

**Ontario Math Curriculum Expectations 2020
Coding Strand .. Grade 7**

Ontario Mathematics September 2021, EXPECTATIONS for CODING

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

RS are Reproducible Sheets

Grade 7 Coding Expectations

- 7.C3.1 Coding Skills** .. Solve problems & create computational representations of mathematical situations by writing/executing efficient code including code that involves events influenced by count &/or sub-program and other control structures.
- 7.C3.2 Coding Skills** .. Read/alter existing code, including code that involves events influenced by a count &/or sub-program & 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.

Chapter 1 of Resource - First Steps to Coding

(Recall from previous grades)

- 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

One Appropriate Selection from Activities #1 to #10 from previous grade 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

Chapter 2 of Resource - Code a Floor Robot ... the Blue-Bot (Neufeld Learning Systems Inc)

- Goal:** The popular Blue-Bot brings STEM - Science, Technology, Engineering, Mathematics and communication into the classroom and builds foundational skills.
- 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

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Gr 7 Coding Expectations continued

SPECIFIC ACTIVITIES: SEQUENTIAL EVENTS

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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

MATH THEATRE: a special activity for gr 3 to 5

pg 55, 56

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 #7: Shape Up by Logo Code

Duplicate 3RS.7 pg 78

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, Counting, 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

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

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Grade 7 Coding Expectations continued

RS are Reproducible Sheets

Chapter 5 of Resource - "First Steps in Coding to Learn" Neufeld - Building 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
Part B: HOMEWORK on the FIRST DAY		pg 150
Activity #1: SQUARES Everywhere	Duplicate 5RS.3	pg 151
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

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

Overview: By creating procedures with variables & subprograms, one becomes more efficient

We will learn how to code using variables or placeholder and subprograms

Concepts: The variable is a placeholder in which contents "vary" to perform a task.

A "procedure" with variables introduces a control condition depending on Count.

SPECIFIC ACTIVITIES:PROCEDURES leading to efficient CONTROL STRUCTURES

Part A: INTRODUCTION: CODING WITH VARIABLES

From 4 Boxes to a ChineseBox Pattern	Duplicate 6RS.3	pg 170
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Part B Procedures with ONE VARIABLE

Activity #1:TEACH CROSS		pg 177
Solution without Variables .. CROSS1 ... CROSS5		
Solution with Variables .. CROSS :LENGTH		
Activity #2 TEACH STRING		pg 180
STRING :L		
Activity #4 Procedure within a Procedure .. A SubProgram		pg 184
PANE :WIDTH	WINDO :WIDTH	

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Part C Procedures with TWO VARIABLES

RECTANGLE :L :W	Duplicate 6RS.5	pg 187
A REGULAR SHAPE POLY :N :T	Duplicate 6RS.6	pg 190
ZIG IT to ART ZIG :X :Y		pg 192
STREET ACTIVITY...Program and SubProgram	Duplicate 6RS.7	pg 193

Chapter 7 of Resource - "First Steps in Coding to Learn" Neufeld - Again & Again with Recursion

Overview: By creating procedures with variables & recursion, one becomes more efficient
 We will learn how to code using variables and recursion.

Concepts: Recursion creates efficiency, making procedures much shorter to create and modify

SPECIFIC ACTIVITIES:PROCEDURES with RECURSION leading to efficient control.

Part A First Lesson with RECURSION pg 196

Activity #1 SQUARES		pg 196
Idea 1 and Idea 2		
Activity #2 EXAMPLE		pg 198
Activity #3 STAIRS		pg 199
Activity #4 MILL		pg 200
Activity #5 SQUARRAL		pg 201
Conditional ... The Runaway Turtle ... IF ... THEN		pg 203

Part B Recursion Homework

Activity #1 Homework #1	Duplicate 7RS.1	pg 205
Activity #2 Homework #2	Duplicate 7RS.2	pg 206
Activity #4 A Polygon Challenge		pg 208

Part C Recursion and Variables in Art Class pg 210

Spin N Grow a SQUARE		pg 210
Spin N Grow a TRIANGLE		pg 211
The POLYSPI Series		pg 212
The INSPI Series		pg 214
Grow & Stop SPINTRIANGLE & SPINSQUARE	Duplicate 7RS.4	pg 215
The PATTERNS Series		pg 216