abiding by these protocols (rules).	Students work in small groups and connect with each other in an online document that allows them to collaborate. They create a list of 'dos and don'ts' to successfully work online. They explain why it is important that the protocols are upheld.
		<p>Student Resources</p> <ul style="list-style-type: none"> ACS Student Resource: Online Collaboration 	<p>Teacher Resources</p> <ul style="list-style-type: none"> ACS Teacher Resource: Collaboration Chosen digital platform to allow users to collaborate online 	
2.	Digital technology used to help communities	<p>Learning Intention Students will explain how the non-profit company, Block By Block, uses Minecraft to redesign underprivileged communities.</p> <p>Success Criteria I can explain how Minecraft is used to help design and create communities.</p>	Students brainstorm all the different uses of Minecraft and any functions of Minecraft they know.	<p>Introduce students to the non-profit organisation Block By Block, Together watch the introduction video (found on the home page of the Block By Block website).</p> <p>In groups student choose and investigate different projects that have been created through Block By Block. They complete a profile card, explain the project, the design and a personal reflection.</p> <p>Students share their findings with their class.</p>
Session Resources	<p>Student Resources</p> <ul style="list-style-type: none"> Block By Block 		<p>Teacher Resources</p> <ul style="list-style-type: none"> Block By Block Project Profile (located at the end of the unit session) 	

Enhancing Communities with Minecraft



Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
5.	Creating a digital solution	<p>Learning Intention Students will use Minecraft to create their design of a digital community.</p> <p>Success Criteria I can use Minecraft to create a digital design of a space for my chosen community.</p>	Students will share their drawing and design with their peers.	Students will commence creating their design of their community. They will use their drawings and plans to guide their digital design.
Session Resources	Student Resources		Teacher Resources	
6.	Coding in Minecraft/ Creating a flowchart	<p>Learning Intention Students will create a flowchart to show how programming can be incorporated into their community design.</p> <p>Success Criteria I can create a flow chart to show how explicit instructions (algorithms) can be used in my community design.</p>	<p>Students share their designs (as a work in process) and showcase the different features they have created. In small groups, students look for ways to incorporate programming and code in their design.</p> <p>*The following lessons can be incorporated while the previous session is still in place.</p>	In groups students commence to identify different functions they could code to incorporate into their community. Students create a flowchart (or list of instructions) written in English to show how the functions would be carried out.
Session Resources	<p>Student Resources</p> <ul style="list-style-type: none"> ACS Student Resource: Algorithms ACS Student Resource: Flowcharts 		<p>Teacher Resources</p> <ul style="list-style-type: none"> ACS Teacher Resource: Algorithms 	

Assessment – Australian Digital Technologies Curriculum

Content Description	Session Number	Assessment Piece	Assessment Statement
Examine the main components of common digital systems and how they may connect together to form networks to transmit data (ACTDIK014)	N/A		
Examine how whole numbers are used to represent all data in digital systems (ACTDIK015)	N/A		
Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information (ACTDIP016)	N/A		
Define problems in terms of data and functional requirements drawing on previously solved problems (ACTDIP017)	2	Design of their community	Students identified the needs of the people in the community by gathering data about the people and the environment. They used this data to influence the design of a new space.
Design a user interface for a digital system (ACTDIP018)	2 & 3	Design of their community	Students used the digital platform Mine Craft to design and create a community.
Design, modify and follow simple algorithms involving sequences of steps, branching, and iteration (repetition) (ACTDIP019)	4	Flowchart/written instructions	Students identified different tasks they could add to their community design in Minecraft. They created a flowchart/set of instructions to show the sequence of steps to complete their tasks. The sets incorporated branching and iteration.
Implement digital solutions as simple visual programs involving branching, iteration (repetition), and user input (ACTDIP020)	5	Code written	Students converted their flowchart/written set of instructions to code in Minecraft. The code they created used branching, iteration and user input.
Explain how student solutions and existing information systems are sustainable and meet current and future local community needs (ACTDIP021)	1 & 6	Community design reflection	Students explained how Block By Block (an organisation that uses Minecraft to help design communities) meets the needs of local and global communities.
Plan, create and communicate ideas and information, including collaboratively online, applying agreed ethical, social (ACTDIP022)	1	Working collaboratively to design and create space	Working in the collaborative environment (Minecraft) students worked together to design and create a community. They followed protocols (identified within their group) and followed these to ensure all teams members contributed to the project.

Activity

Enhancing Communities with Minecraft

Using Minecraft to rebuild a community space.

Creating Entrepreneurs

Looking at how AirBnB has disrupted the hotel industry. Find a problem in local community that can be solved with technology.

Getting Connected

The reality there remote communities around the world not connected to the internet. Create a community in Minecraft and think about the technology that is needed to connect them to the internet.

UN Sustainable Goals

Students choose a UN sustainable goal and look at how it can be solved with technology.

Smart House

Design a smart house that is fit for purpose.

Natural Disasters

Choose a natural disasters and look at how technology can play a part to reduce casualties.



Stress Less

Technologies has disrupted health! Students identify how emotions can impact their lives and create a app to help them through it

Social Data Helping Scientists

Learn about data how to use a spreadsheet. Investigate how marine scientists are using social data and create an app to collect data on an animal.

Micro:bit Camping Companion

Imagine living in a community that isn't connected to the internet. The reality – it's still happening today! Create a community in Minecraft and think about the technology that is needed to connect them to the internet.

Creating a Unit of Work



1

Pick a unit of work to look at. Understand the big idea and what technology has been incorporated

2

Start just with the overview. Have the Digital Literacy Capability open and how you can fit it in. **BE BOLD**

3

Save a copy of the 'Digital Literacy Template'. Start unpacking your idea.



Thank you

