



Science School

Annual Activity Report
Sept 2018-June 2019



Donna Kipta and Amy Leedham
TELUS Spark



TELUS Spark – Neurons Firing Daily



Cities need ‘charging stations’ to power up learning. These charging stations include museums, libraries, after-school programs and science centres. Science centres, more than any other type of institution, charge up learning in the realms of science, technology, engineering, art and math (STEAM). Chevron’s sponsorship elevates Calgary’s science centre TELUS Spark and creates a learning environment where people can strengthen their problem solving, idea generation, collaboration and risk-taking skills — all components of STEAM innovation.

Just as people need real-world experience to become fluent in a language, children need to be immersed in hands-on learning to master STEAM concepts and technology. Spending time at a science centre and thinking with one’s hands help foster fluency in STEAM.

Building a better future for Alberta and the collective prosperity of Albertans will require STEAM fluency. By starting this learning process early, Chevron’s Open Minds is preparing the next generation for a future we can’t even imagine yet. TELUS Spark is proud to help bring this vision to life.

Introduction



The mission of the Campus Calgary/Open Minds program is to transform teaching and learning by increasing student engagement through community, funder and educational partnerships. The program strives to achieve this by providing authentic learning experiences in educationally rich environments that engage students in hands-on discovery, exploration and reflection. These experiences make learning meaningful for students by engaging students in authentic educational learning opportunities that allow them to make personal connections. We strive to create an inquiry driven environment that allows teachers to gain a deeper understanding of student's prior skills, knowledge and aptitudes. This enhances critical thinking, literacy and problem solving skills and facilitates a deeper understanding of community stewardship, responsibility, cultural awareness and civic pride.

Chevron Open Minds Science School at TELUS Spark is one of five Open Minds Program Sites supported by Chevron Canada. Teachers apply for their class to spend one week at TELUS Spark experiencing a wide range of exhibits, live demonstrations, HD Digital Dome shows and customized classroom experiences. Each of the teachers accepted to the program has a unique group of students, individual goals, and a vision of creating an engaging, meaningful experience that meets the needs of his/her students. To achieve this the week-long programs are collaboratively designed by the school teacher and the Science School team.

Chevron Open Minds Science School is a place to get neurons firing, to collaborate in problem solving and to spark a passion for learning through STEAM. Students can explore the design process and discover the connections between engineering, innovation, technology and art through collaborative design experiences. Students engage in meaningful experiences that spark a passion for STEAM through risk taking in a safe environment with opportunities designed to build courage, fuel creativity and learning through play.

This report provides an overview of programs and experiences for Science School for the period of September 2018 – June 2019.

TELUS SPARK



Mission

We bring people together to play, learn and create with science, technology, engineering, art and math.

Core Values

COLLABORATION We believe that encouraging debate and dialogue, embracing diverse perspectives, and that partnership with our communities result in better ideas and outcomes.

COMMITMENT We are passionate about our mission and pursue it in everything we do and how we do it.

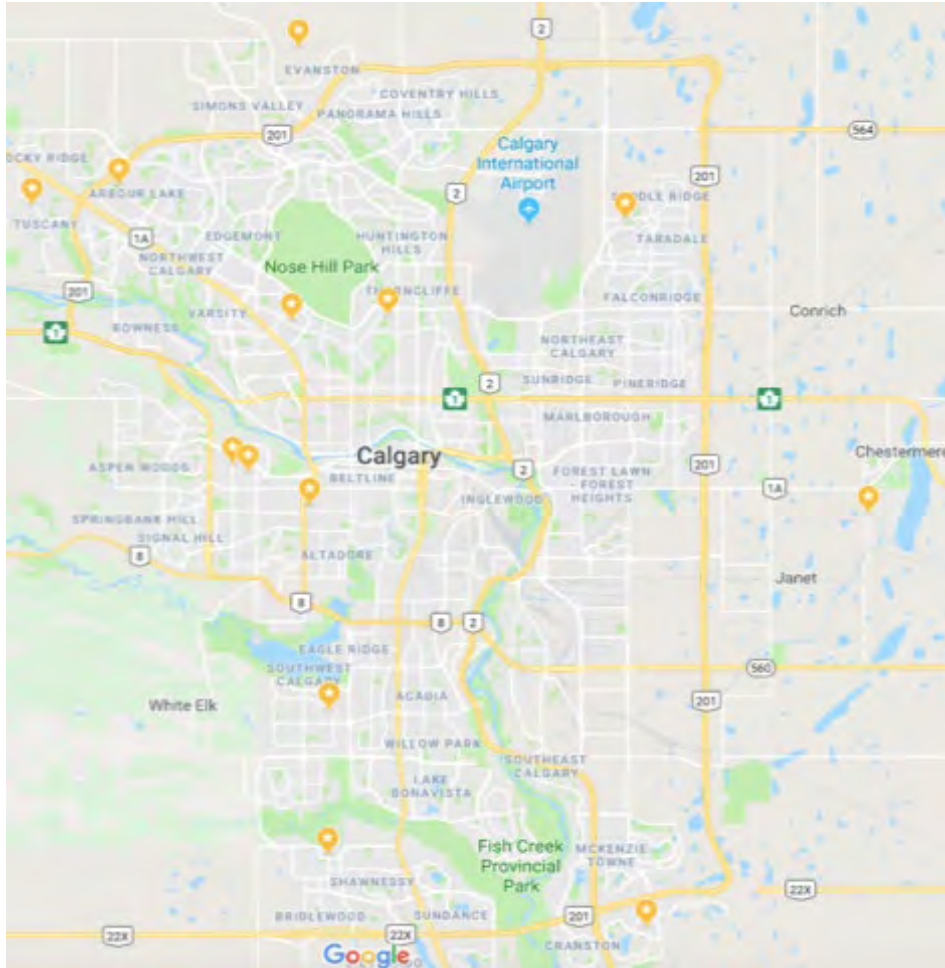
CURIOSITY We are always wondering, always questioning, always seeking to learn.

COURAGE We believe in innovative thinking and taking risks. We embrace change. Our courage to fail gives us the confidence to succeed.

The photos, anecdotes, comments and examples of student work in this report exemplify the core values of TELUS Spark and the Chevron Open Minds Program.

Program Overview

School Demographics



participating schools

One of the goals of Science School is to offer the opportunity to students and teachers all over Calgary. Priority is given to teachers who have not yet participated in the program.

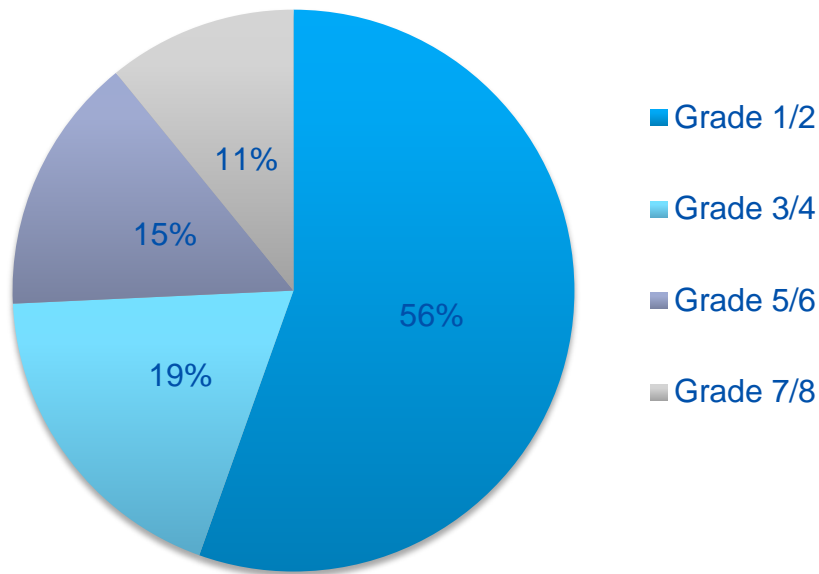
Map of Schools who participated in Science School
September 2018 - June 2019

Program Overview

Grade Distribution



Grade Distribution



In 2018-19, 42% more successful applications were from Gr. 1/2 classes - a significant increase over last year. There were 31% fewer successful applicants from grade 3/4 and 14% fewer successful applicants from Grade 5/6. Successful Junior High applicants increased 4% over last year.

Grade Distribution for Open Minds Science School Classes September 2018-June 2019

Program Overview

Statistics



By The Numbers		
652 Students	520 Chaperone Volunteer Days	202.75 Volunteer Hours
Students spent 5 days participating in Science School at TELUS Spark	Parent volunteers typically come for a day, and their support of the program was overwhelming	TELUS Spark volunteers came weekly to the program

Between September 2018 and June 2019, 27 classes from 13 different schools participated in the Science School. This involved 652 students, chaperone volunteers, TELUS Spark volunteers, staff and community experts who made the experience possible.

The impact of this program was far beyond the 652 students involved. Buses were shared with additional classes 21 times during 2018-2019. This allowed many more students in engage in learning experiences at TELUS Spark.

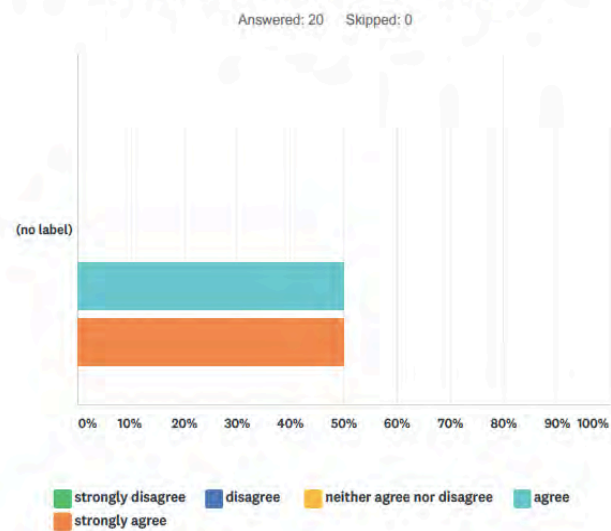
Program Overview

Statistics



What follows on the next few pages is a snapshot of the SROI Teacher Survey Results.

Q14 My students have a greater appreciation of STEAM (Science Technology Engineering Art Math) in their daily lives and the skills necessary to be scientists in the 21st century (creativity, collaboration, innovation, commitment, courage).



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00%	0.00%	0.00%	50.00%	50.00%	20	4.50
	0	0	0	10	10		

“Agree. The opportunities at Science School connected well with some of our classroom experiences (i.e. programming and coding, robotics) and our students continue to develop their awareness and understanding of the role that these technologies play in daily life.”

“Agree. When we see the results in the classroom we are encouraged by the excitement and interest. Especially in the girls, they get a real sense that they can do STEM classes and be successful.”

“Strongly agree. Students are more willing to try and fail, work in groups, and showcase their learning.”

“Strongly agree. The students see interconnectedness how coding effects language, and how art inspires future technology.”

“Strongly agree. Students regularly talked about their creativity in gallery walks, the need to innovate when building a civilization. They identified courage as part of our classroom mission statement and demonstrated the ability to respect each other and collaborate.”

“Strongly agree. Student comments show a new appreciation for math and sciences, and excitement about incorporating art into the various disciplines.”

“Strongly agree. They learned so much about creativity and collaboration while making the mural. There were so many scientific details they absorbed like sponges! (e.g. about animals, microscopes, Being Human and making stop motion animations.)”

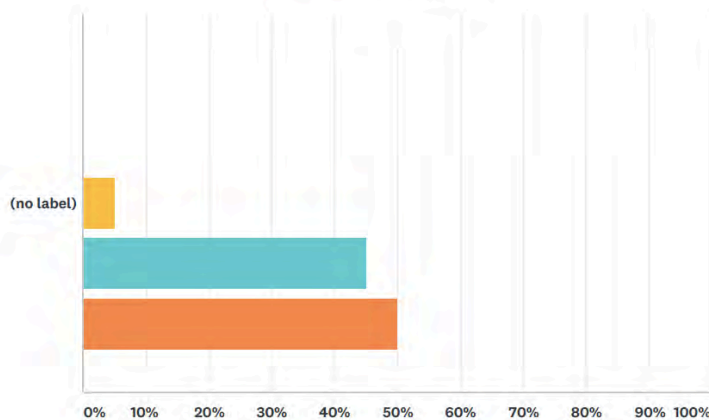
Program Overview

Statistics



My students have gained confidence as learners.

Answered: 20 Skipped: 0



strongly disagree disagree neither agree nor disagree agree strongly agree

	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00% 0	0.00% 0	5.00% 1	45.00% 9	50.00% 10	20	4.45

“Strongly agree. So many start the year in Gr. 1 afraid to try because they are afraid to fail or be “wrong”. Our work this year has helped them grow and move beyond “right” or “wrong.”

“Strongly agree. Each day as students got off the bus, they were eager to share what they learned with friends, family and other teachers in the school. I think impact is the “living” nature and expanse of science in the community vs the limitations of a school classroom.”

“Strongly agree. The design thinking process is valuable with our students and we found that our learning matched this thinking process.”

“Agree. They are more confident because they are not afraid to “put pencil to paper”. The journaling experience was very freeing for them.”

“Agree. All my students have gained confidence in this Open Minds Program, because this program gave students opportunities to use the skills they learned.”

“Strongly agree. A student was unable to complete work in the classroom without a lot of support was very keen to show learning about TELUS Spark.”

“Strongly agree. Taking risks in building, creating and journaling.”

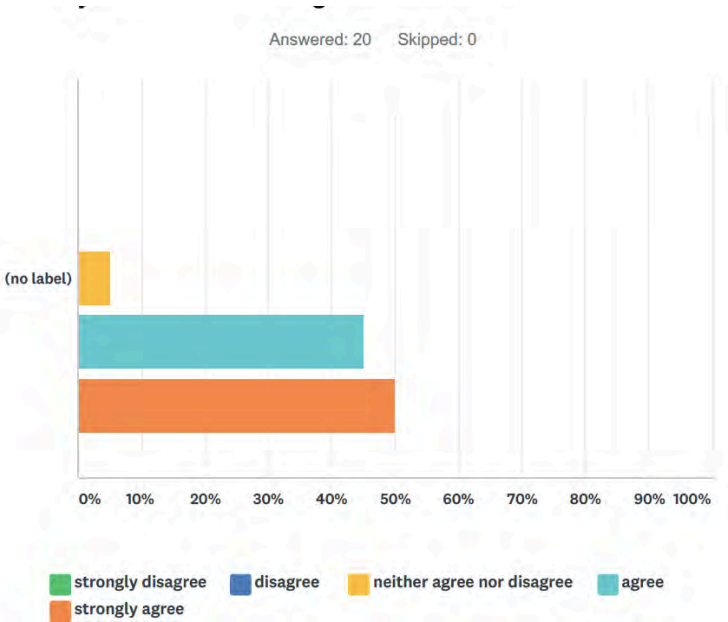
“Strongly agree. They draw and journal more confidently. They are more likely to try or test an idea and not worry it it doesn’t work the way they thought.”

Program Overview

Statistics



My students have gained confidence as learners.



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00% 0	0.00% 0	5.00% 1	45.00% 9	50.00% 10	20	4.45

“Agree. Having the opportunity to explore and engage with exhibits in different ways has allowed our students to consider their own learning in new ways. The opportunities for our students to participate in Science School was, in the majority of cases, their first visit to TELUS Spark.”

“Agree. My students learned to take more risks, especially with tasks that they haven’t tried yet. Excellent!”

“Agree. They became more confident when sharing their ideas, as all thoughts had merit and were valued.”

“Agree. For many as we were early in the year, it gave them a chance to see possibility in the classroom. Many were amazed at what they could do when they take risks in learning.”

“Agree. They are more open to experiment, explore and fail and know that it is a part of learning.”

“Strongly agree. The opportunity to take risks and be creative helped them gain confidence. Also-learning that making mistakes and trying again builds capacity!”

“Strongly agree. Our phrase is “We can do hard things!” Designing and building was a huge process that they confidently finished-and applied in later learning!”

Program Overview

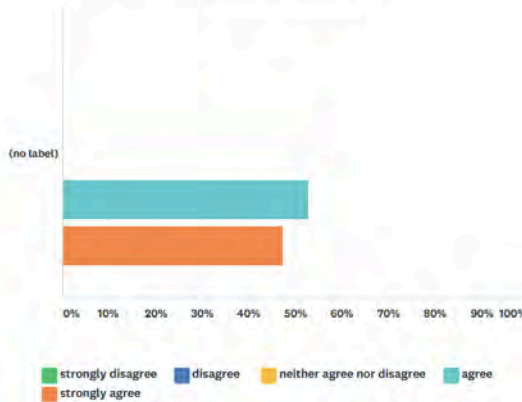
Statistics



My students are likely to apply the knowledge and skills acquired across all academic disciplines.

Q11 My students are likely to apply the knowledge and skills acquired across all academic disciplines.

Answered: 19 Skipped: 1



STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00%	0.00%	0.00%	52.63%	47.37%	
	0	0	0	10	9	19
						4.47

"Strongly agree. Designing the prototypes will be useful during our Flight Unit. Designing, blueprints, engineering process."

"Agree. The week at Science School has provided our students with further opportunities for engaging with questions to drive student learning."

"Agree. We always talk about observing, collecting, analyzing and comparing in my math and science classes."

"Strongly agree. Students always remember this experience. We decided to all write narratives about robots after this."

"Agree. They use the "6C" language with each other, and are incredibly comfortable giving and receiving feedback."

"Strongly agree. Upon return to the classroom students began reflecting upon their learning in journals. They began talking about ways to share and engage others in their learning."

"Strongly agree. The design thinking process is valuable with our students and we found that our learning matched this thinking process."

"Strongly agree. Evident in the development of student visual journals."

"Agree. This program was amazing in integrating many areas of our curriculum and our outcomes."

"Strongly agree. They have already started to use "I wonder" statements more in their writing." They have taken lots of information (usually scientific) about things they saw there and compared it or used it in their classroom. (bed of nails, circus, brainasium, building things)."

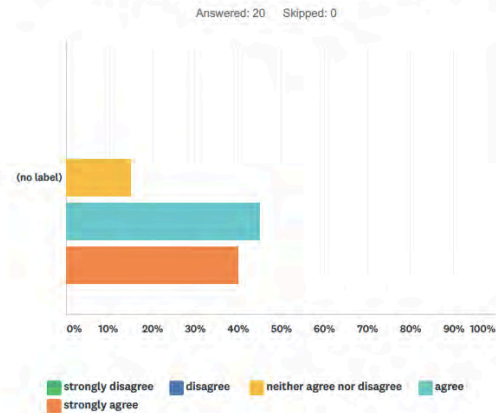
Program Overview

Statistics



My students are more engaged as demonstrated by taking responsibility for their own learning.

Q13 My students are more engaged as demonstrated by taking responsibility for their own learning.



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00%	0.00%	15.00%	45.00%	40.00%	20	4.25
(no label)	0	0	3	9	8	20	4.25

“Agree. Being driven by their own questions and curiosities has allowed our students to become more engaged and invested in their own learning.”

“Agree. Students are proud to show off their journals and use journals to support their learning.”

“Strongly agree. Students are incredible proud of their structures and conversations with them reveal how thoughtfully they planned and executed their visions.”

“Strongly agree. I already had a small group of students with a strong work ethic, and for those who maybe felt less confident, I can see an increase in productivity. Science School allowed everyone to be successful at their level of interest and ability.”

“Agree. I see their engagement with their own learning as they are requiring less prompting from me as they make connections on their own.”

“Agree. Yes, because this open minds program is so personalized and interesting, so students are able to be engaged and take responsibility to complete their own projects.”

“Strongly agree. Students expressed the need to finish assignments related to the program, or asked to build on their work relating to their time at TELUS Spark.”

“Strongly agree. Creating an invention (to clean up the ocean) working collaboratively with another classmate and creating a mural with a local artist.”

“Strongly agree. They know they are responsible to try and challenge themselves and not do the minimum- if they are done early – add more, try something else, think of another detail.”

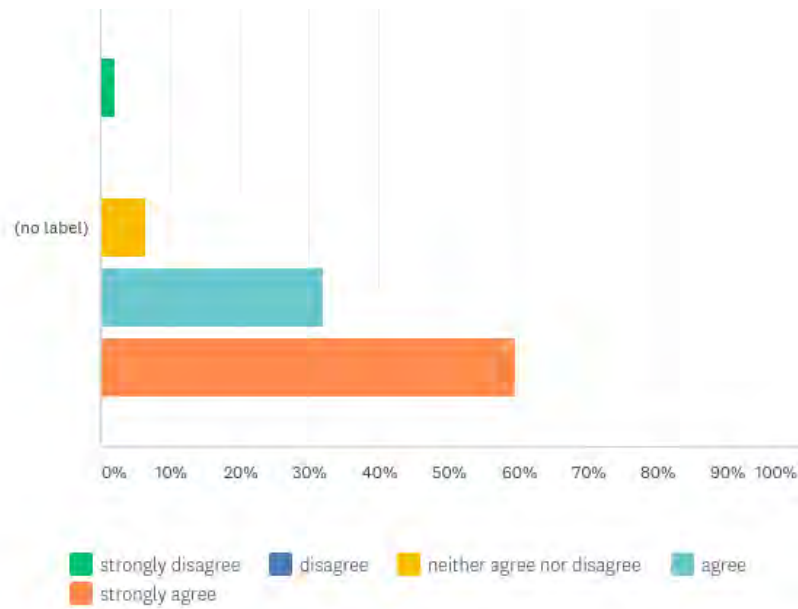
Program Overview

Statistics



SROI Parent Survey Snapshots

I have an increased awareness of what TELUS SPARK is all about.



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	2.13%	0.00%	6.38%	31.91%	59.57%	47	4.47
	1	0	3	15	28		

"I think it was a great place for students to practice hands-on what they just learned."

"Strongly agree. I really loved this program."

"Strongly agree. Well organized, good facility."

"Agree. Our kids are TELUS Spark pass holders and have been coming for years."

"Strongly agree. I am happy to see a picture of message communication under water."

"Agree. Even though I have visited spark several times in past, I was able to see the "behind the scenes", classroom elements that I was less aware of. The instructional time was used well with videos, journals and hands on (robotics, microscopes, 3D printers...)"

"Strongly agree. Staff was knowledgeable and approachable for the students and open to all questions."

"Strongly agree. So many fields of science – something of interest to each person."

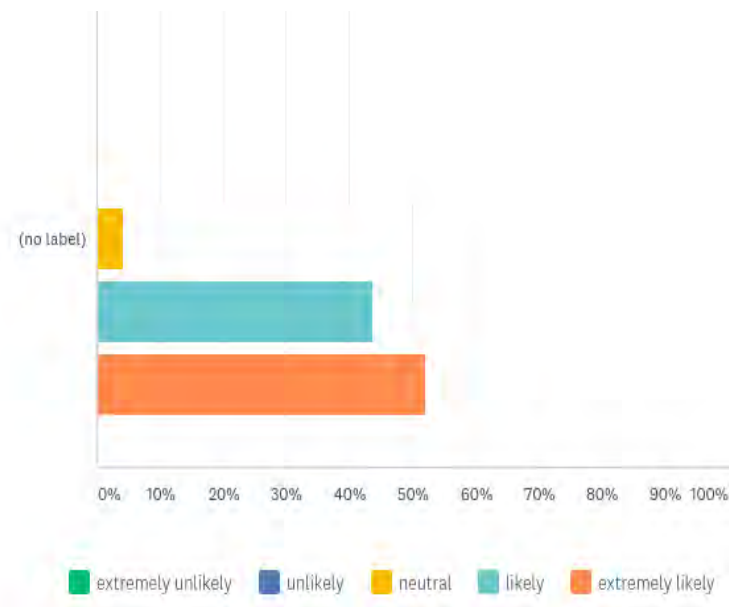
Program Overview

Statistics



SROI Parent Survey Snapshots

I will visit TELUS SPARK in the future.



	EXTREMELY UNLIKELY	UNLIKELY	NEUTRAL	LIKELY	EXTREMELY LIKELY	TOTAL	WEIGHTED AVERAGE
(no label)	0.00%	0.00%	4.17%	43.75%	52.08%	48	4.48
	0	0	2	21	25		

"Extremely likely. My kids love it."

"Likely. It is an expensive visit for a family of 5, however. Family pricing would be appreciated."

"Neutral. It is very expensive for a family to visit."

"Likely. Sadly, it has become too expensive to come as a family. (I had passes for years at the old science centre.)"

"Extremely likely. We actually purchased a family pass shortly after we attended Open Minds."

"Extremely likely. We have a membership."

"Extremely likely. It was a very fun place for the kids. Let them know all about science, sometimes we don't know it."

"Likely. I will like to explore more or explore other things that I did not have time to see."

"Extremely likely. I have visited with my family in the past and will again in the future."

"Likely. Only reason for not circling 'extremely likely' is that I have 4 children and without a family/group price it has become too much of a cost over the old science centre."

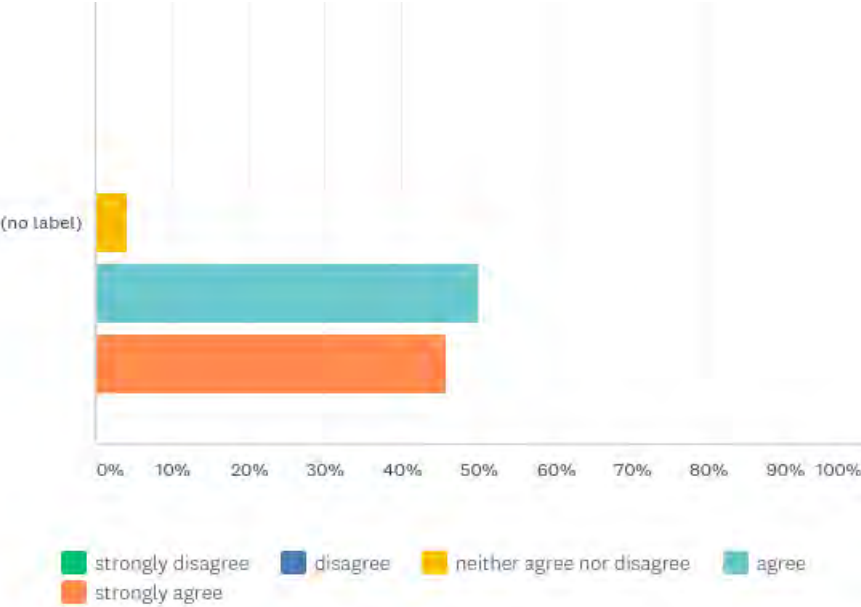
Program Overview

Statistics



SROI Parent Survey Snapshots

I see my child (the children) learning in new ways.



"Agree. Very hands on and fun, they were interested and looking forward to the next day."

"Agree. Hands-on learning is important and keeps children engaged in learning."

"Strongly agree. There is a lot of time granted towards learning through direct hands-on involvement, and I fully support that. The children use this time to self teach, explore, observe. problem solve and then collaborate these findings with one another to become teachers themselves."

"Agree. Programming robots was new."

"Strongly agree. My son came home each night and described in full detail the science experiments and what he learned each day."

	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00% 0	0.00% 0	4.17% 2	50.00% 24	45.83% 22	48	4.42

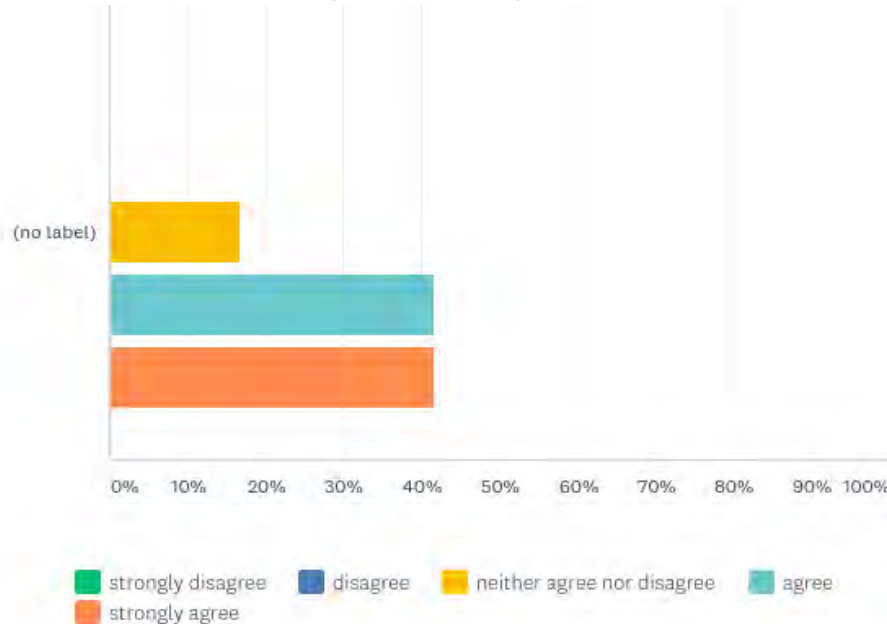
Program Overview

Statistics



SROI Parent Survey Snapshots

I have an increased knowledge of my child and his/her way of learning.



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00%	0.00%	16.67%	41.67%	41.67%	48	4.25
	0	0	8	20	20		

"Strongly agree. Learned my son is a visual learner as we thought."

"Agree. Always can learn more about our children and how they learn."

"Strongly Agree. Visit to TELUS helped her to get into group or class discussions."

"Strongly agree. It was great to witness the kids' creativity, and time exploring the different exhibits."

"Agree. They are given the opportunity to think for themselves, then their ideas are further guided with instruction."

"Agree. I appreciate all the hands-on centres."

"Agree. Proud of her attitude toward exploring and learning and cooperating."

"Strongly agree. My son loves science – he couldn't wait to come to school this week – thank you!"

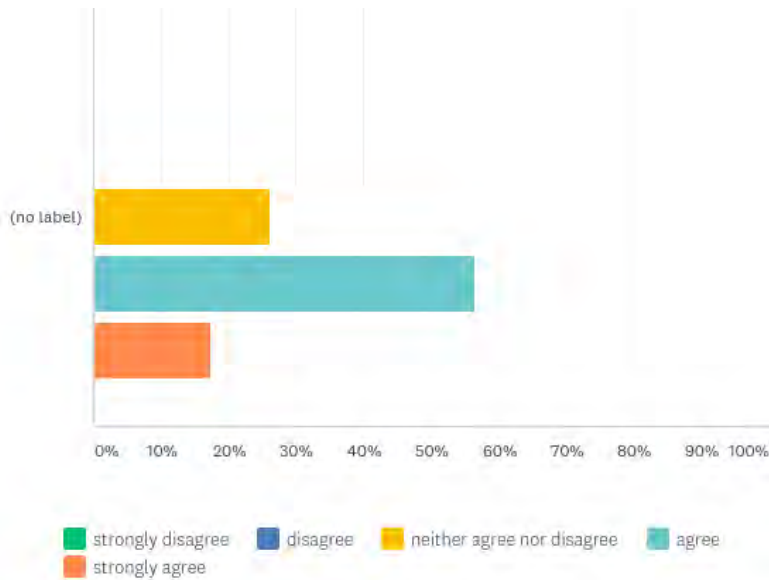
Program Overview

Statistics



SROI Parent Survey Snapshots

I have new strategies to support my child's (the children's) learning.



“Strongly agree. Exploring together and getting an open discussion of her thinking.”

“Agree. Giving them a simple idea, some supporting materials and then letting them have the freedom to explore.”

“Agree. I want to have more to do with experiments at home.”

“Agree. Giving kids more time to freely explore various things/centres.”

	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00% 0	0.00% 0	26.09% 12	56.52% 26	17.39% 8	46	3.91

Program Overview

Statistics



SROI Parent Survey Snapshots

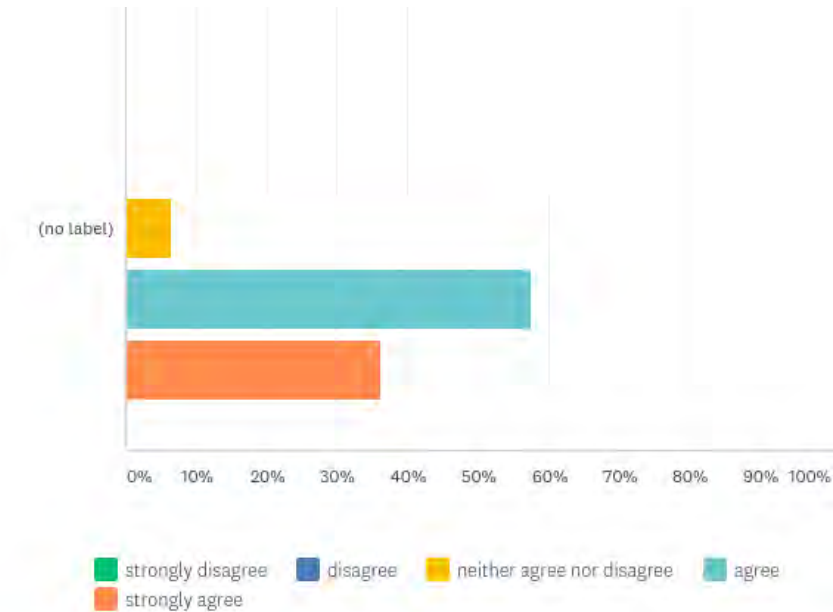
This experience has positively impacted the relationship with my child (the children).

“Agree. My son was happy to have me there.”

“Strongly agree. I’m so happy I can join my child’s class this time. I can see how she works with other kids.”

“Agree. Some of the children speak to me at the school about the trip. They recall details of what we did together.”

“Strongly agree. Most time spent with her is positive. Neat to see her interest in taking apart electronics!”



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00% 0	0.00% 0	6.38% 3	57.45% 27	36.17% 17	47	4.30

What matters for the present?

Learning through Play: How can we explore?

CIRCUS! Science Under the Big Top!



Playful journal entries inspired by wonders in Circus! Science Under the Big Top! Exhibit.

Left: Selling Pink Lemonade after exploring the story behinds the drinks accidental invention.
Right: Acrobatic poetry inspired by words found in the exhibit.

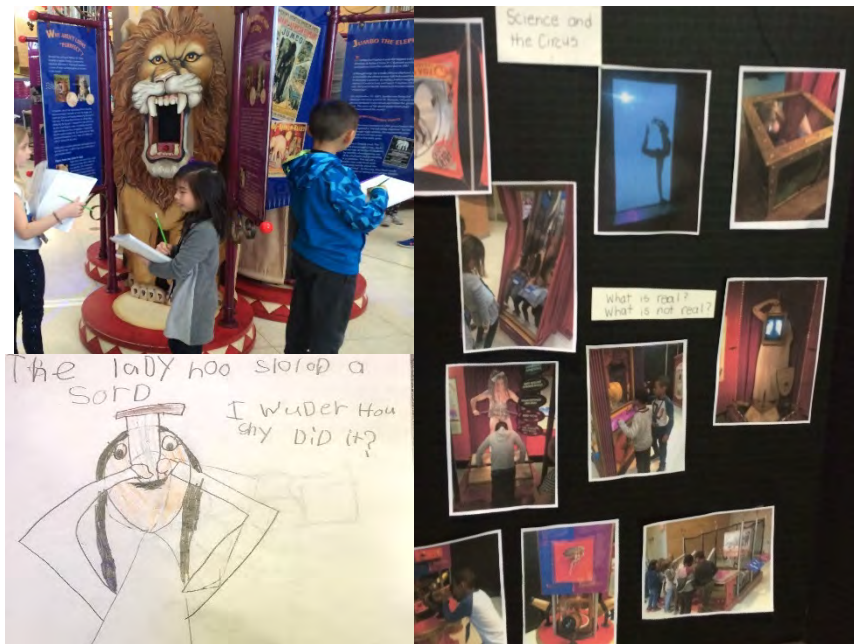


STUDENT OUTCOMES: Curiosity — Inspiring wonder through playful inquiry and immersion in unique learning opportunities.

What matters for the present?

Learning through Play: How can we explore?

CIRCUS! Science Under the Big Top!



Left: Sketching and word finding in the exhibit. Teacher photo documentation to inspire wonder. What is real? What is not real? Right: Art inspired by the circus exhibit. Fun with pretend play in the Dress up Tent.



STUDENT OUTCOMES: Curiosity — Inspiring wonder through playful inquiry and immersion in unique learning opportunities.

What matters for the present?

Learning through Play: How does play connect us?

CIRCUS! Science Under the Big Top!



Right: Students engaging in circus play with Green Fools.
Left: a variety of journal entries



STUDENT OUTCOMES: Curiosity — Inspiring wonder through playful Inquiry and immersion in unique learning opportunities.

What matters for the present?

Learning through Play: How does play connect us?

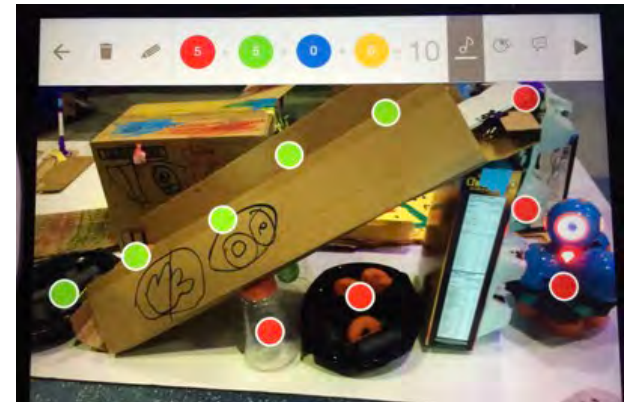
The Design Challenge of the Week: How might we design a play space to include everyone?



Above: An exhibit developer discusses various spaces with Gr.1/2 students. Are these spaces designed for “everyone” to use? What makes a space inclusive for everyone?



Above: Students exploring model play spaces with different design personas (e.g., person with visual impairment, person with mobility challenges). Students redesigned these play spaces using loose parts to better meet the needs of everyone.



Above: Testing cardboard prototypes: Grade 1/2 students designed a playground accessible for the robot “dash.” They used an app to visualize problem areas with their designs.

STUDENT OUTCOMES: Collaboration — Students build empathy as they work together to build inclusive designs.

What matters for the present?

How can we understand change in our community?



Above and Right: Students engaging in our new school program Ecosystem Engineers and sketching the collaborative animal habitats they built. Left: exploring natural artifacts from the program.



STUDENT OUTCOMES: Collaboration — Students build empathy for the natural world as they work together.

What matters for the present? (Past?)

How can we understand change in our community?



Above: "Riding the Earth" to prime the senses for exploring outside.



Above: Hearing Indigenous stories to connect to the land and place. Amy sharing Indigenous Peoples Atlas of Canada



"Teachings come from everywhere when you open yourself to them. That's the trick of it, really. Open yourself to everything, and everything opens itself to you. – Richard Wagamese"

STUDENT OUTCOMES: Collaboration — Students build empathy for the natural world as they work together.

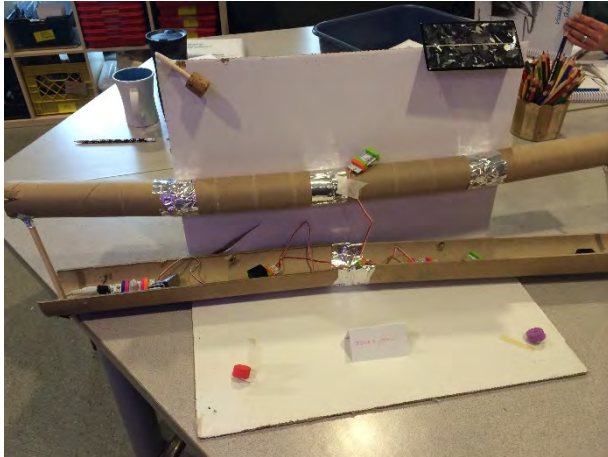
What stories can we tell? Innovation in Program Design
Communicating Science storytelling.



Above: Grade 2 journal writing showing audience perspectives. Amy's imaginative story-based demo takes students on a journey that awakens the senses. Right: Gr. 3 student event map of the Good Vibrations Sound Demo.

STUDENT OUTCOMES: Curiosity

What matters for the future?

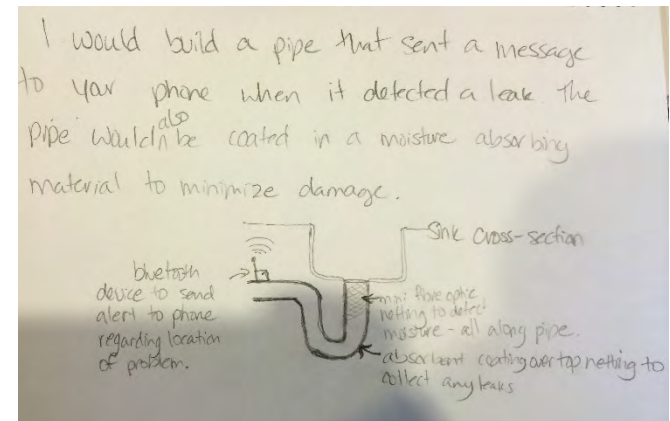
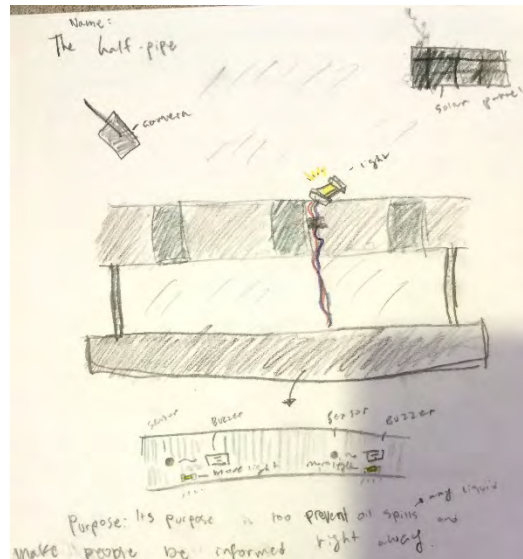


Right: Gr.7 students engage with Dr. Josephine and our temporary exhibit on Fibre Optic Pipeline Technology. Below and left: Student designed prototype of pipeline safety detection system using little bits inspired by the exhibit. Student ideation on leak detection methods.



1) BUILDING IT AND CONSTANTLY CHANGING OUR IDEAS. WE THOUGHT IT WAS GOING TO BE A SIMPLE PIPELINE WITH STUFF ATTACHED TO IT, BUT NO.

- Flex tape
- change pipes every year
- have cameras so you know exactly where the leak might be
- use buzzers with tape or something and when it gets wet it will trigger the buzzer



STUDENT OUTCOMES: Commitment to design and innovation

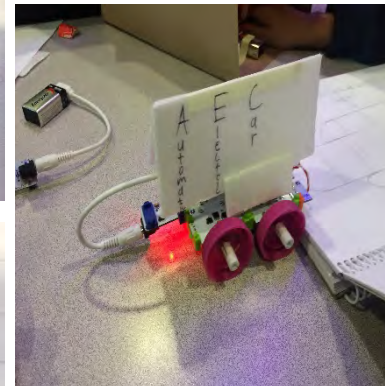
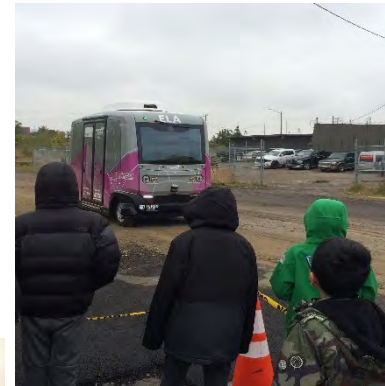
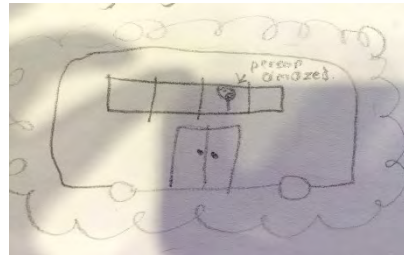
What matters for the future?

What is legacy? How does this help us reimagine the future?

ELA Sep 21/18

~ELA I think will be really famous in 25 years. Transportation will be different by a wee bit. This is my thinking. Maybe ELA will change our city, and in the next 25 years it will leave a legacy for the next generation of kids. I don't know what will help us in the future but this is my closest guess. ELA can help people that are blind or really old. ELA can help people with physical changes or who can't get a car. ELA can leave a huge legacy.

Right: Gr. 5/6 students await the arrival of ELA (Electric Autonomous Shuttle). Dr. Josephine explains how autonomous vehicles work with our temporary exhibit on self-driving vehicles. A student designed prototype vehicle.



I think when I am 25 years old, public transportation will be more invansted. I think there will be a larger population of people who use self driving cars like ELA in the future.

STUDENT OUTCOMES: Collaboration to learn and innovate.

What matters?

Creating a Legacy Post Science School...

Wes, TELUS Spark Exhibit Technician and creator of the Guinness World Record holding Rubik Cube at TELUS Spark, spoke to the Grade 7 students from Vincent Massey and gifted them a clear plastic prototype version of the cube. Vincent Massey Gr. 7 students reassembled the prototype (post science school) and turned it into a work of art.



“The Rubik’s cube is such an amazing gift. Each student was assigned a cube or piece of the stand, and created a unique piece of art that expressed their identity. It was challenging for some to work with a multisided object. Some challenged themselves even further by using other materials like plasticine and papier mache.”

“Assembling the Rubik’s cube was a bit challenging, but students problem-solved to figure it out by using different methods – attaching a weighted fishing line to the bungee hook.... The Rubik’s cube will once again be proudly displayed in the Learning Commons next year.” – Grade 7 Teacher

STUDENT OUTCOMES: Courage for collaboration

What matters for the future?

Design Process

How might we leave a positive footprint on the environment?

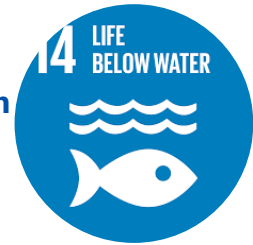


Reflect and communicate

How can this influence systems?
Affect change? Where do we go from here?
What actions can we take?.

Defining the problem

How might we clean the ocean?



Goal 14: UN Sustainable Development Goals

Developing empathy

Understand users and needs



The Great Pacific Garbage Patch

Ideate and brainstorm

How might we be inspired by nature's cleaners (biomimicry)?



Use feedback to redesign and iterate prototypes

Develop and test prototypes



"Our robot is named the pickerupper. We had to make a lot of changes. It captures garbage up or down."



STUDENT OUTCOMES: Collaboration — Students build empathy for the natural world



What matters for the future?

What footprint will we make?

Design Process

How might we leave a positive footprint on the environment?



Reflect and Communicate

Defining the Problem

How might we design something to make a positive environmental impact?

Developing Empathy

Ideate and brainstorm

Develop and test prototypes

Use Feedback to redesign and iterate prototypes

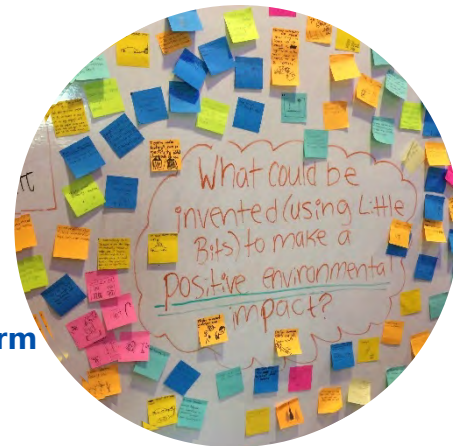


The animal approach... the light sensor, a pulse light and buzzer goes off, giving the warning of animal activity and that they have to stop. When the animal successfully crosses, the light will flash once more to signal the car to continue.

process relative smoothly. When we use the motion sensor at first its sensitivity was so low and was too challenging to use which led us to switch to the light sensor which actually worked much better.



A Wildlife Detection system for roads.



STUDENT OUTCOMES: Collaboration- Students build empathy for the natural world



What matters for the future?

Design Process



How might we redesign an exhibit space to engage more visitors?

- **Use feedback to develop and redesign ideas**

- Students received feedback on their ideas from our exhibit developer
- Students identified some core elements for improving the space including: adding multicultural perspectives, adding building idea prompts to assist visitors and suggestions for re-organizing the material storage and overall "design look" of the space.

Defining the problem

How might we design the build with bamboo exhibit in Open Studio to get more visitors of all ages building with bamboo?

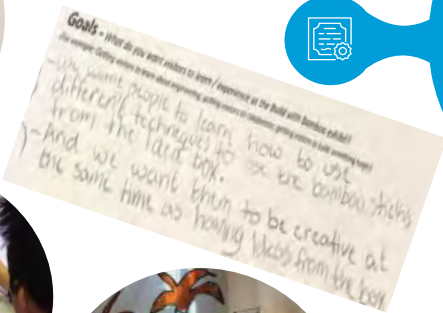
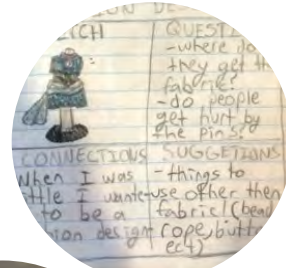
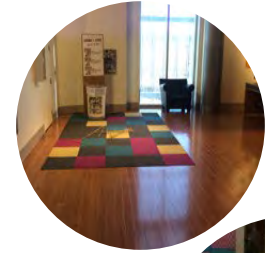
Developing empathy and understanding of user needs

- Students explored exhibits
- Made visitor observations
- Reflected on learning goals and connections for the exhibits
- Learned from our exhibit developers

Ideate and brainstorm

- Students identified learning goals for the exhibit
- Iterated ideas for the space on plastic overlays
- Create a rough map with labels of their ideas

STUDENT OUTCOMES: Collaboration — Students build empathy for others



TEACHER OUTCOMES

Teacher Professional Development



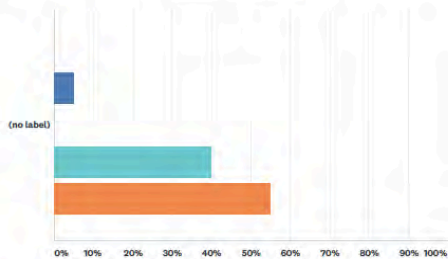
A key element of the Open Minds Program is a focus on teacher professional development. At TELUS Spark, we work with educators and parents to take learners on a journey that allows them to question, challenge, discover and grow, collaborate in new ways to solve problems, and ultimately develop a passion for learning about science, technology, engineering art and math (STEAM). The professional learning also transcends STEAM concepts to include understanding inquiry, journaling and reflective practice, and multidisciplinary community-based teaching and learning.

Below are some comments from participating teachers on how their Chevron Open Minds Science School experience has affected their teaching practice.

Chevron Open Minds Science School: Teacher Questionnaire 2018-2019

Q7 My participation in the Chevron Open Minds Program has given me the courage and motivation to innovate my own teaching and learning.

Answered: 20 Skipped: 0



strongly disagree disagree neither agree nor disagree agree
strongly agree

	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00%	5.00%	0.00%	40.00%	55.00%	20	4.45
	0	1	0	8	11		

“Strongly Agree. We utilize student generated questions as part of developing a guiding focus for our learning and exploration of different subject areas.”

“ Strongly Agree. I have learned some new skills and insight to help me create interesting lessons and innovative teaching strategies for my students. One example would be curtailing the UN’s Sustainability Goals to our deep question of creating a sustainable future from learning from the past.”

“Strongly agree. Incorporating more in the way of design learning in general lessons. Including more technology into my program.”

“Agree. It has certainly motivated me to try new things and be willing to attempt something new with my students.”

“Strongly Agree. I have incorporated more “I wonders” into my teaching, trying to activity their curiosity and creativity.”

“I have applied some of the ideas and journalling techniques in literacy and social – but the open minds mindset is what I will keep with me and share with all my students for years to come.”

TEACHER OUTCOMES

Teacher Professional Development



A key element of the Open Minds program is a focus on teacher professional development. At TELUS Spark, we work with educators and parents to take learners on a journey that allows them to question, challenge, discover and grow, collaborate in new ways to solve problems, and ultimately develop a passion for learning about science, technology, engineering art and math (STEAM).

“The use of objects and artifacts in new and creative ways has been integrated into our classroom work.”

“Thank you for the opportunity to participate in Science School at TELUS Spark. Our students have benefited from their experience in so many ways, and the skills and learning that we gained from our time at TELUS Spark will continue to motivate and engage us in the classroom setting.”

“The “front work” was so helpful – and I have skills/ideas/techniques for journalling and lessons that I will use for many years to come. Also – a whole lot of inspiration and confidence in my own abilities.”

“I really valued getting to explore the materials at Spark and the visual journalling ideas.”

“I appreciated the opportunity to learn new ideas in journalling. I incorporated gallery walks this year which has allowed so much more in the way of sharing of learning.”

“ Journalling! Loved the ideas and intend on using these techniques when I attend Open Minds next year at my new school.”

“One thing I learned most was how to use sketching in my daily teaching. I see benefit of using this method through many of the subjects I teach now.”

“The orientation, summer –inservice, and the workshops definitely made a difference in teaching this year.”

“I feel so lucky to have gone to the inservices ! My own journal is a treasure trove of ideas: how to generate student ideas, to write about “I wonders” , to decide how to narrow it down to one sketch or idea.”

TEACHER OUTCOMES

Teacher Professional Development

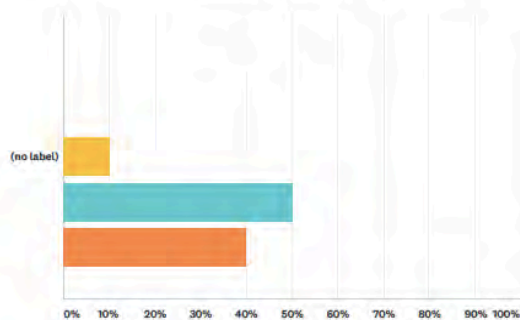


A key element of the Open Minds Program is a focus on teacher professional development. At TELUS Spark, we work with educators and parents to take learners on a journey that allows them to question, challenge, discover and grow, collaborate in new ways to solve problems, and ultimately develop a passion for learning about science, art and technology. Below are some comments from participating teachers on how their Chevron Open Minds Science School experience has affected their teaching practice.

Chevron Open Minds Science School: Teacher Questionnaire 2018-2019

Q3 My ability to identify and create relevant and authentic connections among disciplines has increased and deepened.

Answered: 20 Skipped: 0



strongly disagree disagree neither agree nor disagree agree strongly agree

STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00%	0.00%	10.00%	50.00%	40.00%	
	0	0	2	10	8	4.30

“Strongly Agree. Using a visual journal across disciplines to reflect learning has significantly impacted my teaching practice.”

“Agree. I try to link a concept between different subject areas such as the concept of Urban or rural with is a social studies objective with art and health. My students had to work as a group to draw an urban or rural mural. This involved the skills of working within a group and the art skills of drawing and sketching.”

“Strongly agree. I am able to understand the value and impact that connecting disciplines to inquiry is not only clever but essential with all the curriculum that is being taught in a given school year.”

“Strongly agree. I explored civilization in a very in depth manners in the classroom , and watched as it came alive for students at the science centre. Our knowledge has seemed to explode with the connections at Tom Campbell's hill overlooking the city and in the application of our government knowledge to our dioramas.”

“Neither agree nor disagree. As always in my practice I find connections. In the science school I had the ability utilize the areas for hands on on authentic learning. Especially great for the students who needed to touch and feel the world and see a result in front of themselves.”

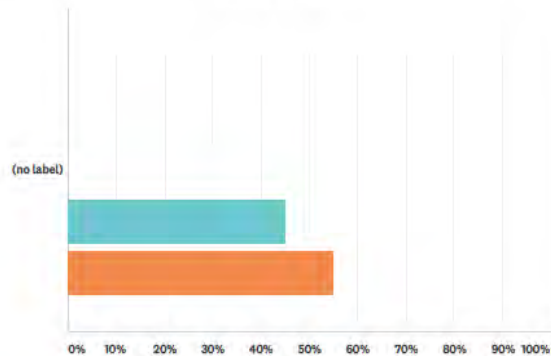
TEACHER OUTCOMES

Teacher Professional Development



Q5 I listen to student voice through journals, conversation and experiences and respond with flexibility as we co-design learning tasks.

Answered: 20 Skipped: 0



■ strongly disagree
 ■ disagree
 ■ neither agree nor disagree
 ■ agree
 ■ strongly agree

	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00%	0.00%	0.00%	45.00%	55.00%	20	4.55
	0	0	0	9	11		

"Agree. Seeing what sparked their interest at each exhibit. Higher level thinking questions from Space Next."

"Strongly Agree. We worked with journals in different ways during our week at Science School, and many of the strategies are now part of our classroom practice."

"Strongly Agree. We got to write in and share our journal entries; and the level of student choice in their journaling was evident."

"Agree. Some students do not like or find it difficult to participate-the journal and one on one conversations really help them find their voice."

"Agree. With each day being a unique experience, this allows each child to express a want and desire. Each day we looked at where students were and through the week each found success."

"Strongly Agree. Probably my favourite part. I have seen tremendous growth through journals. I love all the different techniques."

"Well said. I understand the value of co-designing both the learning tasks but also our learning spaces."

TEACHER OUTCOMES

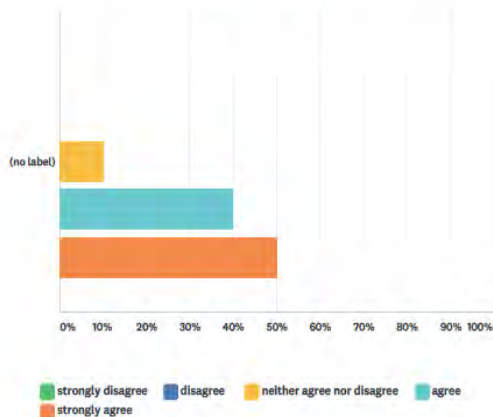
Teacher Professional Development



A key element of the Open Minds program is a focus on teacher professional development. At TELUS Spark, we work with educators and parents to take learners on a journey that allows them to question, challenge, discover and grow.

Q2 I have a better understanding of my role in the inquiry process.

Answered: 20 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00%	0.00%	10.00%	40.00%	50.00%	20	4.40
	0	0	2	8	10		

"Agree. Providing guidance to students through the collaborative establishment of rich questions that lead to curiosity and engagement."

"Agree. I have been involved in CCOM in the past, but never at the TELUS Spark. I really thought the infusion of technology was amazing and gave me good insight into what can be incorporated into the classroom."

"Neither agree nor disagree. I have always based my practice on inquiry, and the process involved. This experience allowed myself a chance to see other practices and collaborate with other educators."

"Strongly Agree. Letting students lead the learning, asking questions that spark inquiry."

"Neither Agree nor disagree. I felt like I had a really good understanding going in. The open minds experience really helps to facilitate this experience with great teachers and amazing exhibits and projects."

"Strongly Agree. My role is to questions and provide framework. For example, when students have an idea I can discuss it with them and challenge the students to engage in deeper thinking."

"Strongly Agree. As a consequence of my time at TELUS Spark, I. became more comfortable with including digital literacy in the classroom, and facilitating the use of coding programs."

"Strongly Agree. I have learned to facilitate better, how to lead the students into a discussion and then let them come up with ideas and answers."

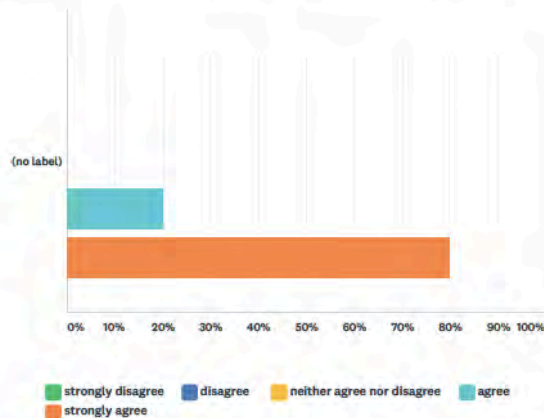
TEACHER OUTCOMES

Teacher Professional Development



Q10 I would recommend this program to a colleague.

Answered: 20 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
(no label)	0.00% 0	0.00% 0	0.00% 0	20.00% 4	80.00% 16	20	4.80

"Strongly agree. Science School provides rich opportunities for students to engage in learning experiences that transcend well beyond the regular parameters of the school classroom. These opportunities blend naturally with so many different areas of the curriculum."

"Strongly agree. Especially for new teachers. This program will and does give you a real chance to expand your practice."

"Strongly agree. Myself and my students got so much out of this experience. They learned, grew and took risks!"

"Strongly agree. From the resources and staff to the in-depth, experiential learning, there is so much value in this process."

"Strongly agree. One just needs to see how a program such as CCOM reaches and engages all students, provides direction for a year of learning, and supports so many curricular areas. It is inspiring!"

"Strongly Agree. My students and I learned a lot and I would and will do this program again. I will absolutely recommend this program to everyone and anyone."

"Strongly Agree. Absolutely! It was an amazing week and the students, parents and myself all had a great time and learned so much."

"Strongly Agree. Absolutely, it was an amazing experience start to finish. The actual time at spark was even better than I envisioned. Have a chance to focus on individuals in a different setting was great."

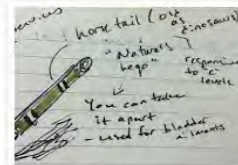
What matters for the future?



Above: Wisdom Gathering and Learning from Story at Fish Creek Provincial Park with Lesley Tait, Indigenous Learning Specialist. Right: CCOM Blogpost.

Wisdom Gathering and Learning from Story: Campus Calgary / Open Minds Coordinator Meeting Oct 26, 2018

The CCOM team spent a great day in Fish Creek Provincial Park learning about the importance of story and of walking “wisely aware”. As we walked alongside Lesley Tait, Indigenous Learning Specialist CBE, we listened to stories about the land and our connection to the natural world. We learned to notice and observe in order to walk “wisely aware”. We collaborated to “gather wisdom” about the various plants and animals we were noticing. It was a great day to be outside reflecting about the land and collaborating as part of a Community of Practice. It made me reflect upon how we might help students and teachers to walk “wisely aware” along with us on our journeys at our sites and about the stories we share.



While inside the Fish Creek Environmental Learning Centre, we reflected on work by Thomas King: *The Truth About Stories* as we talked about how different stories and perspectives help shape our understandings of the world.

It was a great day to connect, collaborate, learn and grow.

Donna Kipta

Chevron Open Minds Science School Coordinator

Professional Learning OUTCOMES: Coordinators growing and learning together.

What matters for the future?



The Human Experience:

How do we take the curriculum and bring the human experience to the table? What is the most effective way to help students relate, and bring their voices and stories to the forefront, alongside the content being taught? This was a common thread at the CASC 2019 conference and also emphasized at the Immigration Museum at Pier 21 in a feature exhibit around the meaning of family. This was a flawless integration of multicultural experiences represented in one space, in a variety of ways.

Left: Amy's photo shows a representation of a "family tree" created by visitors at The Immigration Museum at Pier 21. There were various writing prompts to prompt visitor conversation.

Other Professional Learning experiences:

- Integrating Indigenous Ways of Knowing into the Science Curriculum (with Calgary Regional Consortium)
- Modeling Climate Change in the Classroom (National Geographic Online Educator's Course)
- Alberta Conference for Environmental Education (ACEE) Conference – May 2019 (Canmore)
- Workshop on "Make Writing in the Writer's Workshop" (Calgary Regional Consortium)
- Various Workshops on Coding and Computational Thinking (Ladies Learning Code)
- Teachers Learning Code Conference (Aug 2019)

Professional Learning OUTCOMES: CASC Conference "Making Waves" and other coordinator learning experiences.

What matters for the future?

Looking forward...

Inspiring students to be 21st century thinkers and to engage in STEAM in meaningful ways so that they become agents of positive change in their homes, schools and communities. Chevron Open Minds Science School will continue to play a role in encouraging students along journeys of inspiration pre, post, and during Science School by

- empowering students and teachers to make positive changes and strengthen connections, belonging and ownership with TELUS Spark (including post experience as well)
- inspiring educators and students to utilize the core “c” values of TELUS Spark to evoke a growth mindset
- strive to make real-world connections to STEAM that students can connect with through collaboration with industry experts
- continue to explore how technology can be utilized in meaningful ways for inclusive learning and STEAM integration
- work alongside others to learn and understand how Traditional Knowledge and a diversity of perspectives can help all learners engage in STEAM disciplines
- embark on TELUS Spark’s new journey by participating in the development and execution of TELUS Spark’s Roadmap for the 2020s



Comments from Students

What Matters
TO
ME?
what matters to
me is that I got
to work with many
more people than
usual and learn
in an different
environment



Telus Spark matters ♥
because it teaches people
to know things that
♥ other humans of the
world don't have ♥
the chance to. ♥
It matters to me because
I love to learn about
Science and new things
that Telus discovered.

Telus Spark
Matters because
it teaches
Kids and Adults
about science
and Math in a
Fun way so they
enjoy what there
Doing and ~~making~~
Making life long
Memories

Telus Spark Matters:
I learned to think
about what matters
to the environment. We
see things from different
perspectives. I learned
to create a circuit.
Telus spark "SPARKS"
creativity, curiosity and
THAT MATTERS !! ☺

What matters to me
is the learning while
having fun. Science is
always enjoyable to me,
but Telus spark expands
on it, gives hands on expe-
riments and has learning
experiences that are still
so much fun

How I am a
better explorer is
that before I came
here I didn't really
observe but now
I see everything



Application Statistics for 2018-2019



CBE	Weeks	Schools Represented	Weeks Accepted
Grade 1 - 3	9	4	9
Grade 4-6	7	5	7
Grade 7-9	3	2	3
Sub total	21		
CCSD			
Grade 1 – 3	9	3	9
Grade 4 – 6			
Grade 7-9			
Sub total	9	3	
Independent	0	0	0
Grade 1 – 3			
Grade 4 – 6			
Grade 7-9			
Total Weeks Applied	30		
Total Weeks Not Accepted	2		
Total #of Weeks	27**		

To align with school philosophy and initiative, we accommodate multiple classes applying from one school. We recognize the value of teachers working as a team, whether it be at one grade level, across the grades, or across the curriculum.

** 28 weeks accepted (27 weeks attended as one CCSD school reduced enrollment and only had 1 class for 1 week instead of 2 separate classes)

Application Data from 2006 - 2018



Year	Weeks Requested	Weeks Not accepted	Weeks Accepted
2019	30	2	28
2018	29	2	28
2017	44	15	29
2016	50	22	28
2015	29	4	28
2014	44	16	28
2013	44	16	28
2012	56	26	30
2011	46	28	*18
2010	35	11	23
2009	29	3	26
2008	49	22	27

*The program offered only 18 weeks of classes from January to June 2012. This was the pilot year at TELUS Spark- The New Science Centre

Schedule for 2018 - 2019



# of weeks	School	Gr	FOCUS
2	*Manmeet Singh Bhullar	4/5	What is legacy?
2	*Vincent Massey	7	Interactions/Impacts/Technology/Sustainable Development
3	*Highwood (Mandarin Bilingual Program)	1	How does change impact our mind and world?
2	*Arbour Lake	6	What is our place?
2	*Evergreen	3	What will the future bring?
2	*Rosscarrock	5/6	How do we manage and apply technological innovation to positively impact our lives?
4	#Prince of Peace	1	What footprint will you make?
3	#Our Lady of Grace	2	What do you do with a problem?
1	*Richmond	5/6	What is involved in building a civilization?
1	*John Ware	7	How can we learn from the past in order to sustain the future?
2	*Eric Harvie	2	How does play connect us?
2	*Brentwood	1	What is change?
1	#Our Lady of Wisdom	1	Changes that affect us – past, present and future
* CBE # CSSD 2018-2019			

Schedule for 2019 - 2020



# of weeks	School	Gr	FOCUS
5	*Manmeet Singh Bhullar	2/3	How do we overcome obstacles?
1	*Senator Patrick Burns (Spanish Bilingual Program)	6	How can we help youth become active, responsible, and creative citizens who will take on future challenges in our community?
2	#Ecole St. Pius X (French Immersion)	2	What is the importance of water?
1	*Mid Sun Jr. High	9	What is our story?
1	*Olympic Heights	3	How are we connected?
4	*Citadel Park	4	How do we solve a problem?
1	*Cedarbrae	5/6	Say Something
2	*Dr. Martha Cohen	5	How do we want to be remembered?
3	#Divine Mercy	1	How do we care for the things we love?
2	*Jennie Elliot (Gr 1 and DHH) (program for Deaf and Hearing Impaired)	1	We are all connected
3	*Brentwood	5	How do I contribute?
3	*Auburn Bay	1	How are our stories woven together?
* CBE # CSSD 2019-2020			