St Peter's Primary School Inglewood

Endangered Animal Project

Year 5

Unit length – 7 lessons

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Background Information:

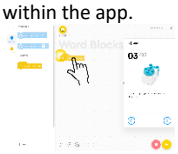
Inquiry at St Peters: At St Peters, we follow an inquiry-based learning approach. We created our own model of inquiry, named 'TRUE Inquiry' which aligns with our school values of Trust, Respect, Unity and Excellence. Below is our inquiry model, which will form the structure of these units of lessons:

St Peter's is in the northern suburbs of Perth, Western Australia. Our native flora and fauna are under incredible threat due to urbanisation, clearing of land, pollution, introduced species and changes in native habitats. Linking to the United Nations Sustainable Development Goal, number 15 – Life on Land, our aim is to make solutions to the endangered population of endangered species in our local area.

This unit of work will follow the TRUE Inquiry model, incorporating research, design and creative thinking. The end goal is to be able to present their design ideas to a local ranger or environmental minister.

Lesson Sequence

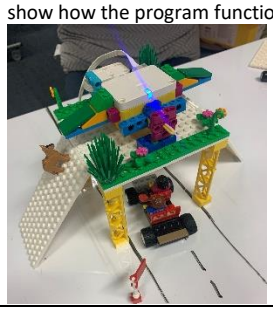
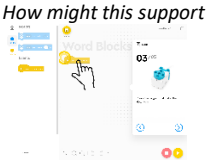
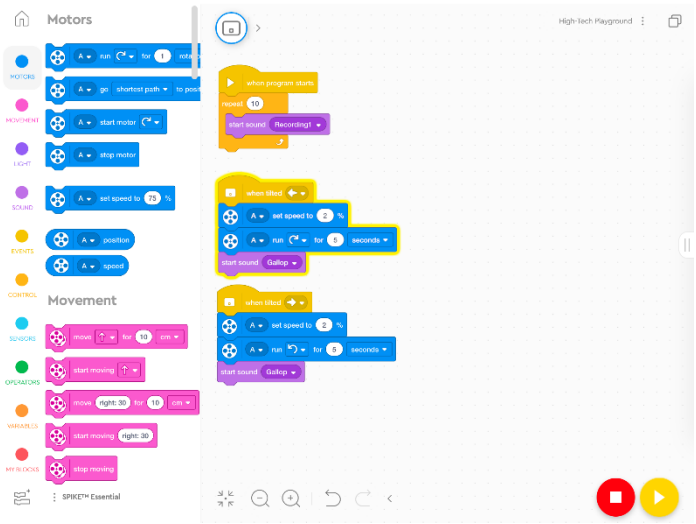
Lessons	Curriculum Overview	Lesson Overview	Resources	Assessment
1 Sparking curiosity	Science: (Biological Sciences) Living things have structural features and adaptations that help them to survive in their environment (ACSSU043) Students will: -Explore the features of endangered animals in the local area -Create inquiry questions to guide their project	Present provocations and stimuluses in the form of a discovery table, with images of local animals, feathers, wooden logs, native plants, books related to the subject etc. Prompt students with guiding questions: *I wonder what these objects might be?* *Where have we seen some of these animals in our local area?* *What do you notice about their appearance?* *How do you think they survive in the wild?* As a whole class, create a *See, Think, Wonder* thinking tool poster to unpack their observations and draw conclusions around the direction of their project. Introduce the inquiry focus: *How can local endangered species be protected using digital technology?* Continue discussion and formulate wonder inquiry questions to guide the future investigation. **Note* Teacher may like to create a wall display to highlight each stage of the inquiry process throughout this project including photos, examples of designs etc*	Provocations table (with items listed in lesson overview) *See, Think, Wonder* template https://thinkingpathwayz.weebly.com/seethinkwonder.html	Teacher anecdotal notes of observations and thoughts expressed throughout the lesson.
2 Research local endangered species	Science: (Biological Sciences) Living things have structural features and adaptations that help them to survive in their environment (ACSSU043) Students will: -Research information in collaborative groups	Discuss the inquiry question and create 4 main questions as a class to guide the research: *What are the main features of the animal?* *How have they adapted to survive in their habitat?* *What threats do the species face?* *How are they already being protected from threats?* Use the *placemat* collaborative tool to collate information on the selected endangered species using a range of websites (through child-safe search engines such as Kiddle and KidRex), books, videos and visual stimulus. Each group member is responsible for a question.	Placemat template	Teacher anecdotal notes of observations and thoughts expressed throughout the lesson

		In the plenary, bring the class together to discuss the information they gathered and how this made them feel. Explore a gallery of what local councils are already doing to try to solve these problems (animal road crossings, security fences, man-made burrows and nests, alarm systems for feral animals etc).		
3 Intro to Lego Prime + digital sketch of design	Science: (Biological Sciences) Living things have structural features and adaptations that help them to survive in their environment (ACSSU043) Digital Technology: (Processes and Production): Define a problem, and set of sequenced steps, with users making a decision to create a solution for a given task (WATPPS27) Students will: -Examine and explore the parts of the Lego Prime Essential kit -Use software to draw a digital sketch of a design	Introduce a digital platform, such as One Note (or another similar tool) to make notes, insert photos and record observations throughout the lesson. This digital tool is like a scrap book. In groups, explore the parts of the Lego kit and complete the thinking tool using the audio function to record ideas. Allow for students to take photos of different parts of the Lego Spike kit and record ideas and thinking on the One Note page Examine the motor within the set and brainstorm ways a motor can be used in different ways. Use the Lego Spike app to learn more about the motor and how to make it run. Practise connecting the hub to the motor.  If required and students haven't used a motor before, practise simple build within the app using the motor such as 'River Ferry' and 'Hovering Helicopter'. The following part of the program will be **completed in pairs**. Linking back to the endangered species, begin completing the design template on One Note, with headings including: -threat to animal species -habitat main features -solutions already in place in the community Use a drawing app (either on the One Note pages, Procreate, Key Note etc) to draw a sketch of their design idea featuring the motor. Share checklist for sketch as a guide for students (and assessment tool)	One Note or similar digital tool Lego Spike app Digital drawing apps / stylus	Checklist for digital sketch: □Title and explanation of design □Main Lego pieces being used □Location of the motor and hub □Other materials being used □Estimated measurements (in cms) (Mark each out of 2 with a total of 10 marks)
4 Build design and test prototype	Digital Technology: (Processes and Production): Define a problem, and set of sequenced steps, with users making a decision to create a solution for a given task (WATPPS27) Students will: -Provide and receive peer feedback -Follow steps to create a solution using the Lego Spike kit *Extension :* Use other features to improve function of design (such as lights, gyro or colour sensor)	After providing feedback on digital sketch of the design, complete a '*2 Stars and a Wish'* peer feedback session with another pair on the features of their design and how it links to the threat the animal is facing. Make changes to the design as required over the original sketch (or duplicate and make changes over the image with another colour to see the changes made). Begin building the model using the Lego Spike and other materials if required. Before coding, refer to the digital sketch and checklist, making adjustments as required.	Lego Spike Essential Kit (one between two students)	Anecdotal notes: Ability to follow a sequence of steps to build a robotic solution. Make note on problem solving skills and ability to make changes as required.
5 Create code for the design to function	Digital Technology: (Processes and Production) Implement and use simple programming environments that include branching (decisions) and iteration (repetition) (ACTDIP020 opens in new window) Students will: -Use prior knowledge of coding to create a program -Include iteration (repetition) within their program -Make adjustments to code and hardware as required	*Prior to lesson:* Spend time discussing what they believe success for this project will look like to them, using this information to inform the rubric, along with descriptors from the SCASA judging standards. Begin by re-examining their builds and making links to their digital sketch and checklist. Discuss what they already know about coding and the blocks of code in the Lego Spike app. If required or if students haven't used the motor before, spend time going through the tutorial within the app. 	iPads with Lego Spike app available Mini whiteboards iMotion stop motion app	Rubric: Attached below linking to SCASA judging standards (Western Australia)

		Plan the code blocks they will require on whiteboards first before connecting the hub and Bluetooth to the app. Practise various sets of code until the most suitable program is determined. Take screenshots for work samples and future reference. Use a stop motion app (iMotion) to capture the program and design working together. Play code and adjust as needed using teacher feedback and incidental peer feedback. Share with another pair to demonstrate their idea and if it is suitable for the threat to the endangered species.		
6  Create persuasive video	Digital Technology: (Processes and Production): Create and communicate information, including online collaborative projects, using agreed social, ethical and technical protocols (codes of conduct) (ACTDIP022 opens in new window) Students will: -Persuade an audience of their idea -Communicate ideas using digital tools in a safe manner *Extension: App smashing between multiple video creation apps to*	Begin lesson with a walking gallery of students' creations with peer feedback being completed through Microsoft Forms (with QR code link in front of the design). Once students have read the feedback they may require time to make adjustments. Discuss – *How can we best share our ideas with a wider audience? How can we bring these designs into reality?* Explain we will be presenting to a local council member, using digital technology, to convince them of their design idea. *What makes a persuasive presentation?* *What might some digital tools be that we could use?* *What information might we need to include?* Student pairs select video creation tools to present (iMovie, Clips, Flip a Clip etc). Include information from all stages of the TRUE Inquiry model as a guide for their presentation. Use checklist criteria as a guide for	Variety of video creation software on iPads	Checklist: □clear explanation of the □selection of appropriate software to present □explanation of the stages of the inquiry model □persuasive devices used
7  Present design idea and reflect on learning	Digital Technology: (Processes and Production): Create and communicate information, including online collaborative projects, using agreed social, ethical and technical protocols (codes of conduct) (ACTDIP022 opens in new window) Students will: -Present their inquiry journey and design ideas -Reflect on their learning	*Prior to lesson*: Invite local council members to attend a presentation session or send as digital files to be viewed at their convenience. Invite leadership and buddy classes to come along to the presentations of their designs. Set up classroom in a showcase style with tables for robots and iPads. Students to present work, with the aim to bring awareness to the concern around the endangered animals in the local area. Post showcase, reflect on learning using the *1,2,3 Reflection* thinking tool.	Classroom set up for showcase 1, 2, 3 Reflection https://thinkingpathwayz.weebly.com/3-2-1-reflection.html	Self assessment – 1,2,3 Reflection thinking tool

Lesson 5: Programming the design

Key Objectives & Curriculum Outcomes	Digital Technology: (Processes and Production) Implement and use simple programming environments that include branching (decisions) and iteration (repetition) (ACTDIP020 opens in new window) Students will: -Use prior knowledge of coding to create a program -Include iteration (repetition) within their program -Make adjustments to code and hardware as required
Differentiation	Support: -Use similar programs already in the Lego Spike app as a guide and to provide inspiration -Visual prompts / posters to support with understanding of the key coding blocks Extension:-Create their own sound recordings when programming -Explore other code blocks if including other sensors
Resources	-Lego Spike Essential kit (1 between 2 students -iPad with Lego Spike app and stop motion app -mini whiteboard class set
Lesson Outline	
Prepare	-Review their builds from the previous lesson -Refer to the checklist to guide their learning moving forward (see unit outline)

	-Continue to refer to inquiry focus and the intention of the project -Spend time discussing what they believe success for this project will look like to them, using this information to inform the rubric, along with descriptors from the SCASA judging standards. -Recap terms such as *software, hardware, input, output, program, coding blocks, Bluetooth and iteration (looping / repeating)*. Display on word wall if possible. Below is an example of a design of an animal crossing for the quenda (an endangered animal which is threatened by urbanisation and increased traffic in the area). This could be used as an example (especially for those who require support). Use this design to show how the program functions the motor on the robotic device.  
Engage (5 minutes)	As a whole class discuss – *How can software support hardware?* Examine how they can connect the Lego hub to the app by using the Bluetooth connection. Guide students through the basic coding blocks in the app. If required, or if students haven't used the motor before, spend time going through the tutorial within the app (below). Demonstrate how to program the motor to function using the app and the role of the loop block (iteration). *When might we need to loop a set of code?* *How might this support our design's functionality?* 
Explore (30 minutes)	Use mini whiteboards to plan the sequence of their code, referring to the app if necessary. Remind students to include looping within their set of code. Plan the code blocks they will require on whiteboards first before connecting the hub and Bluetooth to the app. Practise various sets of code until the most suitable program is determined. Refer to sample below (links to the sample design in the prepare section of the lesson outline):  Run the program for the teacher and peers to provide feedback. Adjust if necessary. Take screenshots for work samples and future reference. Use a stop motion app (iMotion) to capture the program and design working together. Refer to sample stop motion video below: https://cewaedu-my.sharepoint.com/:v:/g/personal/tammy_hunter_cewa_edu_au/EQFyd4hzzoVJgtS45-wYbKYB_dJyEEeDYuFvbs3JUEE6CA
Explain (5 minutes)	Students to explain their design and program to another pair using the following prompts: -Threat to the endangered animal -How the design will help the animal to survive -How the motor functions in their design -How the program assists with the function of the design Pairs to rate themselves out of 5 stars as a brief self-assessment.
Elaborate (5 minutes)	Discuss as a whole class the main coding blocks they used in their program. *How did the looping block support your program?* *What changes did you make along the way?* *How might you use these blocks of code in future builds?* *What was most challenging?* *What might happen if the steps in the code are out of order?* Explain the intentions for the next lesson: to present their design ideas using digital video software.

Evaluate (assessment)

<u>Note</u>: Rubric is created using SCASA judging standards for Year 5 Digital Technology curriculum as well as the students opinions on what they believe success looks like (through whole class discussions).

Learning Outcome	Excellent Achievement	High Achievement	Satisfactory Achievement	Limited Achievement	Very Low Achievement
Digital Implementation 	Consistently designs, follows and clearly represents a sequence of steps (algorithms), involving iteration (repetition) using the Lego Spike app.	Designs, follows and represents a simple sequence of steps (algorithms), involving iteration (repetition) using the Lego Spike app.	Designs, follows and represents a simple sequence of steps (algorithms), involving iteration (repetition) using the Lego Spike app.	Attempts to design, follow and represent a simple sequence of steps (algorithms), involving iteration (repetition) using the Lego Spike app.	Little to no demonstration of ability to create an algorithm or involve iteration.
Robotic Creation 	Expertly constructs a robot following a detailed design to solve the problem threatening an endangered species. Includes other sensors within their design that improve the function of the robot.	Constructs a robot following a detailed design to solve the problem threatening an endangered species. Attempts to include other sensors within their design that somewhat improve the function of the robot.	Constructs a robot following a simple design to solve the problem threatening an endangered species.	Constructs simple robot not completely following a limited / simple design to work towards solving the problem threatening an endangered species.	Little to no construction of a robot, with no / little link to the design.