

**Ontario Math Curriculum Expectations 2020
Coding Strand .. Grade 6**

Ontario Mathematics September 2021, EXPECTATIONS for CODING

Resource - "First Steps in Coding to Learn" (Neufeld Learning Systems INC)

RS are Reproducible Sheets

Grade 6 Coding Expectations

- 6.C3.1 Coding Skills** .. Solve problems & create computational representations of mathematical situations by writing/executing code including code that involves conditions & other control structures.
- 6.C3.2 Coding Skills** .. Read/alter existing code, including code that involves conditional statements & other control structures & describe how changes to code affect outcomes & code efficiency

In Preparation for Upcoming Lessons, discuss following from Resource with Students/Teachers/Parents.

- 1. FORWARD** - An opportunity to set up a special learning environment for all.
- 2. PREFACE - The Role of Robots** to facilitate a special learning environment - learn by teaching.
- 3. PREFACE - The Role of Journaling** is an essential way to express understanding.

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Chapter 1 of Resource - "First Steps in Coding to Learn" Neufeld - First Steps to Coding

Goal: Provide screen free, interactive experiences where students learn the importance of providing understandable, sequential directions -- the foundation of coding.

Overview: We will consider the role of and the coding of robots.
Exercises will have students organize events sequentially.
Communication skills will be emphasized.
Exercises will introduce concepts in distance and turning.

Concepts: Communication, cooperative learning and sequencing
Decomposition - breaking down problems into steps
Accurate measurements of distances and turns

SPECIFIC ACTIVITIES: SEQUENTIAL EVENTS

Part A: Coding - First Steps

Select one appropriate activity from Activities #1 to #10 from grade 1 curriculum pg 2 to 11

Part C: Code for a Degree Turn

- Activity #1: Introduce the DEGREE TURN CODE **Duplicate 1RS.8** pg 21
- Exercise 3 for the DEGREE TURN CODE pg 24
- Exercise 4 for the DEGREE TURN CODE **Duplicate 1RS.9** pg 25
- Activity #3: Command the Paper Robot pg 27
- Activity #4: Design When Given a Code pg 28
- Navigation - choose from .. Town Maze, Logan, Bike **Duplicate 1RS.10,11,12** pg29 to 33

Chapter 2 of Resource - "First Steps in Coding to Learn" Neufeld- Code a Floor Robot...the Blue-Bot

Goal: Blue-Bot brings STEM - Science, Technology, Engineering, Math - Foundational Skills and communication into the classroom and builds foundational skills.

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Grade 6 Coding Expectations continued

RS are Reproducible Sheets

Overview: Apply the robot's keys to enter code into Blue-Bot.
Apply estimation to determine distances & turns.

Concepts: Investigate results of code.
Given code, predict results or outcomes.
Given results, an action or outcome, one can predict code.
Sequencing, directionality, problem-solving, counting, estimation

SPECIFIC ACTIVITIES: SEQUENTIAL EVENTS

RS are Reproducible Sheets

Part A: Code Blue-Bot with Blue-Bot's Keys

Select 2 Activities from page 37 to 47 **From 2RS.1 to 2RS.9** pg 37 to 47

Part C: Code Blue-Bot by Tablet or Computer

Information, Preparation pg 54/55
Investigation Activity pg 56
Prediction Activity #1 **Duplicate 2RS.10** pg 57
Prediction Activity #2: REPEAT **Duplicate 2RS.11** pg 58

Chapter 3 of Resource - "First Steps in Coding to Learn" Neufeld - Interactive Coding

Overview: Introducing the LOGO Learning Environment.

Concepts: Apply clear and concise learning skills.
Sequencing, Directionality, Problem-solving, Counting, Estimation, Repeating

SPECIFIC ACTIVITIES: SEQUENTIAL EVENTS, REPEATING EVENTS

Introduction to LOGO Learning Environment; Acquiring LOGO pg 66 to 68
The LOGO Screen pg 70
Activity #1: Explanation pg 71
Activity #1: Investigate, Predict, Journal **Duplicate 3RS.1** pg 72
Activity #6: Shape Up on Blue-Bot **Duplicate 3RS.6** pg 77
Activity #7: Shape Up by Logo Code **Duplicate 3RS.7** pg 78
Select from Tasks within 7 Mazes **Select from RS** pg 91 to 95

Chapter 4 of Resource - "First Steps in Coding to Learn" Neufeld - Of Shapes and Patterns

Overview: Work through Patterns based on Squares, Triangles, Rectangles and Beyond

Concepts: Changing Code into a more Efficient Code
Sequencing, Directionality, Problem-solving, Count, Estimation, Repeating, Nesting

SPECIFIC ACTIVITIES: SEQUENTIAL EVENTS, REPEATING EVENTS, NESTING

Part A: Think Square

Activity #1: Introduce the Square **Duplicate 4RS.1** pg 98 to 99
Activity #3a: Squares ... Again #2 NESTED **Duplicate 4RS.4** pg 104

Part B: Think Triangle

Activity #1: Introduce the Triangle **Duplicate 4RS.7** pg 108
Activity #3: Triangles...Again & Again #2 NESTED **Duplicate 4RS.9** pg 112

Part C: Art Class

Activity #1: Turn & Repeat a Square .. NESTED pg 114

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Part D: Think Rectangle

Activity #2: Rectangles ... Again and Again #1 **Duplicate 4RS.11** pg 121

Part E: Closed Shapes

Activity #1: Investigate Closed Shapes pg 126

Activity #4: Given code, Design Regular Polygon **Duplicate 4RS.18** pg 130

Chapter 5 of Resource - "First Steps in Coding to Learn" Neufeld - Build New Learning

Overview: Introduction to "Procedures" - a more efficient way of programming

Concepts: A "procedure" is a set of commands used to perform a specific task.

A "procedure" introduces a control structure leading to conditional statements

SPECIFIC ACTIVITIES: PROCEDURES leading to efficient CONTROL STRUCTURES

Part A: TURTLE'S FIRST DAY IN SCHOOL

Activity #1: Introduce the First Lesson pg 134

 Your Second Task **Duplicate 5RS.1** pg 135

Activity #2: The Second Lesson pg 140

 Your Second Task **Duplicate 5RS.2** pg 141

Activity #4: The Daisy pg 147

 Idea #1 pg 147

 Idea #2 pg 148

Part B: HOMEWORK on the FIRST DAY pg 150

Activity #1: SQUARES Everywhere **Duplicate 5RS.3** pg 151

Activity #4: TRIANGLES Around a SQUARE pg 155

Activity #5: The WREATH pg 155

Part C: LESSONS ON DAY 2 IN SCHOOL pg 156

Activity #1: Investigate Plans pg 156

 Plan #1, #2, #3, #4 pg 156, 157

Part D: HOMEWORK ON DAY 2 pg 158

Activity #1: Building Square to Flag to Ferris **Duplicate 5RS.6** pg 158

Activity #3: Build Square to Panes to Condo **Duplicate 5RS.8** pg 160

Activity #4: Build Tri to Para to Trap to Wow **Duplicate 5RS.9** pg 161

Activity #5: PetalBlossomLeavesDaisyGarden **Duplicate 5RS.10** pg 162

Chapter 6 of Resource - "First Steps in Coding to Learn" Neufeld - Coding with Variables

Overview: Introduction to "Variables" - control with repetition

Concepts: Understand how a **VARIABLE** is a placeholder in which the contents

 "VARY" in order to perform a particular task.

SPECIFIC ACTIVITIES: PROCEDURES with VARIABLES ...CONTROL STRUCTURES

Part A: Introduction: Coding with Variables

Activity #1: The Russian Nesting Doll pg 164

Activity #2: Babushka - An Introduction to Variables pg 165

Activity #3: The Chinese Nested Boxes pg 166

From Patterns to Variables .. Activity 1 **Duplicate 6RS.1** pg 168

From Patterns to Variables .. Activity 2 **Duplicate 6RS.2** pg 169

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From 4 Boxes to a Chinesebox Pattern	Duplicate 6RS.3	pg 170
Our Task: Teach Nested Boxes with ONE VARIABLE		pg 171
Part B: Procedures with ONE VARIABLE		
Activity #1: Teach CROSS		pg 177
Activity #2: Teach STRING		pg 180
Activity #3: Teach TRI	Duplicate 6RS.4	pg 182
Activity #4: A "Procedure within a Procedure"		pg 184
Part C: Procedures with TWO VARIABLES		
RECTANGLE	Duplicate 6RS.5	pg 187
A REGULAR SHAPE		pg 188
Activity: A REGULAR SHAPE	Duplicate 6RS.6	pg 190
ZIG IT to ART		pg 192
The STREET ACTIVITY	Duplicate 6RS.7	pg 193