Medium Term Unit Planning

Subject Name: Computing	
Learning outcome: *Students will create programs with sequencing, loops, and events. They will investigate problem-solving techniques and develop strategies for building positive communities both online and offline. By the end of the course, students will create interactive games that they can share.*	
Hook **Dance Party**	**Topic Showcase** **Public Demo** **Pair Playtesting** **Gallery Walk**
Oracy: **Children will have the opportunity to discuss how they created their games and final projects in class assemblies.**	**Key Vocabulary: Algorithm, bug / debugging, sequencing, program, loop, event, binary, password, phrase, symbol, username, repeat, conditionals**
Key Texts (whole class reading/end of the day book/Talk for Writing Texts etc.): UNDER REVIEW	
Citizenship/Community Opportunities: ***Understand how online bullying is still bullying and the importance of being kind online to all.***	

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Experiences/Visits/Visitors N/A

Main Subjects covered: Computing

Computing Threshold concepts :

- Code
- This concept involves developing an understanding of instructions, logic and sequences.

- Connect
- This concept involves developing an understanding of how to safely connect with others.

- Communicate
- This concept involves using apps to communicate one's ideas.

- Collect
- This concept involves developing an understanding of databases and their uses.

Notes:

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Lesson title and learning Intention	Threshold concepts (success criteria)	Milestones 2 (success criteria)	Lesson structure/differentiation
Lesson 1: Password Power-up • Children learn how to protect personal information and gain a deeper understanding of their data privacy rights so they can advocate for themselves and others.	**Connect** • This concept involves developing an understanding of how to safely connect with others.	• Give examples of the risks posed by online communications.	• Children will be doing a jigsaw activity to understand WHY passwords are important. • Children discuss how they can make their password stronger by using a phrase. • Children add a symbol to their password. • Complete the lesson quiz.
Lesson 2: Graph Paper Programming • Children will learn how to develop an algorithm and encode it into a program.	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events.	• Watch the video to give children context for the types of things that robots can do. • Children will act as both programmers and robots, colouring in squares according to programs that they have written for one another.
Lesson 3: Introduction to Online Puzzles • Break down a long sequence of instructions into the	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Use specified screen coordinates to control movement.	• Children split into groups of three or four. They "program" Red, the angry bird, to get to the pig using arrows from "Graph Paper Programming."

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largest repeatable sequence. • Modify an existing program to solve errors. • Order movement commands as sequential steps in a program.			
Lesson 4: Relay Programming • Define ideas using code and symbols.	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Use specified screen coordinates to control movement. • Specify conditions to trigger events.	• The children work in groups of 3-5. • Have each group queue up relay-style. • Place an identical image at the other side of the room. • Have the first child in line dash over to the image, review it, and write down the first symbol in the program to reproduce that image. • The first child then runs back and tags the next person in line, then goes to the back of the queue. • The next person in line dashes to the image, reviews the image, reviews the program that has already been written, then either debugs the program

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			by crossing out an incorrect symbol, or adds a new one. That child then dashes back to tag the next person, and the process continues until one group has finished their program.
Lesson 5: Debugging with Laurel • Children will get to practice reading and editing code to fix puzzles with simple algorithms, loops and nested loops.	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events.	• Children work in teams of 3. Choose a puzzle from the lesson. The children in each team sit at a computer with the puzzle displayed. • Every child should work on these puzzles individually or in pairs, but having a closely knit group to ask and answer questions with can help develop confidence and understanding with the subject matter.
Lesson 6: Events in Bounce • Children will learn to make their paddle move according to arrow keys, and make noises when objects collide. At the very end, they will get to customize their	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events. • Create and edit sounds. Control when they are heard, their volume, duration and rests.	• Say: Let's see if we can find a pattern here: When you flip a switch, the lights turn on. When you tap on a device, an app starts. When the ball goes in the net, score a point. When (event), (action). • Children work through Bounce, building their

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game to make it more unique! • Create an interactive game using sequence and event-handlers.			understanding on events in coding. • Children will have the opportunity to make their game unique. Have the students try new ways to make the game more challenging. For example, try playing with many balls at once, or each time the ball bounces off a wall, launch more balls.
Lesson 7: Build a Star Wars Game • Children will learn to recognize regular programming practices in games so that when they play games at home, they can see common computer science principles being used.	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events. • Use specified screen coordinates to control movement.	• In a class discussion, ask the children what their favourite video game is (you might need to remind the students to only use games that are classroom appropriate). • Once the children are done describing their fun, take a minute to relate it back to the definition of an event. • Children will try and relate some of their favourite parts of video games and how they can be described as events. Have them pair-share and discuss the differences between their events and their partner's.

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			• Children work through Build a Star Wars Game. • Discuss the following: What was today's lesson about? How do you feel about today's lesson? Give an example of an event you used in your program today? Why is it important not to share private information online? How do you know if information is private?
Lesson 8: Dance Party • Children will program an interactive dance party. • Create dance animations with code • Develop programs that respond to timed events • Develop programs that respond to user input	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events. • Use specified screen coordinates to control movement. • Create and edit sounds. Control when they are heard, their volume, duration and rests. • Use the functions define, set, change, show and hide to control the variables. • Set the appearance of objects and create sequences of changes.	• Get up and dance: Announce to the class that today we're going to see how we can combine coding with dancing in a creative way. • Children will be encouraged to show off their favourite dance moves. • Children create a dance sequence to a piece of music of their choice using their own character.

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Lesson 9: Loops in Ice Age • Construct a program using structures that repeat areas of code • Improve existing code by finding areas of repetition and moving them into looping structures	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events. • Use specified screen coordinates to control movement. • Use variables to store a value.	• Instruct your volunteer to walk around the table (or their chair, or a friend). When they finish, instruct them to do it again, using the exact same words you did before. When they finish, instruct again. Then again. • Define the term loop. • Children will work through the puzzle to figure out how many blocks they use with a loop vs without a loop. • Give the children pictures of actions or dance moves that they can do. They then arrange moves and add loops to choreograph their own dance. Share the dances with the rest of the class.
Lesson 10: Drawing Shapes with Loops • Differentiate between commands that need to be repeated in loops and commands that should be used on their own.	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events. • Use specified screen coordinates to control movement. • Use variables to store a value.	• Children to work through the puzzle and add repeat loops by writing out the program without loops then circling sections of repetitions.

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• Identify the benefits of using a loop structure instead of manual repetition.			
Lesson 11: Nested Loops in Maze • Break complex tasks into smaller repeatable sections. • Identify the benefits of using a loop structure instead of manual repetition. • Recognize large repeated patterns as made from smaller repeated patterns.	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events. • Use specified screen coordinates to control movement. • Use variables to store a value.	• Briefly review with the class what loops are and why we use them. • Children work through the Nested Loops in Maze puzzle. • Children can use pen and paper to write out their plan before coding. • Ask the children, "Can you draw a puzzle that would use a nested loop? Try coding the solution to your own puzzle."
Lesson 12: Conditionals with Cards • Define circumstances when certain parts of a program should run and when they shouldn't. • Determine whether a conditional is met based on criteria.	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events. • Use specified screen coordinates to control movement. • Use variables to store a value. • Create conditions for actions by sensing proximity or by waiting for a user input (such as proximity to a specified	• Create a few programs with your class that depend on things like a card's suit, colour, or value to award or subtract points. You can write the program as an algorithm or code. • Each team should have a pile of cards (at least as many cards as team members) nearby.

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• Traverse a program and predict the outcome, given a set of input.		colour or a line or responses to questions).	• Put one of your "Programs" up on the board for all to see. • Teams take turns drawing cards and following the program to see how many points they score in each round. • Children to play red light/green light. The conditions are chosen by the child that is the caller, e.g., step forward if you have a brown belt, step forward if you have blonde hair.
Lesson 13: Looking Ahead with Minecraft • Define circumstances when certain parts of a program should run and when they shouldn't. • Determine whether a conditional is met based on criteria.	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events.	• Children to work through online puzzle; Looking Ahead with Minecraft. • Challenge the children to draw a scene where someone is using a conditional?

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Lesson 14: If/Else with Bee • Solve puzzles using a combination of looped sequences and conditionals. • Translate spoken language conditional statements into a program.	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Use IF THEN conditions to control events or objects. • Specify conditions to trigger events.	• Review the "Conditionals with Cards" activity with the children: What is a conditional statement? When is a conditional useful? What are some of the conditions you used in the last activity? • Children to work through the If/Else with Bee puzzle whilst editing codes to solve if/else problems.
Lesson 15: While Loops in Farmer • Distinguish between loops that repeat a fixed number of times and loops that repeat as long as a condition is true. • Use a while loop to create programs that can solve problems with unknown values.	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Use IF THEN conditions to control events or objects. • Specify conditions to trigger events.	• Discuss with the class what the term, for a 'while' means. *While loops allow the programmer to repeat a command as long as a condition is still true. In the previous example, the condition is the existence of a hole.* • Children to work through; While Loops in Farmer. • Children can work in pairs to help build confidence and understanding of programming.
Lesson 16: Until Loops in Maze • Build programs with the understanding of multiple	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events.	• Children to work through; Until Loops in Maze. • Children use the code "repeat until" loop and press

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strategies to implement conditionals. • Translate spoken language conditional statements and loops into a program. • This set of puzzles will work to solidify and build on the knowledge of loops by adding the until conditional.			"run". Discuss as a class why this worked.
Lesson 17: End of Course Project • This lesson provides children with space to create a project of their own design, using a step-by-step process that requires planning but also allows for broad creativity. • Overcome obstacles such as time constraints or bugs.	**Code** • **This concept involves developing an understanding of instructions, logic and sequences.**	• Specify conditions to trigger events. • Use specified screen coordinates to control movement. • Use variables to store a value. • Create conditions for actions by sensing proximity or by waiting for a user input (such as proximity to a specified colour or a line or responses to questions). • Use IF THEN conditions to control events or objects.	• Equipped with their completed planning guides, children are now ready to bring their projects to life.

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		• Create and edit sounds. Control when they are heard, their volume, duration and rests.	