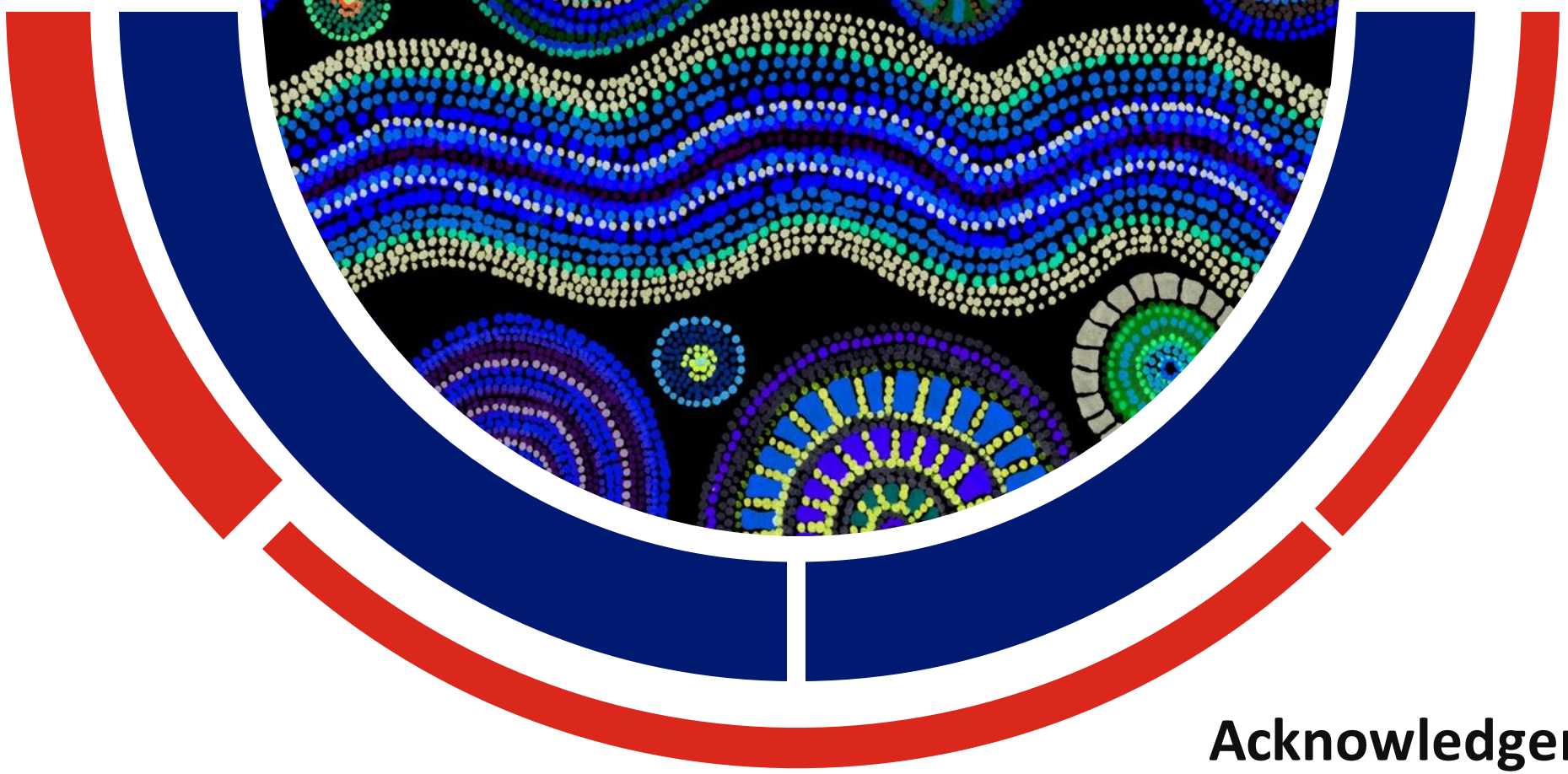
Get Creative with the Digital Technologies Curriculum

Presented by: Claire Andrewartha and Catherine Newington



Acknowledgement of Country

ACS acknowledge the Traditional Custodians of the land on which we gather today. We pay our respects to their Elders past, present and emerging. We extend that respect to Aboriginal and Torres Strait Islander peoples participating in this meeting today.

Meet Claire and Catherine

Claire Andrewartha

Claire Andrewartha is a passionate and dedicated lead teacher of Technology and Humanities with almost 20 years teaching experience in the primary and secondary classroom. Solutions focused and action oriented, she strives to help people navigate complexities in the classroom.

Catherine Newington

Catherine Newington is the ICT Educator Specialist at Australian Computing Society. She leads the ACS national program to support schools to implement the Digital Technologies Curriculum.

Agenda

01 **Pedagogies**
Project Based Learning and the importance of connecting to the real world.

02 **Scratch Examples**
Activity ideas using Scratch Junior and Scratch and example of a skill development continuum

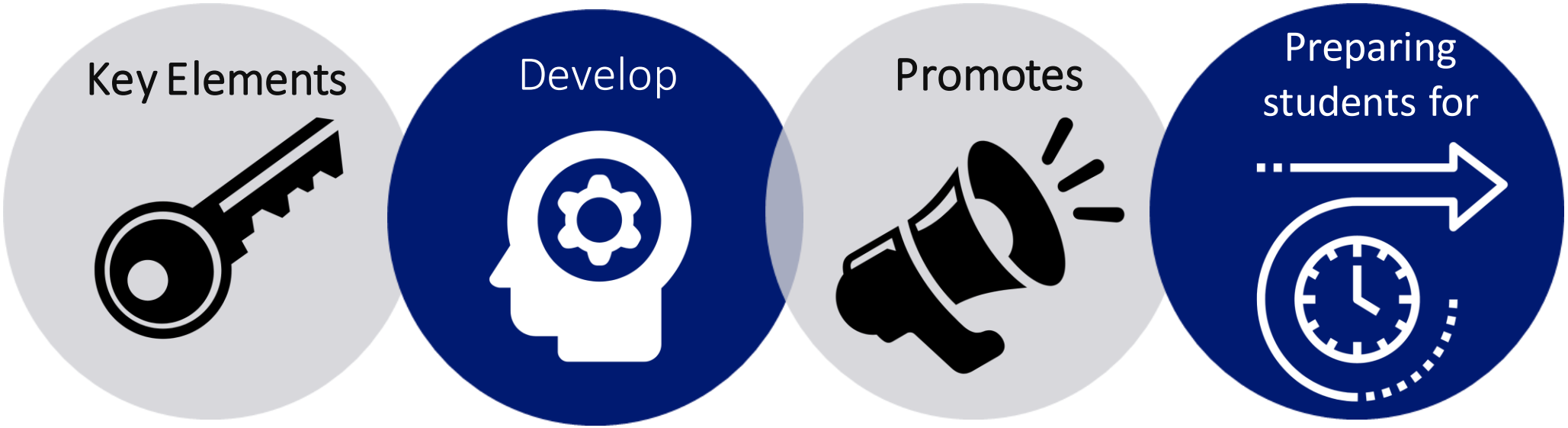
03 **Minecraft Examples**
Activity ideas using Minecraft

04 **Cubetto Examples**
Activity idea using Cubetto

05 **BeeBot Examples**
Activity idea using Beebots in the junior years

Project based learning

Project-Based Learning provides an effective educational approach that fosters active learning, critical thinking, collaboration, and real-world application of knowledge, ultimately preparing students for success in their future endeavors.



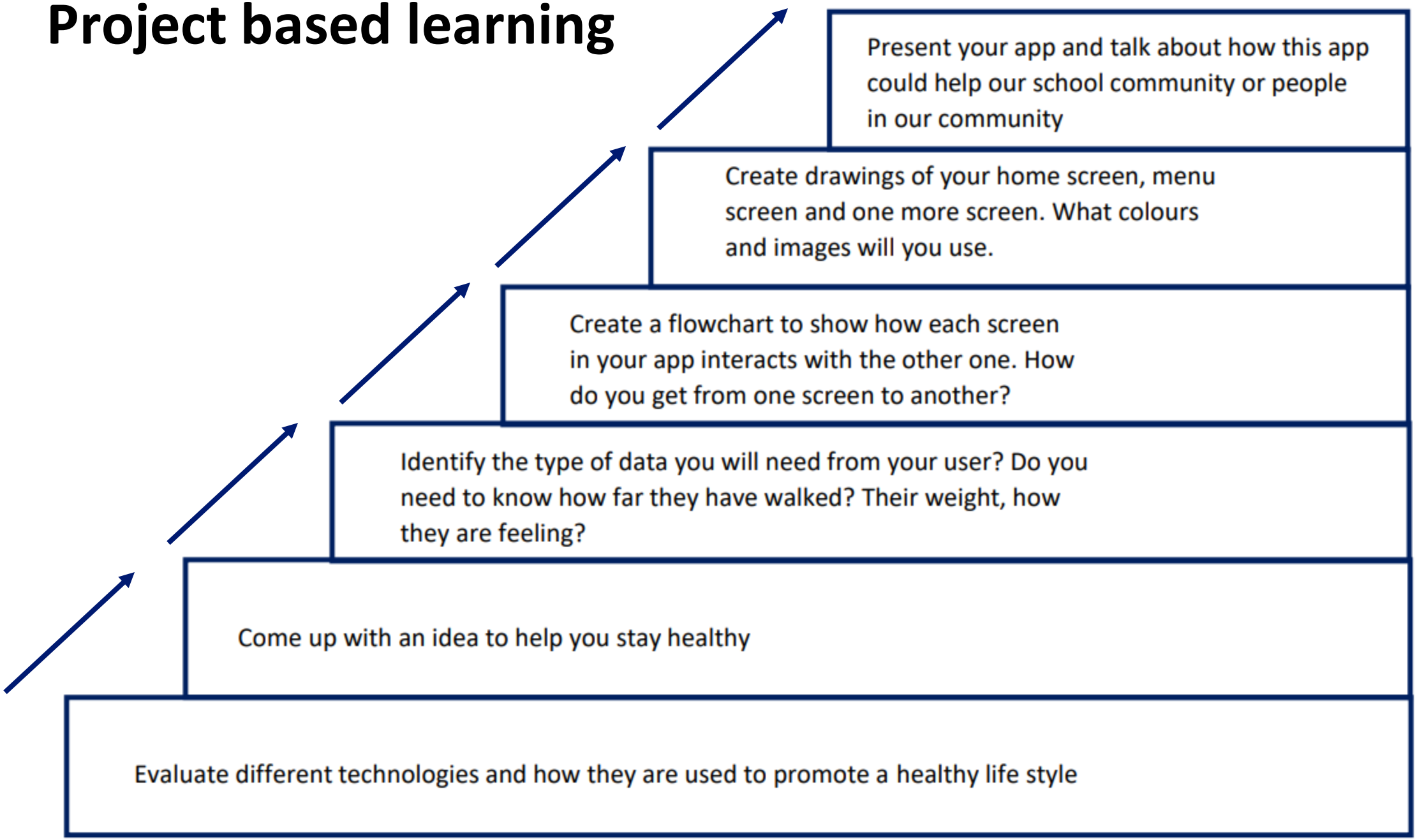
Real-world projects
Inquiry and investigation
Active learning
Collaboration
Authentic assessment
Reflection and feedback

Problem-solving and critical thinking skills
Creativity and innovation
Teamwork & collaboration
Communication & presentation skills

Student engagement & motivation
Application of knowledge & skills to real-world situations

Future challenges and careers

Project based learning



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

Mobile Loaves & Fishes in Austin, Texas is taking a unique approach to combating homelessness. They're using technology to come up with innovative housing solutions.

Japanese students use Augment Reality to learn about the dangers of flash floods

The Amazon Basin Conservation Association in Per is cracking down on illegal loggers. Drones are helping locate and find the loggers.

The shoe company Camper is utilizing 3D Printers to help create prototypes of shoes. Designers create and engineers create.

Waddles the duck was born with a deformed leg. With the help of 3D printers he was given a new leg.

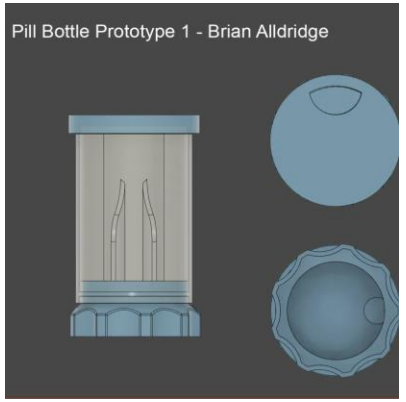
Real World Problems

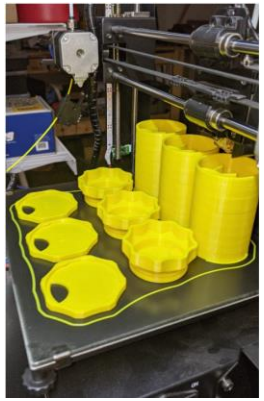
Create authentic learning experiences for students – show them the potentials of technologies and bringing those stories into the classroom. These stories can inspire our students to see the potentials and positive impacts of technologies across the globe.

This story comes from NZ! Recording a sheep dog's bark to help heard farm animals.

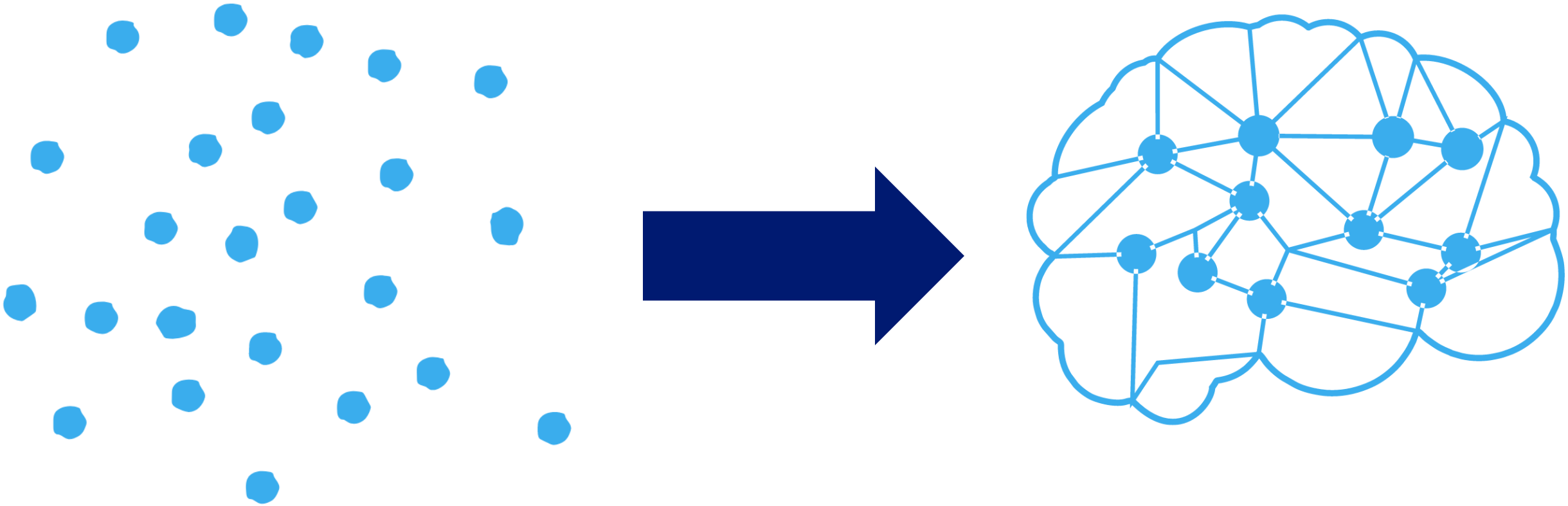
A group of scientists at Oregon State University captured rare footage of blue whales. This footage helps scientists with insight into what the whales eat.

TikTok was used as a platform to help a man dispense Parkinson's Disease pill easily.





From standalone lessons to connected lessons



Choosing a pathway; so many options!

Considerations

Scope and sequence of the program:

- **Whole School / Individual Subject**
- **Curriculum**
    - Content descriptors
    - Elaborations
    - Achievement Standards
    - Cross-curricular opportunities / links for authentic learning applications
- **Individual contexts**
    - **Pedagogy - know your learners, play to your strengths and look to extend**
    - **Logistics, organising and planning:**
        - Human resources – team size, skills audit, lesson materials
        - Technology access – hardware / software
        - Time allocation – lessons, weeks, terms, semesters...
        - Feedback, reflection and review

Scratch Jr Activity Years F-2: Laying Foundations

Dinosaur Inquiry Unit

✓ Whole school approach F-6:

Curriculum:

✓ Many links, across multiple disciplines (Science, Maths, Geography, History, English, Visual Art)

Individual contexts:

✓ Pedagogy: Inquiry (mostly)

✓ Resources, organising and planning:

- Integrated, collaborative, team teaching
- Technology access – iPads for F-1, Scratch Jr
- Time allocation – 5 weeks

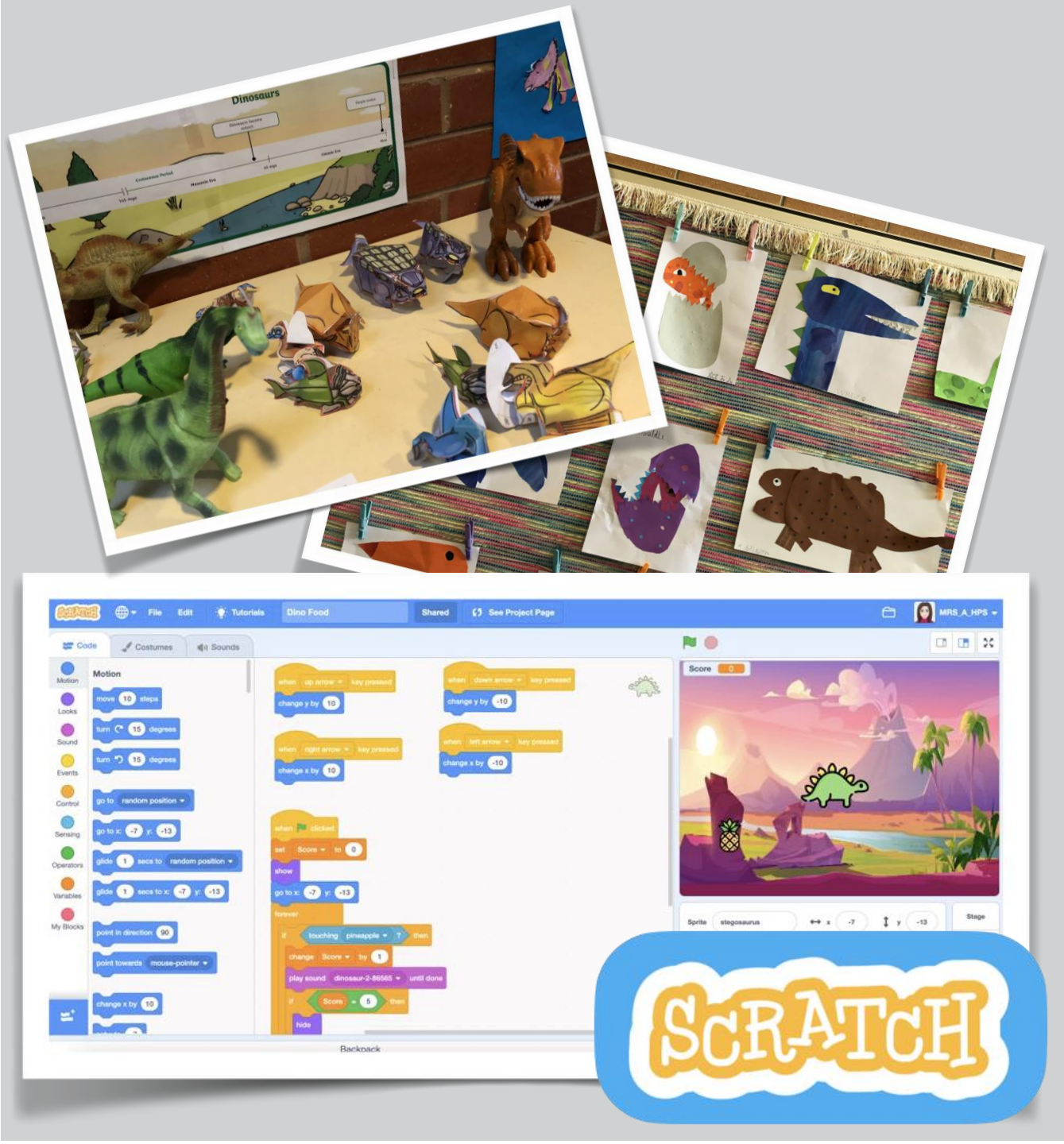
Scratch Activity Years 3-6: Building and Consolidating

Dinosaur Inquiry Unit

✓ Whole school approach:

- **Building knowledge and skills**
  - familiar platform
  - user friendly
  - integration with other platforms for student management
- **Developing creativity**
  - greater options for designing solutions
  - opportunities for complex thinking and problem-solving
- **Achieving success**
  - trial and error, debugging, "YES!" moments

Next steps: Text-based coding (Years 7-10)



Scratch Activity: Dinosaur Inquiry Unit Aus Curriculum Links

	Version 8	Version 9
Foundation	Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE013)	Explore the ways people make and use observations and questions to learn about the natural world (AC9SFH01)
Year 1	Living things have a variety of external features (ACSSU017)	Observe external features of plants and animals and describe ways they can be grouped based on these features (AC9SFU01)
Year 2	Represent and communicate observations and ideas in a variety of ways (ACSIS042)	Write and create texts to communicate observations, findings and ideas, using everyday and scientific vocabulary (AC9S1I06)
Year 3	Represent and communicate observations, ideas and findings using formal and informal representations (ACSIS060)	Write and create texts to communicate findings and ideas for identified purposes and audiences, using scientific vocabulary and digital tools as appropriate (AC9S3I06)
Year 4	Living things have life cycles (ACSSU072)	Compare characteristics of living and non-living things and examine the differences between the life cycles of plants and animals (AC9S3U01)
Year 5	Living things have structural features and adaptations that help them to survive in their environment (ACSSU043)	Examine how particular structural features and behaviours of living things enable their survival in specific habitats (AC9S5U01)
Year 6	The growth and survival of living things are affected by physical conditions of their environment (ACSSU094)	Investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions (AC9S6U01)

Scratch Activity: Dinosaur Inquiry Unit VIC Curriculum Links

	Science Understanding | Biological Sciences
Foundation - Year 2	Living things have a variety of external features and live in different places where their basic needs, including food, water and shelter, are met (VCSSU042)
Year 3 - Year 4	Different living things have different life cycles and depend on each other and the environment to survive (VCSSU058)
Year 5 - Year 6	Living things have structural features and adaptations that help them to survive in their environment (VCSSU074)

Cross-curricular Learning...a taster!

Digital Technologies: Creating Digital Solutions		
F-2	3-4	5-6
Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (VCDTCD017)	Develop simple solutions as visual programs (VCDTCD024)	Develop digital solutions as simple visual programs (VCDTCD033)

Visual Arts: Present and Perform			
Foundation	1-2	3-4	5-6
Create and display artworks (VCAVAP019)	Create and display artworks to express ideas to an audience (VCAVAP023)	Explore different ways of displaying artworks to enhance their meaning for an audience (VCAVAP027)	Create and display artwork considering how ideas can be expressed to an audience (VCAVAP031)

Scratch Junior Skills Development

Year Level	Foundation		Year 1 and 2	
Content Descriptions	Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (VCDTCD017)		Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (VCDTCD017)	
Key vocab	Follow, describe, represent, sequence of steps, decisions, solve problems		Follow, describe, represent, sequence of steps, decisions, solve problems	
Technology	Scratch Junior		Scratch Junior	
Interface Functions	Change the background, add a Character, green flag, save		Add text, pages, characters and add new characters	
Code	Triggering Blocks (yellow) Green flags Start on message Send message Motion blocks (blue) Move right	Sound blocks (green) Play recorded sound End blocks (red) End	Triggering Blocks (yellow) Start on tap Start on bump Motion blocks (blue) Move left Move up Move down Go home (yr 2) Control Blocks (orange) Wait Repeat (yr 2)	Looks Blocks Say Grow Shrink Reset size (yr 2) End blocks (red) End Repeat forever (yr 2) Go to page

Scratch Skills Development

Year Level	Year 3 and 4		Year 5 and 6	
Content Descriptions	Define simple problems, and describe and follow a sequence of steps and decisions involving branching and user input (algorithms) needed to solve them (VCDTCD023) Develop simple solutions as visual programs (VCDTCD024)		Design, modify and follow simple algorithms represented diagrammatically and in English, involving sequences of steps, branching, and iteration (VCDTCD032) Develop digital solutions as simple visual programs (VCDTCD033)	
Key vocab	Simple problems, Describe, Follow, Sequence of steps, Decisions, Branching, User input, Algorithms, Visual programs		Design algorithms, modify algorithms, follow algorithms, sequence of steps, branching, iteration, digital solution, visual programming	
Technology	Scratch		Scratch	
Interface Functions	Join, Sign in, Choose a sprite, Choose a backdrop, record own sounds,		Costumes, Create or upload a sprite, Create or upload a backdrop, code backdrops	
Code	Motion Go to random position Move 10 steps Looks Say hello for 2 seconds Think for 2 seconds Sound Play sound * until done Events When flag is clicked When Sprite is clicked	Control wait If then Wait until Stop	Motion Turn 15 degrees Turn 15 degrees Go to 0 x 0 y Set x to Set y to Looks Switch backdrop to Next back drop Sound Start sound *meow Stop all sounds	Events When backdrops switches to When space key pressed Control Repeat Forever Wait until Repeat until

Minecraft Example

Overview

This unit of work has been created to demonstrate how a global non-profit organisation, Block By Block 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.

Key Understandings and Key questions

- 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.

- 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?

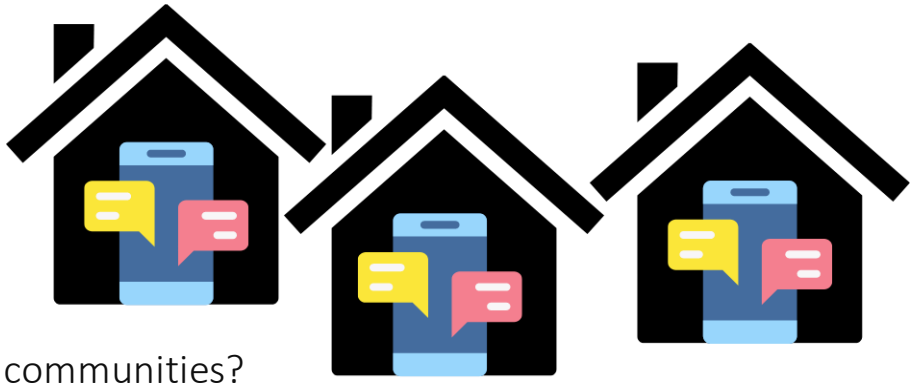
Minecraft Example

Overview

Students will investigate and explore the hardware, software and processes that are required to build and create a network and allow users to have access to the internet. Once students have the initial knowledge they will commence putting their knowledge into a real-life application. Students will explore communities around Australia and globally that do not have access to the internet. They will research these communities and create profiles of these communities – creating an understanding of the needs of the communities and how they can support their needs. In small groups, they will use the profiles to help design and create the community and include information on how they can support the community and provide them with fast, reliable internet speed.

Key Understandings and Key Questions

- Explain how the internet and networks are formed
- Explain how data is transmitted through the network
- Explain how binary code is the representation of data when data is transmitted and stored.
- Evaluate existing digital solutions to connect using a set questions and prompts.
- Design a digital solution to provide a remote community access to the internet.
- Evaluate student digital solution using a set questions and prompts.



- How do you access the internet?
- What resources and devices do you need?
- How can you increase the speed of a network?
- Why is it important to connect remote communities? How does it benefit the remote communities?
- What would you do to provide a community with a network and connection?
- What would that network connection look like?

Cubetto Example

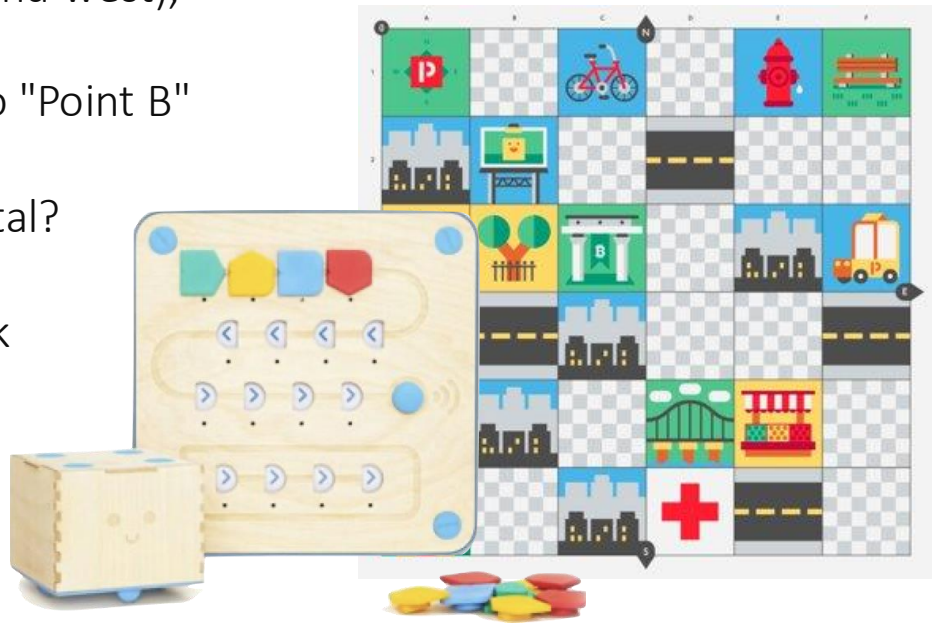
Overview

Foundation to Year 2 students create a narrative around navigating their way through an urban environment (provided as a large floor map). The focus of the lessons is to introduce students to rules, algorithms, and sequencing. Cubetto is a simple cube-shaped robot that operates via instructions from its 'board'. Students add blocks that are hands-on coding tiles that instruct Cubetto when the algorithm is run.

Key Understandings and Key Questions

- Develop a story that helps Cubetto navigate to different places on the map.
- Introduce the concepts of cardinal points (directions: north, south, east and west), location and navigation.
- For example: write a program that will help Cubetto get from "Point A" to "Point B"

- What steps should Cubetto take to get from the fire hydrant to the hospital?
- Is there an alternate route that Cubetto could take? Is it faster/slower?
- Consider the addition of conditions to the route taken e.g. go via the park



BeeBot Example

Overview

Students identify healthy and unhealthy foods. The focus of the lessons is to introduce students to algorithms and sequences of steps through the use of robotics. Students will use Bee-Bots and provide the Bee-Bots with a sequence of steps to help make healthy choices.

Key Understandings and Key Questions

- Follow, describe and represent a sequence of steps and decisions needed to solve simple problems.
- Use Bee-Bot devices to create and program a sequence of steps.
- Program a Bee-Bot to go shopping for healthy food.

- What are the sequence of steps in the Hungry Caterpillar?
- What are the sequence of steps when we eat? What happens in our body?
- What steps would you create to code a robot to only pick up healthy foods?
- How can you program your bee-bot to only pick up healthy foods?

BeeBot Example

Overview

Students will investigate the different type of technology that is within the school. Students will create a digital solution (through annotated drawings) to help solve school, home and community tasks/problems. They will identify the type of hardware that is used to design their robots. The unit will then focus on how technologies are used to complete tasks in society. They will mimic these tasks using Bee-Bots.

Key Understandings and Key Questions

- Investigate the role of different technologies used in the school community.
- Design and create new digital solutions to support the community,
- Follow instructions to complete everyday tasks.
- Identify the correct sequence when completing everyday task.
- Create a sequence of steps to program a Bee-Bot to solve a simple problem.

- What technology do we use at school and home?
- What technology is same and different?
- How can technology help us at school?
- What type of digital solutions could you design to help at school?
- What instructions do you need to follow to use a Bee-Bot?
- What code do I need to include to make sure my program runs correctly?

Thank you

access to presentation: