

Bella Coola

Summer Science Outreach 2025

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ACKNOWLEDGMENTS

We would like to acknowledge that the delivery for this project took place on the unceded ancestral lands of the Nuxalk in Bella Coola, as well as on the unceded ancestral and traditional lands of the xwməθkwəy̓əm (Musqueam), Skwxwú7mesh (Squamish), and Səlílwətaʔ/Selilwitulh (Tsleil-Waututh) peoples, where preparatory work was carried out.



We are deeply grateful for the opportunity to live, learn, and work on these lands, which hold histories, teachings, and resilience that continue to shape their communities today. We honor the enduring connection of Indigenous peoples to their lands and waters, and we remain committed to supporting Indigenous rights, reconciliation, and the building of meaningful partnerships. May we continue to learn from the wisdom and stewardship of Indigenous cultures, fostering mutual understanding, respect, and solidarity in all that we do.

Our gratitude is extended to all who contributed to the success of this initiative. In particular, we recognize the staff of Acwsalcta School for their openness, collaboration, feedback, and ongoing dedication to Nuxalk knowledge integration in classrooms and student success. Most importantly, we thank the wonderful students who participated; their curiosity, engagement, and enthusiasm that not only encouraged this program but also continues to inspire us to deliver and improve STEM outreach in rural classrooms across British Columbia.

Additionally, we sincerely acknowledge the support of the UBC Centre for Community Engaged Learning through the Global Fund grant. A special thank you to Jacquie Kwok and the CCEL team for their guidance and support throughout this project.

Finally, this project was also made possible through the generous support of the Indigenous STEM team at Geering Up UBC, whose insights, resources, and additional funding were essential in bringing our workshops to life.

EXECUTIVE SUMMARY

In collaboration with Acwsalcta School and UBC's Geering Up Indigenous STEM (InSTEM) team, this 5 day long program was successfully delivered in Bella Coola. This partnership developed engaging, hands-on STEM workshops along with land-based learning; tying in Nuxalk education. This initiative aimed to address systemic barriers that limit Indigenous youth in remote communities from accessing STEM (Science, Technology, Engineering, and Math) opportunities comparable to their urban peers and to also inspire the next generation of indigenous thinkers and innovators.



The program was designed to blend STEM learning with land-based exploration. Students participated in activities ranging from chemistry; slime and biodegradable plastic making, to engineering design challenges; storm boat competition, and outdoor learnings such as a neuroscience related obstacle course. One of the highlights was the microscope investigations of blueberries gathered from a local farm, where students compared healthy samples with those affected by the “mummy berry” fungus. These activities not only connected scientific concepts to the students' everyday environment but also encouraged creativity, problem-solving, and teamwork.



Equally important, the program created space for Acwsalcta educators to integrate Nuxalk teachings and language learning alongside the STEM activities. This ensured that cultural knowledge remained rooted in community hands, while Geering Up facilitators focused on delivering the STEM components. The workshops were further supported by the remarkable level of in-class involvement from Acwsalcta staff; most days achieving nearly a 1:1 teacher-to-student ratio. This support not only provided additional assistance for students who required it but also promoted a comfortable and familiar learning environment for the students. By continuing Acwsalcta's usual cultural programming and avoiding a colonial style of pedagogy, the program respected existing classroom relationships and created an inclusive space where students felt encouraged to explore and succeed at their own pace.

The grant funding was essential in covering travel and accommodations, enabling our team to bring STEM programming directly to Bella Coola. While the program faced challenges such as weather-related travel disruptions and the unavailability of elders to join that week, its impact was still significant: students left with new scientific skills and excitement, and the school expressed strong interest in continuing annual outreach that builds on this foundation.

PROJECT BACKGROUND



Providing opportunities to quality education in science, technology, engineering, and mathematics (STEM) is crucial in preparing students with the skills required to flourish in an increasingly competitive and technological society. Yet most rural and remote communities encounter systemic barriers such as limited access to STEM programs that provide hands-on-learning, and culturally relevant educational opportunities outside of the classroom. These challenges often hinders students' confidence and limits exposure to pathways in STEM. This creates an overarching disadvantage for students in these communities as they typically have less funding, equipment and partnerships with external organizations compared to students in urban settings (Haynes, 2022).

The geographic isolation of these communities further adds onto these disparities, contributing to the underrepresentation of rural students, who are often indigenous, in STEM fields. This underrepresentation not only limits opportunities for youth but also restricts innovation by excluding the unique perspectives and problem-solving approaches rooted in their own communities.

Hands-on, experiential STEM education has been shown to stimulate curiosity, critical thinking, and creativity (Freeman et al., 2014). By providing the space and materials to solve real-world challenges introduced in a fun and engaging matter, students can better understand abstract concepts, gain confidence, and see themselves as capable problem solvers. Delivering STEM programs to these communities is especially impactful in empowering them to envision futures that include higher education, or careers in STEM fields (Wan et al., 2021).

At the same time, the vitality of Indigenous knowledge is critical to many communities' well-being and identity. Indigenous knowledge has been described as “ancient, communal, holistic, and spiritual knowledge that encompasses every aspect of human existence” (Brascoupé and Mann, 2001). This knowledge shapes identity, grounds communities, and preserves the centuries-old connection they have with the land (Harbord et al., 2022). However, the inheritance of Indigenous knowledge to younger generations has been threatened by colonialism, systemic marginalization, and ongoing intergenerational trauma (United Nations, 2019; Panofsky et al., 2021). Supporting Indigenous communities in protecting, revitalizing, and passing down knowledge is not only a matter of justice but also a vital step in reconciliation and cultural resilience.



Our project in Bella Coola responds to both of these realities. By delivering interactive, hands-on STEM workshops in partnership with Acwsalcta School, we sought to address systemic inequities in rural STEM education while creating intentional space for Nuxalk language and cultural teachings to be integrated by community educators themselves. This approach ensures that cultural knowledge remains in community hands, while facilitators contribute STEM resources and expertise. The combination of STEM engagement with land-based learning and Nuxalk teachings reflects a decolonizing approach to education; one that values local knowledge, centers Indigenous voices, and provides rural youth with opportunities to see themselves as innovators and leaders in STEM.

WORKSHOP DELIVERY

We delivered each workshop activity with a quick lesson usually accompanied by an interactive demo and/or presentation slides. This helped encompass a range of modal learning to accommodate different learning styles. The presentation slides were a great visual aid capturing the attention of younger students; helping them stay attentive throughout the lesson. Light-hearted trivia games were also integrated to solidify concepts and facilitate learning in a fun matter while also enhancing engagement. After explaining the scientific concepts of the activity; the hands-on workshop was then delivered.

Our workshops were also tailored to the unique context of Bella Coola and adapting activities for younger learners and those in alternative education streams, the program promoted both curiosity and confidence in their understanding of STEM. We adapted the activities to encompass the range of grades we worked with along with logistical constraints such as limiting outdoor programming due to bear season. Classroom aides provided daily support, making the workshops accessible to all students and reinforcing their connection to local culture and learning.

Monday

Fluffy Slime

A popular and fun activity for all was making slime but also teaching them chemistry and the differences of physical and chemical change. Emphasis on the chemical chemistry as we ask students what they observe happening at each stage of making their slime.

Gliding Cars

This physics based activity taught students the basics of gravity by creating a car that glided off elevated surfaces.

Biodegradable Plastic

The focus of this activity was sustainable materials and underlining the harms of single-use plastics. Students made their own 'biodegradable plastic' using sodium alginate, calcium chloride and food colouring. Syringes were used to make strings that students later braided and used for a hanging bridge challenge.



Tuesday

Battle of The Brains

Neuroscience was the basis of this outside obstacle course activity as the students learnt about the nervous system. Specifically, students paired up and acted as either the 'motor neuron' or the 'sensory neuron'.

- The 'motor neuron' was blindfolded and moved through the obstacle course through the instructions of their partner who acted as the 'sensory neuron'.
- The 'sensory neuron' student sees the obstacle course and guides their 'motor neuron' partner to the end of the obstacle course.



Electrifying Energy

Electrical engineering was the theme of this activity as students learn about basic circuits and later build their own DIY light sabers using popsicle sticks, copper tape, LED lights, a battery, and a binder clip.

Projectile Launchers

Students built their own slingshots and catapults with just popsicle sticks and rubber bands. The physics lesson covered potential and kinetic energy but mainly elastic potential energy.

Wednesday

Blueberry Farm

The students were brought to an organic blueberry farm in Bella Coola to pick blueberries for our blueberry dissections activity and to also look at local chickens. We also learnt about the 'Mummy Fungus' which are not native to the Bella Coola Valley and the only way to get rid of it is to destroy the whole infected plant, or use fungicides which can be a challenge for organic blueberry farms like the one we visited.



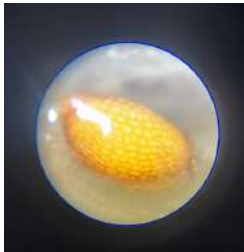
High Flyers

Students further learnt about the physics of kites; lift and drag and which shape is best for kites. Students created their own kites and were able to personalize it using their creativity and later tested them outside!



Thursday

Blueberry Dissections



Instructors walk students through a simple blueberry dissection to observe under a pocket microscope. The skin, flesh and seeds were investigated using the microscopes and students were able to ask questions and explore other plant and animal sample slides that we provided.



Glow-in-the-Dark Bubbles

An interactive demo of the science behind bubbles was given to visualize how they're made and how they pop! We then made a bubble solution that glowed in the dark using water, dish soap, glycerin, and highlighter ink. We also gave students pure cotton gloves so they can bounce around their glowing bubbles with their hand.



EDC: Storm Boat

We provided students with a variety of crafting materials to design and build their very own storm boats that would be tested in a large tub of water.

This engineering design challenge starts with a blueprint diagram that each student or pair of students will design before beginning to construct their boats. After receiving approval of their designs, the students will receive materials such as cardboard, tape, plastic cups, and more to begin creating what they have designed.

The ultimate goal of the engineering design challenge is to test which student's boat was engineered the greatest and therefore will float the longest in the water.

Friday*

*Due to unforeseen weather conditions, our team had to cut programming short in order to catch the return flight to Vancouver. To ensure continuity, we left all materials and instructions so Acwsalcta staff could complete the final day's activities on our behalf.

Storm Boat - Testing

This day was dedicated to test their Storm Boat designs and is often facilitated as a friendly challenge to hype students up and promote good sportsmanship as well as learning that designs often need constant testing and tweaking to engineer a successful product.

EDC: Biomimicry

The Engineering Design Challenge is to design an egg protection device for a successful egg drop. The key is to use biomimicry, or "imitation of the living," as a guide. Other than the material provided students are also encouraged to utilizing nature-sourced material such as grass, etc.

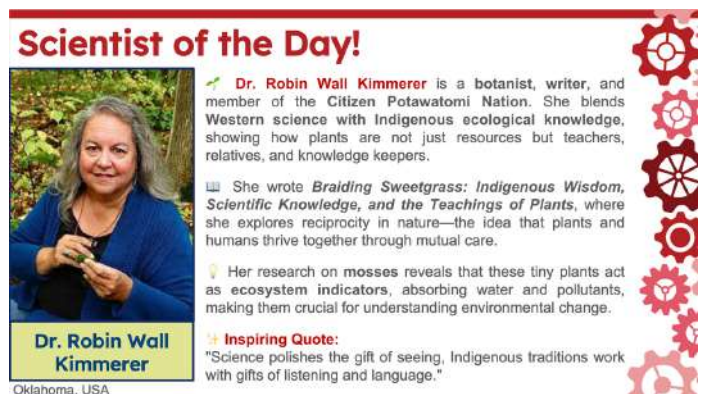
Booster Engines

This activity involves chemistry and the lesson of acids and bases which essentially teaches students that mixing an acid and base results in the production of gas which causes their DIY rockets to launch.

Their rockets were made using film canisters, vinegar, and Alka seltzer tablets.

SCIENTIST OF THE DAY

Throughout the week each day began with a spotlight on a "Scientist of the Day", all of whom were Indigenous scientists connected to the STEM topic of the day to further inspire confidence and representation in STEM. These stories offered students relatable role models who demonstrated that STEM is both accessible and relevant to their identities.



Scientist of the Day!

Dr. Robin Wall Kimmerer is a botanist, writer, and member of the Citizen Potawatomi Nation. She blends Western science with Indigenous ecological knowledge, showing how plants are not just resources but teachers, relatives, and knowledge keepers.

She wrote *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*, where she explores reciprocity in nature—the idea that plants and humans thrive together through mutual care.

Her research on mosses reveals that these tiny plants act as ecosystem indicators, absorbing water and pollutants, making them crucial for understanding environmental change.

Inspiring Quote:
"Science polishes the gift of seeing. Indigenous traditions work with gifts of listening and language."

Dr. Robin Wall Kimmerer
Oklahoma, USA

We would also like to acknowledge Madeline Su, a member of our team whose personal connections in Bella Coola established the basis of this project. From developing workshops to facilitating them with students, her contributions as an Indigenous UBC student were vital in ensuring cultural sensitivity and relevant perspectives that helped shape the program. Her presence not only strengthened ties with the community but also offered students a relatable role model; as someone who shares similar backgrounds and experiences when pursuing STEM. Combined with our daily routine of featuring Indigenous scientists in our curriculum, Madeline's attendance provided powerful first hand representation. Together, these elements of our project helped spark motivation and build confidence among students to imagine themselves in STEM pathways in the future.

USE OF GRANT FUNDS

The grant funds we received played a huge role in the successful execution of our project. A significant portion of this funding was allocated to cover the transportation and accommodations of three facilitators, which were essential for delivering the five-day program in Bella Coola.

Reaching a remote community required meticulous logistical planning, and the grant's support made safe and reliable travel possible. Having secure accommodations, especially during bear season, allowed our team to feel at ease and fully focused on engaging with students and delivering high-quality programming while in Bella Coola.



Accommodations Our team stayed in a small cabin located on an organic farm through Airbnb. This was the perfect location as the property was secured by an electrical fence, providing security and peace of mind during bear season. This farm also allowed us to interact with livestock animals and take a tour of the vegetable and fruit garden they had.

Flights The flights to and from Bella Coola ended up costing more than anticipated due to higher demand and travel during the end of summer,

Car Rental Having a vehicle in Bella Coola is a necessity as there is only one local bus that travels around Bella Coola that was very infrequent. The drive from our airbnb to Acwsalcta School was about 25 minutes along the highway.

During this time of year in late summer black bears and grizzly bears are quite abundant in Bella Coola along the highway near rivers and streams where salmon have come to lay their eggs and pass away. These bears are often spotted travelling along the highways between their dens and the rivers and streams, making it very dangerous to walk the highways on foot.

By enabling travel and covering accommodations, the grant funds helped address barriers to STEM education in rural communities. This support not only ensured the success of our project but also contributed to a lasting impact by strengthening partnerships outside the lower mainland and expanding STEM opportunities to Bella Coola and beyond.

RESULTS & IMPACT

The program created new opportunities for students in Bella Coola to engage with STEM in ways that are typically unavailable in remote communities. Students expressed excitement and curiosity all

throughout the week particularly when examining blueberries under microscopes and comparing them to prepared plant and animal slides.

Teachers noted increased enthusiasm for science and expressed interest in carrying forward such activities in the future. The program strengthened relationships between UBC Geering Up facilitators and Acwosalcta School, laying the groundwork for annual programming that combines STEM education with Nuxalk knowledge and land-based learning.

TESTIMONIES

“Many students really enjoyed learning with Sammy, Maddy, and AJ. They learned their names and felt a genuine connection to them and were so excited to come to the summer program to see what they had planned for the day. Kids showed an improvement in their executive functioning including planning materials for multi-day projects, sustaining attention for long periods of time, and working in groups. Some students were able to remember the names and the roles of the scientists that inspired, although it was high level thinking for many students and with more practice more of them would have been able to retain that information.”

“A lot of the youth in Bella Coola stay in the valley for most of the year, this limits their access to learning in a variety of ways. We do not have science centers, or a variety of summer activities. By having guests come into the valley our students have access to learning from many people, and access to projects and experiences that they otherwise could not have.”

“The lasting impact of this project includes the many memorable hands-on experiments our students got to have daily. Even in school four weeks later our students are still talking about their boats and slime.

Unanticipated results were the fantastic connections our students made with the scientists. They really enjoyed their teaching style, their calm presence, and the way they made all students successful.”

“We had huge success with multi day projects and can see how well our students can begin something, go home for the night, then come back and expand on and improve their ideas. Our students can take their learning and share it with the community, they can lead the experiments and share their learning in their own classrooms.”

STUDENT REFLECTIONS

MADELINE

This project means so much to me being an Indigenous woman in STEM, with family in Bella Coola and being able to teach one of my little cousins. I am so grateful that I was given the opportunity to travel to Bella Coola with two fellow instructors who I am very close with. I take much pride in being able to be a role model, breaking down systemic colonial barriers and showing Indigenous youth that these fields are open to anyone and everyone. Being able to connect my family's community and the Geering Up InSTEM team was a truly rewarding experience!

AJ

One of the biggest lessons I took away from this project is how quickly curiosity can grow when kids are given the chance to explore STEM in hands-on, accessible ways. Going into the program, I knew that Indigenous youth often have limited exposure to STEM, and that many students feel STEM “isn’t for them” due to stigma around grades, capability, or lack of representation in these areas. However, when given the chance to explore hands-on STEM activities in a non-academic environment, students not only engaged, but had fun, asked questions, and built confidence. Just because students are unfamiliar or hesitant at first does not mean they cannot thrive in these spaces.

I also learned a lot about myself as an educator and facilitator. Our team had to adapt quickly to younger grades and alternate education learners, and I realized how much flexibility, collaboration, and humility are needed in community work. Creating space for Acwsalcta staff to lead Nuxalk teachings alongside our STEM sessions showed me what a decolonizing approach looks like in practice: stepping back, valuing community knowledge, and avoiding a top-down model. This shifted my perspective on how to balance my role as a facilitator while ensuring cultural knowledge remains in community hands.

Professionally, I strengthened my skills in project management, grant writing, and especially teamwork in cross-cultural contexts. Navigating challenges like weather disruptions and schedule changes allowed me to improve my adaptability and patience. These skills will continue to shape how I approach both academic projects and future community partnerships.

Most importantly, this project reaffirmed my commitment to equity in STEM education. I want to continue developing sustainable partnerships that inspire Indigenous youth to see themselves reflected in STEM and to pursue their futures with confidence.

NEXT STEPS

Deepening Cultural Integration

- Coordinating earlier with elders and knowledge keepers well in advance to ensure their involvement.
- Creating time and space for local partners and facilitators to co-create culturally integrated STEM workshops.



Recurring Annual Outreach

- Continue this built partnership with Bella Coola to sustain the impacts of delivering such programming to their communities and to improve with each visit



Expanding Technology Workshops

- Building capacity to deliver robotics, coding, and digital technology activities to Bella Coola



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