

Working Together:
Developing a Shared Vision of Mathematics to Support Student Success

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Over the course of the school year, our team met four times to continue the work started last year and build curriculum maps for mathematics at the cycle two and cycle three level. Last year we worked to target math concepts to be developed each month as well as evaluation tools (situational problems and application questions). This year, we aimed to add open questions and discussion tasks, games and math centres to our monthly plans. Furthermore, we brought our curriculum maps to life, by preparing the materials to be used with students and by creating digital resources to be stored on Office 365.

Our main challenge throughout this process was maintaining focus. Even though we see each other every day, we seldom have the time to sit together and talk pedagogy. We tended to get swept up in tangential conversations and had to rein ourselves in. Throughout our sessions together, we also fed off each other's enthusiasm and kept finding ways to make our project bigger and better. We had to remind ourselves to stick to the essentials at first and to move on from there. We didn't want to make our vision so big that it would never materialize.

One of the main objectives of our project was to create a teaching plan that effectively combined all the elements of a balanced curriculum. One of the most important challenges we face as teachers is how to "pull it all together". We wanted to find a way to ensure that we favored best practices and selected activities that could reach all learners. These activities included open-ended questions, error analysis, games, exploration of manipulatives, projects, application questions, situational problems, etc. Figure 1 shows a sample page from the grade 5 yearly plan.

Of course, it can be said that all good teaching is a work in progress. No curriculum map or teaching plan can ever be truly finished. Good teachers evolve with every passing year, incorporating new ideas and replacing old ones. In exchanging with other colleagues or attending professional development sessions, our knowledge base is constantly renewed. Therefore, though we have come up with a "finished product", our hope is that our curriculum maps continue to grow. We have already thought of incorporating error analysis questions, multiple choice/mastery questions, mental math questions and projects with a focus on technology in the future. Our mathematics consultants at Riverside are aware of our project and they know that we are open to sharing with teachers at other schools and collaborating

with them to create an even richer resource. In fact, some teachers at another school have already started to share resources with us via Office 365.

GRADE 5 YEARLY PLANNING							
Month	Concepts	Situational	Strategies	Talk/Journal	Games/Activities	Online	Reference Books
September	Numeracy Multiplication	Moving Towards a Cure	<ul style="list-style-type: none"> Math Dictionary Visual representation of problem Partial products Area model for multiplication Act it Out 	<ul style="list-style-type: none"> Good Questions (M. Small) pg. 29 Good Questions (M. Small) pg. 57 Largest Product (nrich) Math Thinking (M. Small) p. 89 Good Questions (M. Small) p. 159 	Place Value: 1) Place value Battle Ship game 2) Place value card game 3) Betweeners (dice game) 4) Place value dice – ordering numbers	Nrich	Nelson pg. 177 (Multiplication) Box Cars and One-Eyed Jacks online resource
October	2D Geometry Triangles Angles	Masks (fractions & frieze)/ In the Style of Picasso	<ul style="list-style-type: none"> Math Dictionary Trial & Error 	<ul style="list-style-type: none"> Angle Hunt (iPad - explain everything) Squares in Rectangles (nrich) Egyptian Rope (nrich) Good Questions (M. Small) p. 131 Good Questions (M. Small) p. 101 Good Questions (M. Small) p. 83 	1) YouCubed: How Close to 100? 2) AngLegs – Activity 8	YouCubed Nrich	Nelson pg. 197 (angles) Nelson pg. 225 & 231 (area)
November	Stats	Does Winning Make a Difference?	<ul style="list-style-type: none"> Questioning an image Start with the question & dig for information 	<ul style="list-style-type: none"> Searching for meaning (nrich) Good Questions (M. Small) pg. 189 How Will I Show it? (Daily Stretches p. 163) Good Questions (M. Small) p. 176 Good Questions (M. Small) p. 173 	1) Class survey project (bar graph) 2) Physical activity project (line graph)	Nrich	Good Questions (M. Small) pg. 173 Math Stretches p. 163
December	Measurement Time	Dragon Breeder	<ul style="list-style-type: none"> Number line (jumps) 	<ul style="list-style-type: none"> Good Questions (M. Small) pg. 132 	1) Area Blokus game 2) Exploring different measurement tools to		Nelson pg. 128 & 141 (measurement)

Figure 1: Sample page from grade 5 curriculum map

While our curriculum maps are the physical product of our work together, the benefits of this project have been much greater. First, our time together has allowed us to share ideas and develop a common vision of solid math teaching. We previously saw the fact that we teach math in French in cycle 2 and in English in cycle 3 as an obstacle to collaboration. Now, we know that sound math instruction has little to do with language. There are some universal strategies and tools that we can use. While it is common for teachers within a cycle to work together regularly, we sometimes overlook the advantages of cross-cycle collaboration. Earlier this year, we paired up grade 6 and grade 3 students to analyse situational problems. We also have plans to team teach in grade 4 and 5 and have students complete a situational problem together, where the grade 4 students would receive the problem in French and the grade 5 students would receive it in English. We hope this will help students transfer knowledge and see mathematics as one knowledge base that transcends the language of instruction.

Our conversations have also led us to consider the materials we use to support learning in a more critical way. We think about which materials will allow us to best respond to a student learning need. This project gave us the opportunity to consult professional reference books and online sources, in addition to approved textbooks and other workbooks. At the

school level, we have begun to discuss the need for a library of professional books and have already begun building one with the help of our school board librarian. While still in its infancy, a collection of professional resources will help us diversify our teaching strategies and stay aware of current research and best practices.

On a more superficial level, we have pooled our resources. We sorted and compiled a list of manipulatives as part of our 2016-2017 PDIG grant. This made us aware of the resources and tools that are available at school and, subsequently, we put them to better use now than we did before. We even consult each other before making purchases to maximize the materials that will be available for teaching.

Adopting a shared vision of mathematics has allowed us to better align our teaching with the MEES expectations for end-of-cycle. This means facing the reality that even application problems are multi-step and, often, multi-concept. However, now more than ever, we feel ready to face the challenge of helping our students become effective problem-solvers who can deal with increasingly complex tasks. The fact that we have adopted common teaching practices will undoubtedly help students deal with challenging math situations.

Overall, this project has served as a means for us to renew our commitment to student success and provide the best quality instruction for our students.