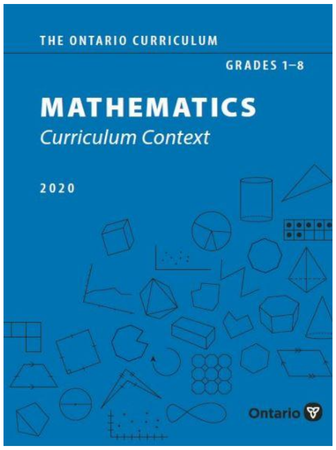
Peterborough Victoria
Northumberland and Clarington
Catholic District School Board

Math Moment…

Coding: Another Way to Communicate

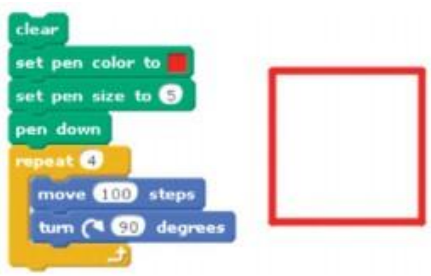


THE ONTARIO CURRICULUM
GRADES 1–8
MATHEMATICS
Curriculum Context
2020
Ontario

Coding, in the simplest of terms, is telling a computer to do what you want it to do. This begins with breaking a task down into logically sequenced step-by-step commands for the computer to follow. It is like a recipe! Coding allows users to investigate, problem solve, explore and communicate through discovery, and it is a way to express ideas creatively.

Coding requires computational thinking, which is embedded throughout the Ontario Curriculum and more recently as expectations within the revised Ontario Grades 1-8 Math Curriculum. The task can consist of applying Math concepts like patterning, geometry and measurement to the development of interactive stories, videos, websites, and artwork.

The very nature of writing code requires the programmer to become metacognitive about how to communicate these plans effectively to bring about the intended goal. Students not only apply critical thinking and problem solving skills, but also mathematical communication skills through visual and concrete approaches. Coding enables multiple entry points for diverse groups of learners so as to allow students to represent and explore.



```
clear
set pen color to 🟥
set pen size to 5
pen down
repeat 4
    move 100 steps
    turn ↻ 90 degrees
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In schools today, students are exploring the action of writing code. This includes using digital and/or unplugged activities. When students code digitally, they use a specific programming language that is either block-based or text-based to complete a task such as moving an animated character on a computer screen or causing a robot to move along a path or perform an activity. Educators use a variety of websites with rich digital activities and/or simple programmable robots that enable students to develop programming skills. Students also have opportunities to develop coding skills by participating in unplugged coding activities that do not require the use of a computer or robot. These involve hands-on activities with Math tools, blocks and/or cards.

Some sites that educators are using to support coding and can also be used at home include:

- Digital activities: Scratch, Code.org, KidsCodeJeunesse
- Unplugged activities: code.org, CSUnplugged, Teach Your Kids Code

Gadanidis, G. (2014) Young Children, Mathematics, and Coding: A low floor, high ceiling, wide walls learning environment. *Cases on technology integration in mathematics integration* (p 312-344). Hersey, PA: IGI Global.

Marks Krpan, C. (2018) *Teaching Math with Meaning: Cultivating self-efficacy through learning competencies, Grades K – 8.* North York, ON: Pearson Education.

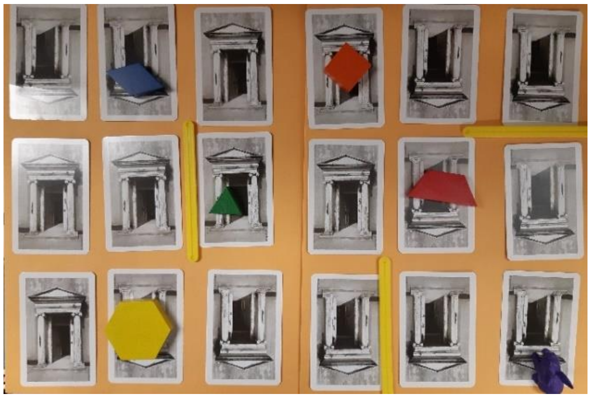
Moss, J., Bruce, C., Caswell, B., Flynn, T., & Hawes, Z. (2016) *Taking Shape: Activities to develop geometric and spatial thinking.* Don Mills, ON: Pearson Education.

Check out January’s Coding Math Tasks! Share your strategies with @PVNCCDSB using #PVNCLearns #PVNCMath!

Feed the Mouse

Goal: using a deck of cards, a “mouse” needs to navigate and collect treats.

How to play:



- One person acts as the *computer* who moves the mouse by listening to the programmer’s instructions.
- The other person acts as the *programmer* who gives the commands.
- The *programmer* gives verbal instructions like 'move forward' or 'move backward' and 'turn right' or 'turn left' to guide the computer/mouse throughout the path.
- The *programmer* must also indicate the number of card spaces, without missing any of the treats.
- The challenge level of the game can be increased by creating a more complex maze and putting obstacles in pathways that the mouse has to escape from or maneuver around.

Build Your Own Robot

Goal: build a brick or block figure robot correctly while only listening to verbal instructions.

How to play:

- One person acts as the *programmer* who builds a brick or block figure and does not show the other person - *computer*.

- The *computer* and the *programmer* have either a partition between them or have their backs turned during the activity.
- The *computer* has just enough bricks or blocks to complete the build.
- The *programmer* is to give one instruction at a time to the *computer* to build their robot.
- The job of the *computer* is to build the robot without seeing the model and only listening to the *programmer’s* instructions.
- If the *computer* is unable to recreate the robot with the given instructions, both the *programmer* and the *computer* will realize that there is something wrong with the instructions and revisit the steps. This is a key concept of coding called debugging.
- The difficulty level of this game can be increased by giving the *computer* more than the desired brick or block pieces. The *computer* has to choose only the desired pieces and reject the undesired pieces according to the *programmer’s* instructions.

More ideas can be found here.