



2015-2016 NOII Case Study

School: W L McLeod Elementary

District: #91 Nechako Lakes

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Our focus for this year: Our focus involved improving learning for all students and meeting the diverse needs through hands on, engaging project and problem solving oriented learning tasks, specifically using the Science curriculum about simple machines to have students build compound machines that perform a task.

Scanning: We were at the beginning of our new learning as a teacher collaborative team this year, moving from having a common focus and acting individually in our classrooms, to actually working together, sharing in our actions and learning a new, messy, scary but exciting way of engaging learners.

- Students were showing us needs in the area of critical thinking.
- Many learners were not as engaged with traditional learning as we wanted.
- Diverse learning needs meant that we needed to change to be able reach the many students whose needs were not being met in traditional ways.

We used three of the four questions in reflection activities we had our learners engage in (sharing circles, interviews) and as we used the critical thinking competencies to assess our learners. We only used the question about adults who believe in learners in a few interviews and focused the question on the projects they were involved in because it felt out of context to ask the bigger question about success in life.

The principles of learning that guided us:

- learning requires patience and time
- understanding the importance of Indigenous knowledge
- recognizing individual differences and stretching all learners
- the social nature of learning and learners at the centre

Focus: We wanted to use Science to inspire all learners to become creators, critical thinkers and problem solvers. The new curriculum and Critical Thinking Competencies inspired us to collaborate more closely and support each other to try a new way of teaching and learning that we knew would be difficult for us. The grade 5 curriculum was common for all four classrooms (Simple Machines) and it would enable us to have all our French and English students together to build an even stronger community across the school.

Hunch: We adults often feed expectations and information to students, to the point where we tell students how to think and what to think and simply ask them to regurgitate it as proof of their learning.

We also control as many variables as possible most of the time, which requires students to do very little thinking.

New professional learning:

During professional development days and our biweekly collaboration time we engaged with the following new learning:

- Universal Design for Learning workshop
- Austin's Butterfly (formative assessment focused on self and peer feedback)
- British Columbia's revised curriculum
- Assessment for Learning (AFL) strategies explored, implemented and then shared in Professional Learning Community (PLC) meetings
- Local distance learning teacher with experience in project based learning
- Debbie Koehn and Michelle Miller-Gauthier facilitated our planning a few times with reflective questions and guidance to make the work more than simply project based.

Taking action:

- We began with the end in mind, articulating the skills and knowledge we wanted the students to acquire. The emphasis was on the processes of problem solving, being able to face challenges and persist, and articulate the thinking and problem solving skills they applied. If a machine did not work in the end, if the learner could explain why and have some ideas for making it better, that would be credible as a project that worked perfectly. We also wanted our learners to use the scientific terminology to demonstrate their understanding of the content.
- We 'front-end loaded' learning about simple machines the first week by having six workshops (one for each simple machine) hosted by teachers and combining all grade 4-6 classes into six groups. Some workshops were very hands on with experimentation, questioning and hypothesizing.
- Connections to Indigenous knowledge involved three presentations by community members showcasing local First Nations' traditional use of simple machines. Students interacted with pulley and line systems to cache food in the wilderness, jumped in a canoe (on dryland), learned about weaponry and other practical tools for hunting and gathering food.
- We designed planning pages and learning logs to help students start strong and to help us keep track of their progress and learning.
- Learners then began researching information about simple machines and various ways they are the components of compound machines. As students made plans, teachers began purchasing supplies and contacting community members to help with the building and to provide the tools that would be necessary
- We presented cooperative building challenges in each classroom to provide learners with the experience of working with a team to problem solve while creating structures. We also video-taped a sharing circle where learners from one team demonstrated effective discussion and thinking skills. The video was shown to all students, and co-generated criteria for future sharing circles. The criteria emphasized thinking and metacognitive skills as well as appropriate social-emotional interactions
- Students then brought in materials, chose from those provided and began hammering, sawing, screwing, tearing apart and redesigning. Family members and community members came with table saws, drills and other power tools. The district Careers program lent us tools and donated other supplies.
- The efforts culminated in an exposition where parents and community members as well as other classes from the school toured the gallery of compound machines as the builders demonstrated and explained.
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Checking:

Our Evidence:

- Teachers interviewed each student team and facilitated sharing circle conversations
- Students submitted daily logs
- Teacher and parent observations
- Video interviews of individuals and sharing circles

Engagement:

Every day students were asking if it was a building day. "Are we having Science today?" "Is it a building day?" and they were always wanting the building time rescheduled if it got bumped. Parents were commenting that students were talking about their compound machine at home, many parents attended the Expo, and students were identifying simple machines in the community as they were out and about with their families.

This way of learning challenged all students, both those who often excel in school, as well as those who do not do well with typical school learning. One student who is often not in the room during traditional learning, stayed in the room every time we were building. Other students who often disengage with traditional methods of teaching, were completely engaged and often teaching other students. Students who need challenges, were especially tested by working with actual building materials and grew in confidence because they were learning new skills (even though many were also frustrated and struggled with the problem solving aspect).

Skills/Competencies:

Patience, perseverance...working through frustration

How to take risks

Cooperative learning; Support they are getting from each other is wonderful

Some are learning that it is alright not to have the answers (don't have to be perfect)

Problem solving

*Students still struggle with being metacognitive. Most are operating at a concrete level of thinking and are not aware of how they problem solve, or that they can find answers within themselves. They look to the adults for help when they run into a challenge.

Knowledge:

Almost all students could explain the simple machines and how they worked together to make the compound machine they built work properly. If they couldn't write about it, they could talk about it.

Student Feedback

- Some students felt overwhelmed by the 'bigness' of the project when all four classes were together building in the intermediate wing.
- Students also found the daily log difficult. Some found it difficult to articulate their thinking.
- Many students liked being able to choose what they could build.
- Many wanted more time to plan. This is a celebration because they often resist planning (even in writing) so the recognition that planning is important is a wonderful step.
- Longer blocks of time to build was a wish of many.
- Many didn't care for the exposition because they had to sit for lengths of time waiting for an audience to arrive. (Next year, we may have two classes present while two classes act as the audience.)

Reflections/Advice: Even though it was messy, imperfect and full of hair pulling moments and ear splitting noise, we will do this again because the engagement was incredibly high for all learners. We will also explore other research oriented inquiries in different curricular areas because the importance of choice for students was so evident.

Next Steps:

We see that our students are still at the beginning of their critical thinking skill development and their metacognitive abilities. They are very egocentric and concrete in their reflections. Almost all keep referring to what they did with the materials to solve a problem instead of the qualities and mindsets it took to overcome challenges, even when the question specifically asked “What mindsets and ‘heart work’ did it take to overcome the challenges?”

Next year we will use growth mindset language and lessons to help our learners build their awareness of their problem solving skills and improving their own learning through positive mindsets and flexible thinking. A BC teacher from the Fraser-Cascade School District #78 has shared some detailed lessons that we are looking at for guidance, as well as a local school, Evelyn Dickson Elementary.