BC K-9 Curriculum Correlation

UNDERSTANDING MATH THROUGH CODING

CLASSROOM-TESTED, RESEARCH-BASED LESSONS

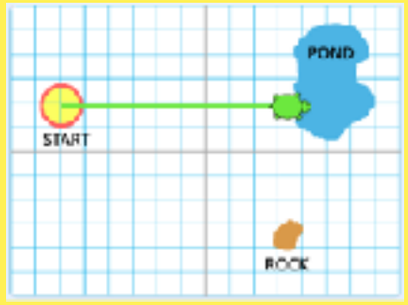
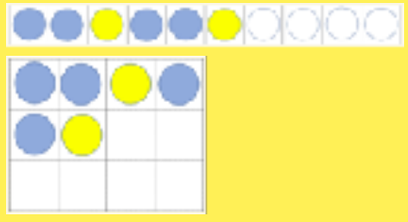
In English & French

From the research of GEORGE GADANIDIS, PhD — Western University

Correlation to BC K-9 Math Curriculum: COMPETENCIES

COMPETENCIES	MODULES & LESSONS
Reasoning and analyzing	
• Use reasoning to explore and make connections	All Modules focus on reasoning and making conceptual connections within mathematics and between various representations.
• Estimate reasonably	The Turtle Walks Module offers opportunities for estimation of distances on the Scratch Stage.
• Develop mental math strategies and abilities to make sense of quantities	The following Modules offer opportunities for developing mental math strategies: Turtle Walks, Odd & Even Numbers and Infinity & Fractions.
• Use technology to explore mathematics	All Modules use coding (Scratch and Python) to help student model and bring to life math connections and relationships. Students are given code to use and edit.
• Model mathematics in contextualized experiences	Lessons make connections among math ideas and representations, to offer a rich context for the grade-specific content they are studying.
Understanding and solving	
• Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving	Lessons engage students in problem situations that offer mathematical surprise and insight (such as “odd numbers hide in squares” and “I can hold infinity in my hand”. Coding offers multiple opportunities for students play and explore by editing code and seeing the result immediately and dynamically.
• Visualize to explore mathematical concepts	Concrete, visual, tabular, graphical and dynamic coding representations are used throughout the Modules, where appropriate.
• Develop and use multiple strategies to engage in problem solving	Modules present problems through various perspectives, representations and solution strategies.
• Engage in problem-solving experiences that are connected to place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures	
Communicating and representing	
• Communicate mathematical thinking in many ways	The Modules focus on big ideas that capture students’ imaginations and are worth talking/communicating about.
• Use mathematical vocabulary and language to contribute to mathematical discussions	Math vocabulary is learned explicitly and incidentally across all Modules.
• Explain and justify mathematical ideas and decisions	The Modules focus on sense-making. The coding representations/models are one way for students test, justify and communicate their ideas and decisions.
• Represent mathematical ideas in concrete, pictorial, and symbolic forms	A variety of representation forms are used throughout the Modules.

Correlation to BC K-9 Math Curriculum: CONTENT

PAGE	MODULES & LESSONS	CONTENT CORRELATION
5	**TURTLE WALKS** 	In this Module, students use and edit simple Scratch code to move Turtle to the pond and to the rock.
6	1. Turtle walks to the pond with Scratch	**K:** direct comparative measurement **Gr.1:** direct measurement with non-standard units; repeating patterns with multiple elements and attributes **Gr.2:** repeating and increasing patterns
9	2. Turtle turns and walks with Scratch	**Gr.1:** direct measurement with non-standard units; repeating patterns with multiple elements and attributes **Gr.2:** repeating and increasing patterns
12	**REPEATING PATTERNS** 	In this Module, students stamp repeating patterns on inch-grid chart paper. Students sing, dance and perform the patterns on xylophones. They use and edit code to create such patterns. For repeating patterns on a grid, they identify fractions as areas.
13	1. Repeating patterns	**K:** repeating patterns with 2 or 3 elements **Gr.1:** repeating patterns with multiple elements and attributes **Gr.2:** repeating and increasing patterns
16	2. Repeating patterns with sequential Scratch code	**K:** repeating patterns with 2 or 3 elements **Gr.1:** repeating patterns with multiple elements and attributes **Gr.2:** repeating and increasing patterns
19	3. Repeating patterns with repeating Scratch code	**K:** repeating patterns with 2 or 3 elements **Gr.1:** repeating patterns with multiple elements and attributes **Gr.2:** repeating and increasing patterns
22	4. Repeating patterns on a Grid	**K:** repeating patterns with 2 or 3 elements **Gr.1:** repeating patterns with multiple elements and attributes **Gr.2:** repeating and increasing patterns
25	5. Repeating patterns on a grid with code	**Gr.1:** repeating patterns with multiple elements and attributes **Gr.2:** repeating and increasing patterns **Gr.5:** equivalent fractions

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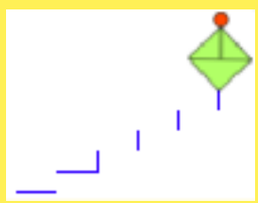
28	**MOVEMENT PATTERNS**  	In this Module, students use and edit simple Scratch code to move a sprite on the Scratch Stage using repeating movement patterns. The sprite leaves a trail of the movement patterns. They use and edit simple Scratch code to turn and stamp a sprite, and change its colour pattern.
29	1. Sequential walk patterns with Scratch	**Gr.1:** direct measurement with non-standard units; repeating patterns with multiple elements and attributes **Gr.2:** repeating and increasing patterns
32	2. Concurrent walk patterns with Scratch	**Gr.1:** direct measurement with non-standard units; repeating patterns with multiple elements and attributes **Gr.2:** repeating and increasing patterns
35	3. Walk patterns with Scratch repeat blocks	**Gr.1:** direct measurement with non-standard units; repeating patterns with multiple elements and attributes **Gr.2:** repeating and increasing patterns
38	4. Turn and stamp patterns with Scratch	**Gr.1:** repeating patterns with multiple elements and attributes **Gr.2:** repeating and increasing patterns

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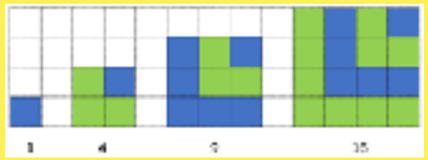
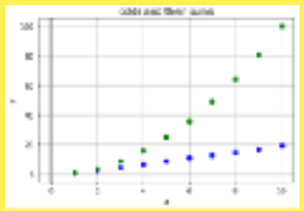
41	**ODD & EVEN NUMBER PATTERNS**  	In this Module, students see that odd numbers “hide” in squares. They use visual and numeric patterns to understand odd, even and natural numbers and their sums. They plot odd numbers and their sums on a bar graph and notice their growth rates. They use and edit Python code to list numbers and their sums and identify patterns and relationships. They use and edit Scratch and Python code to plot graphs of numbers and their sums.
42	1. Number patterns: odds & evens	**Gr.1:** number concepts to 20; addition/subtraction to 20; change in quantity to 20, concretely and verbally; repeating and increasing patterns **Gr.2:** number concepts to 100; addition and subtraction facts to 20; repeating and increasing numbers **Gr.3:** number concepts to 1000; addition and subtraction to 1000; pattern rules using words and numbers, based on concrete experiences **Gr.4:** increasing and decreasing patterns, using tables and charts
45	2. Sum patterns: odds & evens	**Gr.1:** number concepts to 20; addition/subtraction to 20; change in quantity to 20, concretely and verbally; repeating and increasing patterns **Gr.2:** number concepts to 100; addition and subtraction facts to 20; repeating and increasing numbers **Gr.3:** number concepts to 1000; addition and subtraction to 1000; pattern rules using words and numbers, based on concrete experiences **Gr.4:** increasing and decreasing patterns, using tables and charts **Gr.5:** rules for increasing and decreasing patterns with words, numbers, symbols, and variables
48	3. Algebraic expressions: odds, even and naturals	**Gr.4:** increasing and decreasing patterns, using tables and charts; algebraic relationships among quantities **Gr.5:** rules for increasing and decreasing patterns with words, numbers, symbols, and variables
51	4. Sum patterns: odds & evens with Python	**Gr.4:** increasing and decreasing patterns, using tables and charts; algebraic relationships among quantities **Gr.5:** rules for increasing and decreasing patterns with words, numbers, symbols, and variables **Gr.6:** increasing and decreasing patterns, using expressions, tables, and graphs as functional relationships
54	5. Algebraic expressions: sums of numbers	**Gr.4:** increasing and decreasing patterns, using tables and charts; algebraic relationships among quantities **Gr.5:** rules for increasing and decreasing patterns with words, numbers, symbols, and variables **Gr.6:** increasing and decreasing patterns, using expressions, tables, and graphs as functional relationships
57	6. Plotting numbers & their sums with bar graphs	**Gr.3:** one-to-one correspondence with bar graphs, pictographs, charts and tables **Gr.4:** increasing and decreasing patterns, using tables and charts; algebraic relationships among quantities **Gr.5:** rules for increasing and decreasing patterns with words, numbers, symbols, and variables; one-to-one correspondence and many-to-one correspondence, using double bar graphs **Gr.6:** increasing and decreasing patterns, using expressions, tables, and graphs as functional relationships
60	7. Plotting numbers & their sums with Scratch	**Gr.6:** increasing & decreasing patterns, using expressions, tables, & graphs as functional relationships; line graphs
63	8. Plotting numbers & their sums with Python	**Gr.6:** increasing & decreasing patterns, using expressions, tables, and graphs as functional relationships; line graphs

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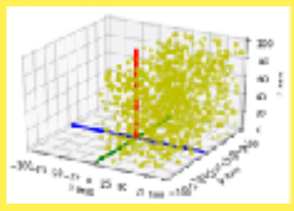
66	**INFINITY + FRACTIONS**  	In this Module, students see that when walking to the classroom door, they have to travel an infinite number of fractions (1/2, 1/4, 1/8, 1/16 and so forth). They represent these fractions as area diagrams and realize that an infinite number of fractions can fit in a single square.
67	1. Walk to the door	**Gr.3:** fraction concepts; increasing and decreasing patterns **Gr.4:** ordering and comparing fractions;
70	2. Bug walks to strawberry with Scratch	**Gr.3:** fraction concepts; increasing and decreasing patterns **Gr.4:** ordering and comparing fractions;
73	3. Infinity + fractions = math art	**Gr.3:** fraction concepts; increasing and decreasing patterns **Gr.4:** ordering and comparing fractions;
76	Fractions + decimals + infinity + Python	**Gr.6:** increasing and decreasing patterns, using expressions, tables, and graphs as functional relationships
79	**INEQUALITIES WITH SCRATCH**  	In this Module, students plot inequalities like x > 10 on line graphs. They use and edit Scratch code to plot inequalities in one and two dimensions. They use their classroom space to visualize inequalities plotted in three dimensions.
80	Inequalities like x > 100	**Gr.7:** discrete linear relations, using expressions, tables, and graphs; Cartesian coordinates and graphing **Gr.8:** discrete linear relations
83	Inequalities like x + 50 > 100	**Gr.7:** discrete linear relations, using expressions, tables, and graphs; Cartesian coordinates and graphing **Gr.8:** discrete linear relations
86	Inequalities like 2x + 40 > 100	**Gr.7:** discrete linear relations, using expressions, tables, and graphs; Cartesian coordinates and graphing **Gr.8:** discrete linear relations
89	Inequalities in 2 and 3 dimensions	**Gr.7:** discrete linear relations, using expressions, tables, and graphs; Cartesian coordinates and graphing **Gr.8:** discrete linear relations

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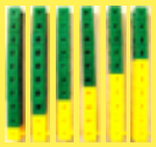
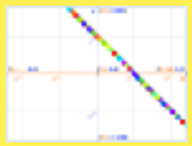
92	**MAKING 10**  	In this Module, students make sums of 10. They represent the sums using linking blocks of two colours. They use Scratch to create stamping patterns that represent sums of 10. Students use the number sentence __ + __ = 10. They roll a number cube to get the first number and calculate the second number. They plot each pair of numbers on a grid and are surprised that they line up. They use and edit Scratch code to plot __ + __ = 10, as well as __ + __ < 10.
93	1. Making 10	**K:** number concepts to 10; decomposition of numbers to 10; change in quantity to 10, using concrete materials; concrete or pictorial graphs as a visual tool **Gr.1:** ways to make 10; number concepts to 20; addition/subtraction to 20; concrete graphs **Gr.2:** change in quantity, using pictorial and symbolic representation; symbolic representations of equality and inequality **Gr.3:** pattern rules using words and numbers, based on concrete experiences
96	2. Making 8	**K:** number concepts to 10; decomposition of numbers to 10; change in quantity to 10, using concrete materials; concrete or pictorial graphs as a visual tool **Gr.1:** ways to make 10; number concepts to 20; addition/subtraction to 20; change in quantity to 20, concretely & verbally; concrete graphs **Gr.2:** change in quantity, using pictorial and symbolic representation; symbolic representations of equality and inequality **Gr.3:** pattern rules using words and numbers, based on concrete experiences
99	3. Making 8 with sequential Scratch code	**Gr.1:** ways to make 10; number concepts to 20; addition/subtraction to 20; change in quantity to 10, using concrete materials; concrete graphs **Gr.2:** change in quantity, using pictorial and symbolic representation; symbolic representations of equality and inequality **Gr.3:** pattern rules using words and numbers, based on concrete experiences
102	4. Making less than 8	**Gr.1:** ways to make 10; number concepts to 20; addition/subtraction to 20; concrete graphs **Gr.2:** change in quantity, using pictorial and symbolic representation; symbolic representations of equality and inequality **Gr.3:** pattern rules using words and numbers, based on concrete experiences
105	5. Plotting __ + __ = 10 on a grid	**Gr.6:** line graphs **Gr.7:** discrete linear relations, using expressions, tables, and graphs; Cartesian coordinates and graphing **Gr.8:** discrete linear relations **Gr.9:** two-variable linear relations
108	6. Making 10 simulation & game	**Gr.6:** line graphs **Gr.7:** discrete linear relations, using expressions, tables, and graphs; Cartesian coordinates and graphing **Gr.8:** discrete linear relations **Gr.9:** two-variable linear relations
111	7. Plotting __ + __ = 100 with Scratch	**Gr.6:** line graphs **Gr.7:** operations with integers; discrete linear relations, using expressions, tables, and graphs; Cartesian coordinates and graphing **Gr.9:** two-variable linear relations
114	8. Plotting __ + __ < 100 on a Grid	**Gr.7:** operations with integers; discrete linear relations, using expressions, tables, and graphs; Cartesian coordinates and graphing **Gr.8:** discrete linear relations **Gr.9:** two-variable linear relations
117	9. Plotting __ + __ < 100 with Scratch	**Gr.7:** operations with integers; discrete linear relations, using expressions, tables, and graphs; Cartesian coordinates and graphing **Gr.8:** discrete linear relations **Gr.9:** two-variable linear relations
120	10. Fixing a plotting issue with Scratch	**Gr.7:** operations with integers; discrete linear relations, using expressions, tables, and graphs; Cartesian coordinates and graphing **Gr.8:** discrete linear relations **Gr.9:** two-variable linear relations