

**NETWORKS OF INQUIRY AND INNOVATION
2011-2012**

**MOUNT SENTINEL SECONDARY SCHOOL
#08 Kootenay Lake**

Leadership Team

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School Context/Community Involvement

Mount Sentinel is a rural grade 7 to 12 school of approximately 370 students, with a majority based from a variety of locations. Like other schools in the West Kootenay region, a large number of our students are of Russian descent and an increasing population of students self-identify as Aboriginal. The school has a vibrant athletics and fine arts culture with a large number of students and staff involved in curricular and extra-curricular pursuits. The school is located in a geographical area that has vulnerability rate of 31% according to EDI data collected by the Human Early Learning Partnership for 2009/10 and 2010/11. Therefore, a majority of the focus for our Learning Support Program and School Based Team is to work alongside our teaching staff in differentiating to support a student body with increasingly diverse learning needs. Various leadership teams have been involved in inquiry based professional learning for a period of five years; our school growth plan cycle focuses on improving student learning by purposefully supporting adult learning. Our 2011/2012 plan focused on improving ownership and engagement in learning for students and adults.

School Inquiry and Action Numeracy and Social Responsibility

School Question

Will a project based approach to teaching Math 7 improve attitudes about learning Math and therefore increase ownership of learning as measured by the “*contributing to classroom and school community*” band of the social responsibility performance standard?

Strategies

This inquiry focused on two areas of educational research. The first is that a student who is highly motivated and has a positive attitude toward mathematics demonstrates higher success and achievement levels. (Ma,1997; Singh, Granville, & Dika, 2002). Second, the Program for International Student Assessment (PISA) describes mathematical literacy as “an individual’s capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgments and to use and engage with mathematics in ways that meet the needs of that individual’s life as a constructive, concerned and reflective citizen (OECD, 1999). We strived to stretch learners beyond just knowing, understanding and applying math concepts, principles and all of the associated algorithms by engaging their “head, heart and hands,” the cognitive, affective, and behavioral domains of learning. Several of our learners expressed that they are “*not good at math, don’t like math, don’t understand why we have to do math.*” A deliberate shift was made to plan a unit of study that emphasized exploring math, with the teacher as facilitator and guide, versus simply covering the curriculum. This gradual release of responsibility in learning and meeting learners where they are at were thought to be key aspects of our work focused on increasing ownership of learning.

The Math and HCE (Health & Career Education) teachers worked with the grade 7’s during the same teaching block. This provided the teachers a natural opportunity to work as learning partners and to collaboratively plan and design an integrated unit of study that encompassed the academic, social/emotional, learning skills and behavioral aspects of learning. Through a hands-on, project based approach the students built 9 dog houses to develop numeracy, communication, problem solving, critical thinking, and teamwork and collaboration skills.

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Cognitive Domain: The project was designed to engage students in the application of mathematics to better enable them to transfer these skills to other disciplines and real world problems. Mini-workshops were provided as required in small groups to facilitate “just in time learning.” This enabled the teacher to differentiate learning and students were able to progress at a natural pace for learning. For example, direct instruction was required to develop an understanding of how to measure angles and to calculate fractions to determine accurate cut lengths for the wood.

Behavioral Domain: Students developed individual and collaborative problem solving, critical thinking, communication, teamwork and creative thinking skills. A blend of direct instruction and experiential learning during HCE classes enabled the teacher to then help guide the students in transferring their learning to further practice and develop these skills in Math. In addition, each learner maintained a journal; their teacher prompted them with key questions to reflect on their learning experience. Students self-assessed progress using our school’s learning skills rubric as well as a collaboratively designed rubric focused on the criteria related specifically to planning, designing and constructing the dog houses.

Affective Domain: A key focus of this learning was mindset and learning beyond the classroom. The Math teacher enlisted the support of a carpenter to act as a guide and mentor to help the students design and construct the dog houses in teams of four to five students. This community member also shared how math skills and habits are a part of his work as a carpenter as well as in his own everyday life. In addition to the students having choice about the size and design of the house, they also decided to raffle the dog houses as a way of fundraising to give back to their community. The students presented a cheque of \$535.00 on a field trip to the SPCA. The students also made thank you cards for the community businesses for their donations of supplies and materials, the parent and other adult helpers, and the carpenter for donating his time. There was also a notable attitudinal shift in their thinking about Math and in their interactions with each other as recorded below.

School Findings

	NY	A	M	E
Fall 2011	1	3	6	0
Spring 2012	0	0	4	6

Total Number of Learners: 10 out of a class of 44 students.

As a whole class, we noticed that the majority of students were fully meeting or exceeding expectations in their ability to take responsibility, contribute and work cooperatively. The majority of the students also reflected in their learning journals and in their eportfolios that the dog house project changed their attitude about learning Math. One student reported “*I love Math now its lots more fun, after we completed the house. I really hope we can do this again, but it was also because we had a great math teacher.*” “*One thing I want my new teachers to know about me as a learner is that I like to do lots of projects or presentations, not just listening or taking notes.*” “*I think that my teacher was seeing that we could not sit so she said we should do something hands on.*” Of the ten students we followed in our case study, nine learners responded at the midpoint of the year *no, I do not like learning and thinking about Math.* At the conclusion of the dog house project, all ten students responded *yes.* These ten students also all increased in their capacity to fully meet or exceed expectations on the contributing to the classroom and school community band of the social responsibility performance standard.

School Plans for 2012-2013

Through our school growth plan, we will strive to explore ways to embed inquiry and an inquiry mindset across the curriculum. Our entire Math teaching team would like to work more collaboratively to discuss how projects like the dog houses can be embedded across grade levels in our practice to better develop numeracy, literacy and general thinking and learning skills.

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Reflections, Advice

To move learning forward, it is important to listen to the voices of the learners in our schools. Too often we focus on pushing through the curriculum, while leaving a majority of our students behind. Capable learners can become disengaged and unmotivated; while vulnerable learners feel that the learning targets are unattainable and/or are not important. As a professional learning community, we need to continue to ask challenging and respectful questions about our practice by engaging in conversations about:

- rigor versus vigor in learning
- growth versus a fixed mindset
- coverage versus “uncoverage” and the gradual release of responsibility
- relationships that move learning forward
- assessment practices that move learning forward

Every school is unique in its strengths and challenges. However, every school that is focused on improving learning for all students would be remiss to not engage in inquiry aimed at developing our professional practice.