

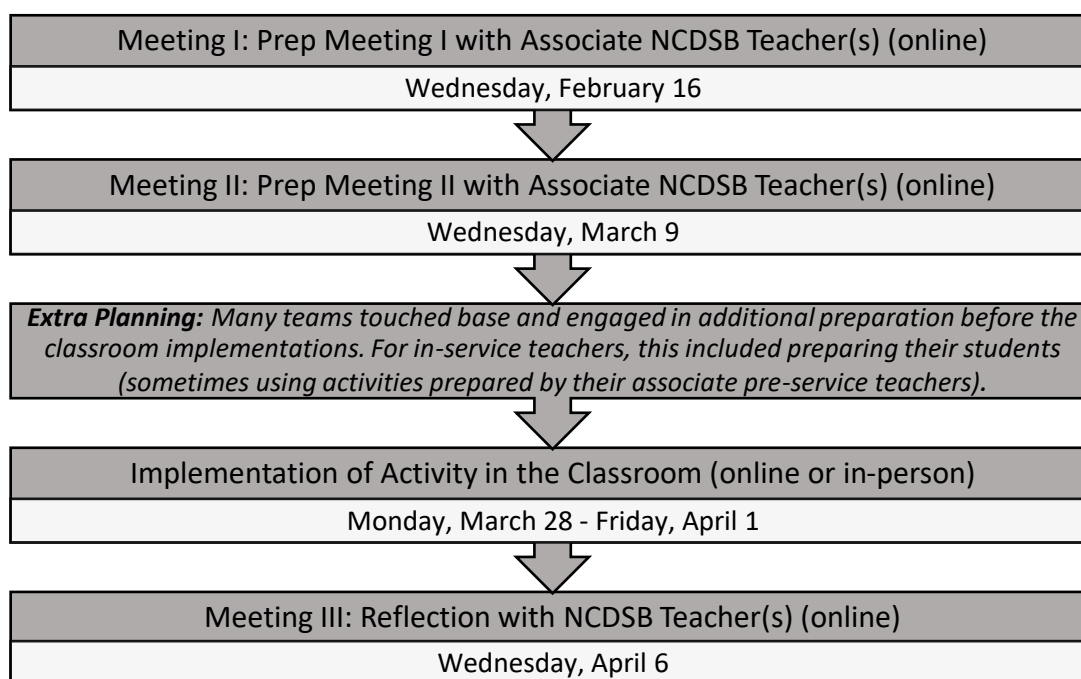


A Collaborative Approach to Implementing Coding in Grade 5-9 Classrooms Involving Pre- and In-Service Teachers, Numeracy Consultants, and University Faculty

Niagara Catholic District School Board
 Department of Mathematics and Statistics, Brock University
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This past winter, 25 Niagara Catholic District School Board in-service teachers and 36 Brock University pre-service teachers worked together to prepare and implement coding and mathematics activities in Grade 5-9 classrooms. This collaboration was coordinated by Laura Cronshaw and Jeffrey Martin (NCDSB) and Dr. Laura Broley and Dr. Chantal Buteau (Brock). In this document, we layout the timeline of this collaborative project and the meeting guidelines used. For more details about the overall collaborative approach, see the [facilitation guide](#).

Timeline:



The following are topics to be discussed at the first meeting.

1. **Introduce yourselves**
 - a. Including math and coding background
 - b. Teachers: Why you joined this project
2. **In-service Teacher(s):**
 - a. Who is the class like (number of students, typical math lesson structure, any particular challenges, etc.)?
 - b. How much class time can be dedicated to the implementation of the activity (1 lesson, 2 lessons, etc.)?
 - c. What does the class know about coding (in Scratch, in Python, etc.)?
3. **Topics and Technology:**
 - a. Discuss the different math topic(s) that could be at the center of your activity.
 - b. What technology and programming language could be used (Scratch, Python, etc.)?
 - c. What would be the learning objectives of the activity (e.g. any objective pertaining to coding?)
4. **Brainstorming about the Activity (in relation to 3):**
 - a. Explore different resources and identify potential activities (to use as is or as a starting point).
 - b. Decide whether you will design an activity or select one from the resources and potentially amend it for the classroom.
5. **Contact Information of Associate In-/Pre-Service Teacher(s)**
6. **Each team member's 'To-Do' before next meeting**

List of Resources (not exhaustive, in no particular order)

- Understanding Math + Coding Gr 1-8, e-textbook by Gadanidis, 2021
- Math + Coding Teams, e-textbook by Gadanidis, 2022
- Ontario Association for Mathematics Education (OAME), 'Coding Resources': <https://ontariomath.support/?pg=results&type=subject&lang=EN&subject=Coding>
- TVO Digital Learning Outreach: Coding in the Classroom (numerous activities by Lisa Floyd): <https://outreach.tvolearn.com/codingintheclassroom/#tve-jump-1764b1d0f77>
- UCL ScratchMaths (a two-year computing and mathematics-based curriculum for pupils in Grades 5 and 6 in **England**. Its aim is to enable pupils to engage with and explore important mathematical ideas through learning to program) : <https://www.ucl.ac.uk/ioe/research/projects/ucl-scratchmaths/ucl-scratchmaths-curriculum>

Overall Principles: This is a collaborative project. You are working *together* on preparing and implementing the activity.

Purpose: Finalize decisions on the math and coding activity to be implemented in the classroom. By the end of the session, you should be able to describe:

1. **Learning Objectives (pertaining to math and possibly coding):**
 - List them all using bullet points if more than one objective.
2. **Math topic(s) and computational concepts involved**
3. **Overall approach of the “math and coding” activity (one of the following):**
 - Design of an activity from zero
 - Use and modification of an activity from a resource
 - Use of an activity from a resource
4. **Date(s) and time(s) for implementation:**
 - Will the pre-service teachers be in the classroom in-person or virtually?
 - What days and times will the implementation take place?
5. **A description of your activity:**
 - Including how 1-2 affordances of programming for mathematics learning are a part of your activity
6. **Each team member’s ‘To-Do’ before Implementation:**
 - Additional meetings, preparatory lessons, expected dates for completion, etc.
7. **Protocol for going into the school:**
 - What to do upon arrival to the school (form to fill out, Police Check confirmation, etc.)

Once discussed, a member of the organizing committee will meet with you to hear about the proposed activity and implementation.

Meeting III: Reflection with NCDSB Teacher(s) I

90 minutes

**Groups will be assigned consisting of a facilitator and three pre-/in-service teacher teams.
** See below for reflective questions to be answered by pre-/in-service teachers prior to this meeting.*

10 minutes: Whole Group

- Go through an overview of what the reflection will look like

50 minutes: In assigned groups

- Use the following questions as guidance to your reflections:
 1. What were the major learning outcomes when integrating coding in the mathematics classroom?
 2. What were the major challenges when integrating coding in the mathematics classroom?
 3. What recommendations would you give to teachers for their preparation or implementation of such an activity.
- Use the provided Jamboard to keep track of answers

30 minutes: Whole Group

- Share key ideas for each of the questions

****Prior to this Meeting:**

Every in-service teacher and every pair of pre-service teachers will respond to a questionnaire with the following questions.

- a) One thing about the activity that I would describe as successful, and what I think contributed to this success
- b) One thing about the activity that didn't quite work, and what I would do differently next time
- c) One key thing that some students learned
- d) Anecdote (using pseudonyms) illustrating a (math) learning moment and/or a challenge of integrating coding in the math classroom

In-service teachers only:

- e) Would you do this activity again and would recommend this activity to other teachers? Why or why not?
- f) As a teacher, what did you personally gain from the experience of implementing this activity?
- g) Looking ahead, what are your next steps towards continuing to implement such activities?

Pre-service teachers only:

- h) As a future teacher, how did you feel about implementing a math+coding activity with school students, and how do you feel now that you've implemented it?

For related pre-service teacher course material, visit the following page:
<https://ctuniversitymath.ca/teacher-education-resources/>

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