ANNUAL report

The 2021 Virtual Experience

10 YEAR ANNIVERSARY

SCIENCE RENDEZVOUS KINGSTON 2021

MAY 1 - 16, 2021

PREPARED BY CO-COORDINATORS

Lynda Colgan
Kim Garrett

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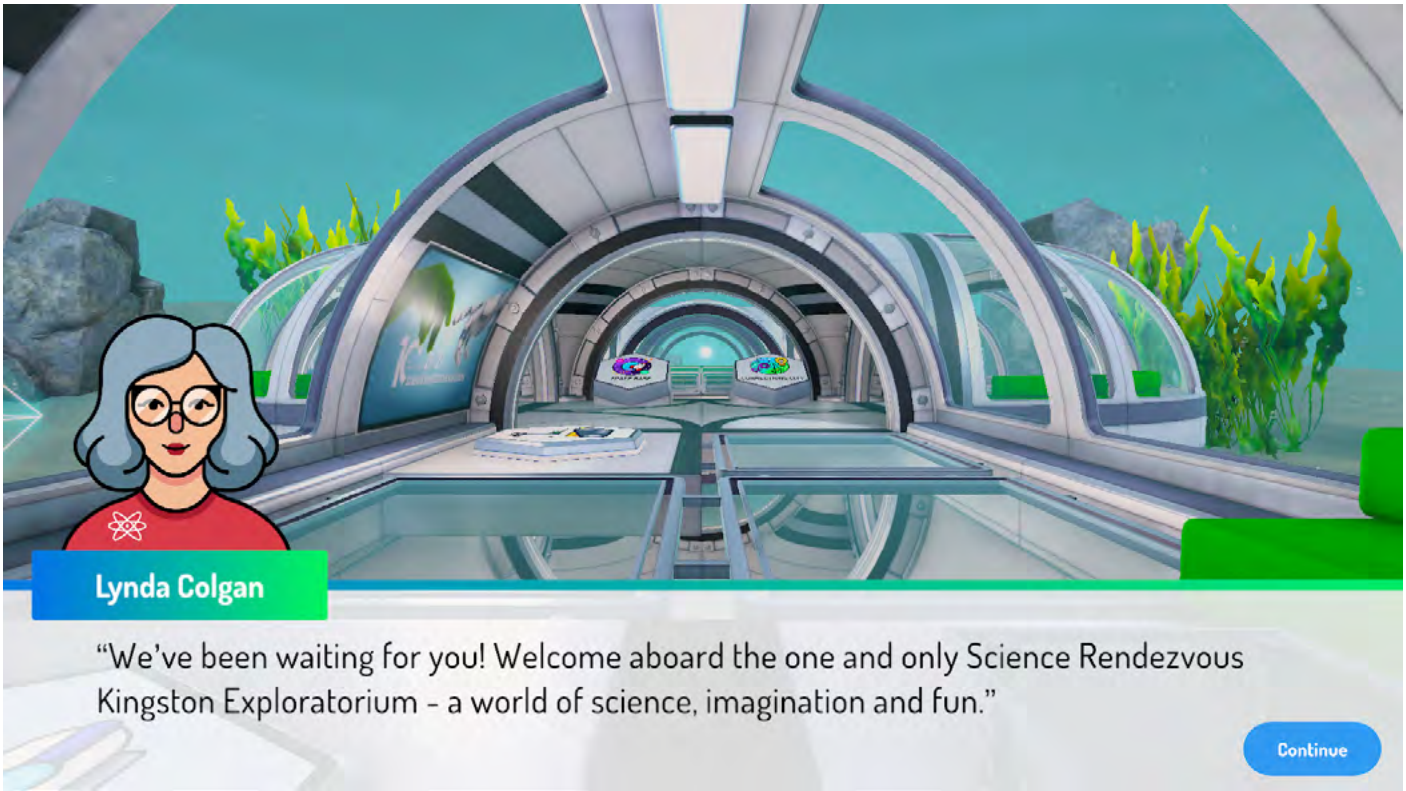
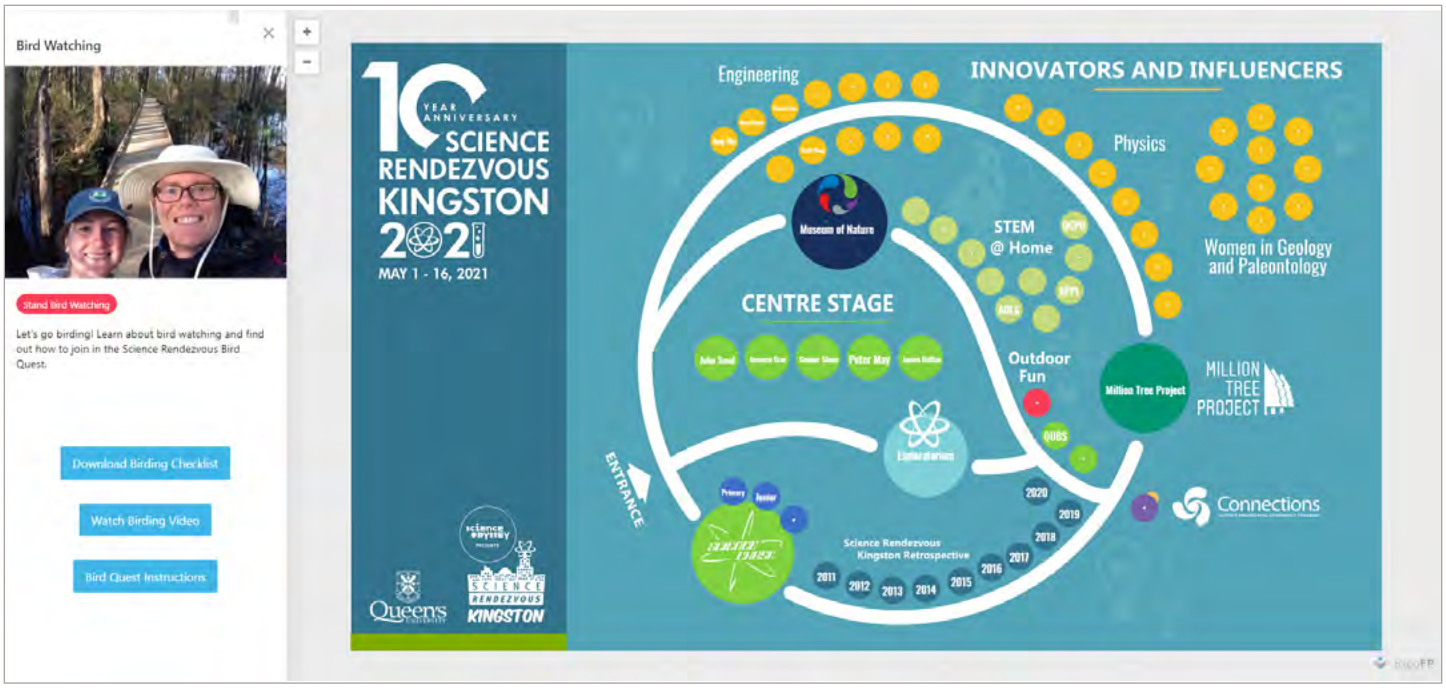

Lynda Colgan
"We've been waiting for you! Welcome aboard the one and only Science Rendezvous Kingston Exploratorium - a world of science, imagination and fun."
Continue



https://ygksciencerendezvous.expofp.com/

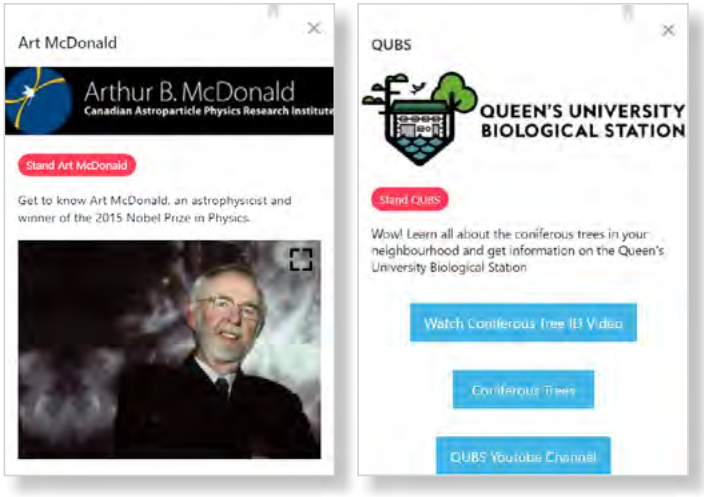
EXPOFP CREDITS

The invitational Science Rendezvous Kingston 2021 virtual floor plan was designed by Cheryl Hallam, of Hallam Design to complement our eye-catching 10th Anniversary graphic, also designed by Cheryl.

The artistic logo for Science Rendezvous Kingston was originally prepared for our 2020 annual event as a powerful visual message to capture our theme: S.T.E.A.M. GREEN. We wanted the our logo to communicate our focus on conservation and the environment and simultaneously acknowledge the important role played by science, technology, engineering and mathematics in the research conducted in these crucial fields of study.

The purposefully non-linear design of the floor plan was planned to help visitors to Science Rendezvous Kingston 2021 feel that they were wandering through an open green space with interesting places to stop and visit along the way. There are multiple pathways through the space and visitors were free to travel back and forth along the paths, able to stop at any display as many times as they wished.

Each dot on the green space was interactive—by clicking, a new window opened up to describe the content in the booth, providing options to watch videos, download resources such as an activity book or interact with puzzles.



Our virtual event was made possible by an incredible team of IT specialists from Queen's Faculty of Education: Holly Shepard, Joanna Michalski and Jeff Leach who took the lead in populating the 60 booths, uploading hundreds of photographs, hours of video, and volumes of digital resources. They brought Cheryl's design to life by making it easy to navigate and accurate with respect to the enormous quantity of content.

Thank you!

THE "PIVOT"

After winning the S.T.E.A.M. BIG Award for the best Science Rendezvous event in Canada in 2019, we had even bigger plans for Science Rendezvous Kingston scheduled to be held on May 9, 2020. Like so many in-person programs around the world, we were put "on-hold" by COVID-19 and its necessary restrictions.

Though we were disappointed to cancel our 10th anniversary celebration of science, scientists and scientific research at Leon's Centre, we began making preliminary plans for 2021 with the support and commitment of some of our 2020 headliners: Arctic climate change researcher and renowned Queen's Professor, Dr. John Smol; Arctic explorer, Dr. James Raffan; and, the Museum of Nature in Ottawa.

When the official word came down in September 2020 that all 2021 Science Rendezvous events would be virtual, we accepted the challenge and began development in earnest—again with the support of Queen's faculty and students and other partners from the past 10 years, as well as many new faces. Knowing even then there was growing fatigue from remote teaching, learning and working; e-socializing; and, "life on-line" among individuals of all ages, we began to plan for events and activities that could be delivered via the worldwide web.

We knew that in the past our event was family-focused and welcomed by educators and communities across south-eastern Ontario in the past. We also recognized that May 2021 would bring most welcome springtime weather, and with it, a focus on outdoor family time, so we opted to extend our program beyond one day. After all, if Saturday May 8, 2021 was a glorious, warm and sunny day, who would want to stay inside at the computer?

Our principal goal was to host a balanced event that included screen-time and outdoor opportunities. To make this possible, we "went big," expanding Science Rendezvous Kingston to a 16-day event to coincide with the Natural Sciences and Engineering Research Council of Canada (NSERC) Science Odyssey program. We offered both "live" and "on demand" events in addition to digital resources, including interactive puzzles and tours of research labs and an art gallery. Classes and members of the public could attend webinars with engaging speakers if schedules permitted, and if not, they could catch the recorded session a few days later at a time that was convenient. Parents could reserve books (English, French and Indigenous books for readers of all ages) at the public library based on our daily recommendations to complement the focus: engineering, physics, trees, dinosaurs or the Arctic.

Community groups such as Girl Guides downloaded birding and tree identification checklists for outdoor scavenger hunts. Children and families could compete for the top position on a Canada-wide leaderboard in a national Science Chase or complete the tasks at their own pace, and cooperatively, if so desired, to learn and have fun.

Perhaps most exciting of all, we set out on a mission to develop an unparalleled special feature for Science Rendezvous Kingston that would "Wow" even the most reluctant science, technology, engineering and mathematics (STEM) learner.

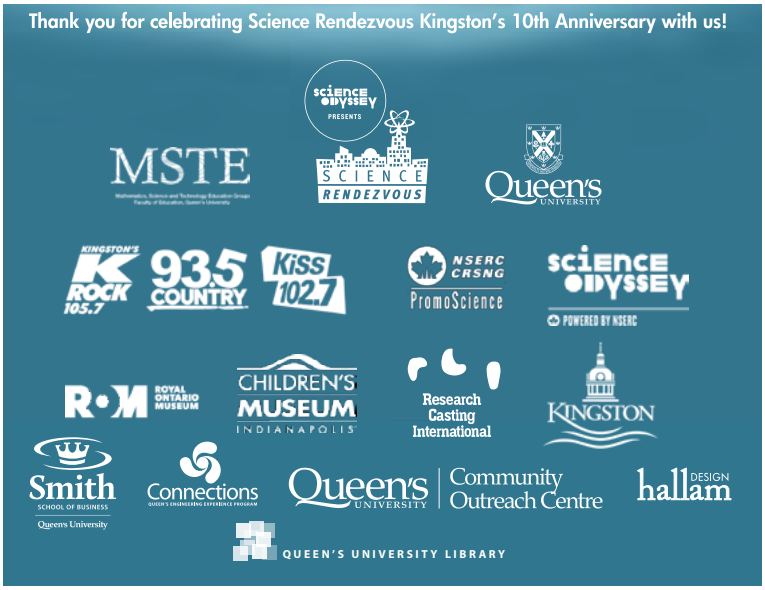
There is a slogan that says, "if you can dream it, you can do it." So began the quest to develop an interactive gaming environment where players could meet researchers, solve challenges, explore, have fun and learn. Originally, our plan was ambitious—we planned for six "hubs" that would immerse players in fantastical worlds showcasing physics, chemistry, engineering, environmental studies, paleontology, and the Arctic/Antarctic. A small team met weekly to plan, regroup, debug, problem solve, create and cycle through all of those steps iteratively, until finally, in early May, we were in a position to Beta Test two single player, mobile games that invited people of all ages to explore the fascinating worlds of and people from engineering and physics.

Something unexpected (and wonderful) happened over the last official days of our event…lots of people began to ask how long the virtual conference space would be open and requested an extension so that they could use the resources over the summer or with their classes next school year.

So, on Monday May 17, 2021, we made the important decision to keep the Science Rendezvous Kingston site alive for one year—an announcement that was met with enthusiastic responses such as "Thank you so much! I look forward to exploring more with this with my three boys this summer! These resources are appreciated!"

The Science Rendezvous Kingston Exploratorium is now launched as a summer fun learning event, aimed at keeping STEM momentum alive and growing…bringing visitors back to https://ygksciencerendezvous.expofp.com/ to look for new things to do until Science Rendezvous Kingston Is back bigger and better (and yes, in hybrid form) in 2022.

Yours sincerely,
Lynda & Kim



SPECIAL THANKS

Supporters	Queen's University, Office of the Principal	Patrick Deane, Principal and Vice-Chancellor
	Queen's University, Office of the VP (Research)	Kimberly Woodhouse, VP and Professor, Faculty of Engineering and Applied Science
	Queen's University, Faculty of Education, Mathematics, Science, Technology Education Group	Jamie Pyper, Associate Professor, MSTE Coordinator
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Webinar Technical Support	Smith School of Business at Queen's University	Jason Miller, Content Analyst Ben Milligan, Technology Support Specialist

Centre Stage Speakers & Discussion Moderators	Peter May	Michael Ryan, Adjunct Research Professor, Department of Earth Sciences, Carleton University
	John Smol	Brian Cumming, Professor oF Paleolimnology and Aquatic Ecology, Queen's Biology
	Jasveen Brar	James Raffan, Fellow, International of the Explorers Club, Past Chair of the Arctic Institute of North America, Fellow, and Past Governor of the Royal Canadian Geographical
	Lindsey Carmichael	Lynda Colgan, Professor, Queen's Faculty of Education
	James Raffan	Kyle Clarke, Ph.D. Candidate, Queen's Faculty of Education
	Connor Stone	Karen Lee-Waddell, Director of the Australian Square Kilometre Array Radio Telescope Regional Centre (jointly appointed at The International Centre for Radio Astronomy Research [ICRAR] and Australia's National Space Agency [CSIRO]
Promotion	City of Kingston	Bryan Paterson, Mayor Chris Whyman, Town Crier
	Queen's Community Relations	Melinda Knox, Associate Director, Research Profile and Initiatives
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		Jonah Hudson, Teacher Candidate
		Hannah Riding, Teacher Candidate
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		Brianne Peters, Librarian, Children's Services, Kingston Frontenac Public Library
	Rogers Media Group Kingston	Stephen Peck, General Manager of Rogers Communication
		John Noon, Promotions and Web Director

SPECIAL THANKS

Promotion *(continued)*	CKWS-TV (Global Kingston)	Bill Welychka, Host/ Producer, Global News Morning:The Morning Show
	Kingston Whig-Standard	Julia McKay, Journalist
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		Catherine Denoble, Reference Assistant
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		Deb St. Amant, Elder in Residence, Faculty of Education
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		Simran Nirval, M.Sc. Candidate
		Connor Stone, Ph.D. Candidate and Coordinator, Queen's Observatory
		Mark Richardson, Education & Outreach Officer Arthur B McDonald Institute
		Robert Knobel, Department Head, Associate Professor, Condensed Matter Physics & Optics, Engineering & Applied Physics
	Queen's Faculty of Education	Lynda Colgan, Professor
		Lindsay Mainhood (Ph.D. Candidate) & Andrew Belyea (Queen's Family Medicine Resident)
		Emma Bannerman, Teacher Candidate
		Jonah Hudson, Teacher Candidate
		Hannah Riding, Teacher Candidate
		Tyler Ashford, Teacher TDSB
		George Hart, Professor Emeritus, University of New York in Stony Brook, New York

Content Development *(continued)*	Queen's University Biological Station	Emily Verhoek, Outreach & Teaching Coordinator, Elbow Lake Environmental Education Centre
		Ruth Bryce, Eco-Adventure Camp Director
	Queen's Psychology, Child & Adolescent Development Group	Valerie Kuhlmeier, Professor
		Sara Jones, Lab Coordinator
		Tara Karasewich, PhD Student
		Mark Payumo, PhD Student
		Sylvia Pinheiro, PhD Student
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	Queen's Cardiopulmonary Unit (QCPU)	Brooke Ring, Manager, Facilities & Operations, Queen's CardioPulmonary Unit
		Oliver Jones, Histologist QCPU & Son
		Charlie Hindmarch, Associate Professor (Adjunct) of Medicine and Director of the Genomics, Transcriptomics, and Molecular Medicine (QCUP)
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		Jasmime Buddingh, PhD Candidate, Chemistry
		Olivera Kralj, MSc Candidate, Cardiovascular Stress Response Lab
		Nicholas Chronis, BSc Candidate
		Melissa Munoz, PhD Candidate, Department of Physics, Engineering Physics and Astronomy
	Association of Ontario Land Surveyors (AOLS)	Michael Matthews, Senior Crown Surveyor at Ontario Ministry of Natural Resources and Forestry
		Chris Oyler, OLS, Surveyors on Site
		Maureen Mountjoy, OLS/Deputy Registrar, AOLS
		Grant Lee, AGL Marketing Ltd
		Makenna Humes, MTO Queen's/QUIP student; and Sarah Matthews, Science Rendezvous Volunteer

SPECIAL THANKS

Content Development *(continued)*	Kingston Frontenac Public Library	Kimberly Sutherland Mills, Manager, Programming and Outreach, Kingston Frontenac Public Library
		Brianne Peters, Librarian, Children's Services, Kingston Frontenac Public Library
	Million Tree Project	Kathleen Miller, Executive Director, Science Rendezvous
		Lindsey Carmichael, Scientist & Author
Photography	2011	David Youseff
	2012	Lynda Colgan
	2013	Megan Bond and Sandy Fanning
	2014-2016	Guillaume Nolet
	2017-2019	Garrett Elliott
	2019	Marie-Eve.Boucher
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		Alex Wright, Assistant Professor, Particle Physics
		Simran Nirval, M.Sc. Candidate
		Connor Stone, Ph.D. Candidate and Coordinator, Queen's Observatory
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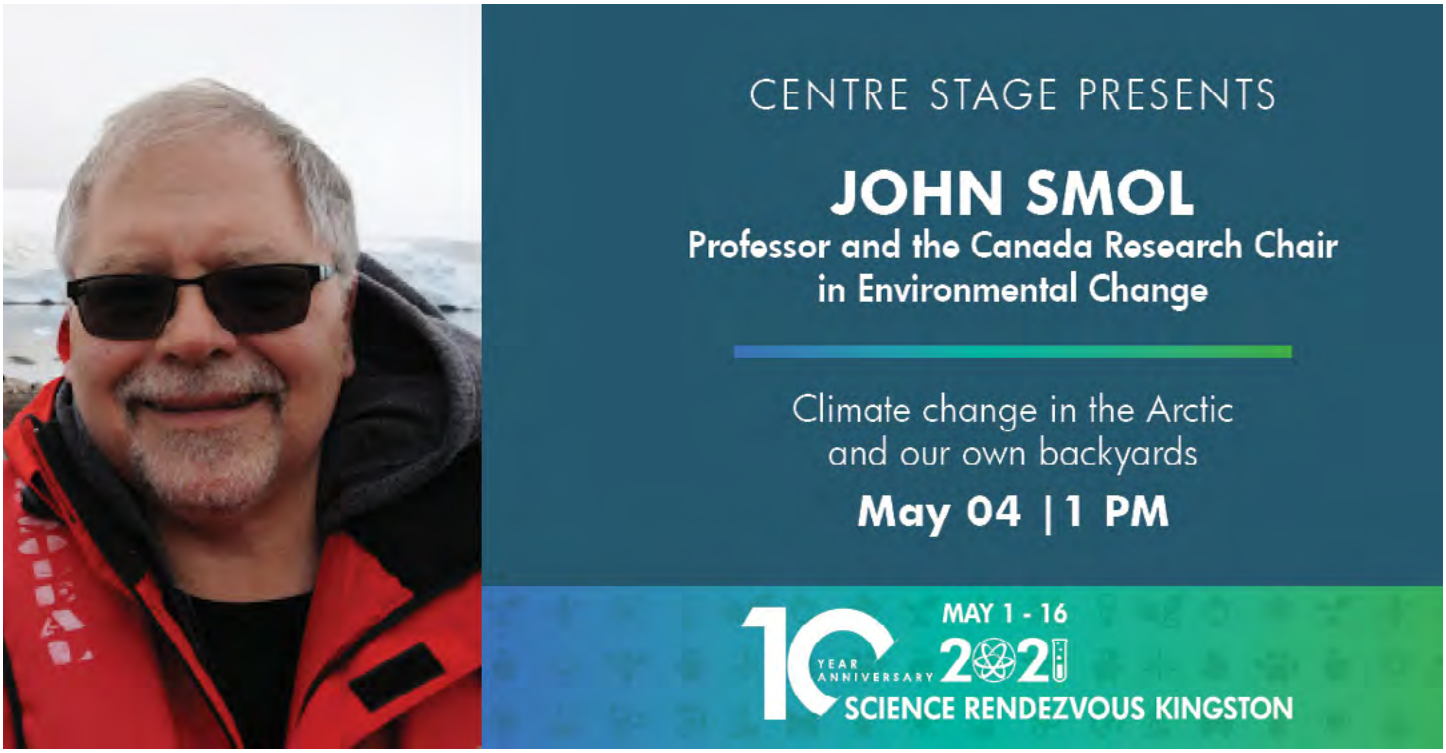


SOCIAL SHARE BANNER

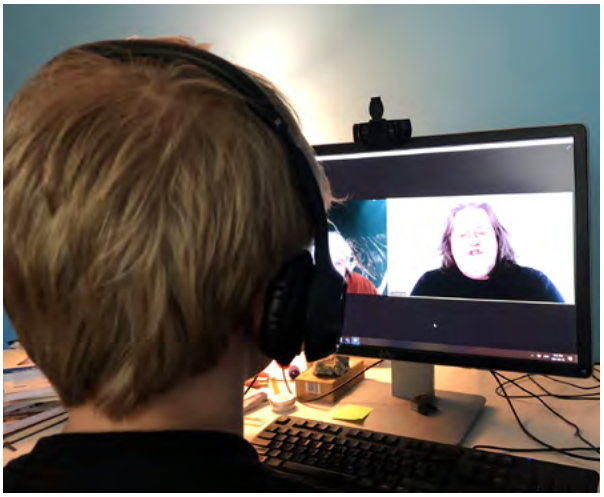
CENTRE STAGE

The goal of Science Rendezvous Kingston 2021 was, once again, to S.T.E.A.M. GREEN—celebrating our planet and the extraordinary efforts made by scientists to better understand its past, present and future through research and exploration.

To help us understand our past, we had:

- two presentations by **Peter May**, President and founder of Research Casting International (RCI), engagingly assisted by moderator, renowned Canadian paleontologist, Dr. Michael Ryan. RCI is the world's leading creator of mounted dinosaurs and other cast specimens—experts in the art and technology of preserving the past. Peter and Michael taught us about dinosaurs, early mammals and prehistoric ocean life, showcasing specimens and casts from the RCI collection, The Royal Ontario Museum and The Children's Museum of Indianapolis;
- a virtual tour of the universe, with Queen's University Ph.D. candidate and Queen's University Observatory Coordinator, **Connor Stone** who used a free software application called Stellarium to teach us about the oldest of the sciences, Astronomy. He explained how different cultures identified and named constellations and how ancient civilizations used the stars to navigate vast distances, and showed us stars that were over four billion years old; and,
- reflections on the courage, determination, and importance of early explorers, Indigenous teachings and the legacy of both by **Dr. James Raffan**, who in 2020, was named by Canadian Geographic as one of the 90 most influential explorers in the nation's recorded history. James encouraged us to begin exploring close to home and as far away as the Antarctic! He called upon us to tap into our curiosity and wonder in order to grow, learn and make the world a better place.

PRESENTERS



To help us understand our present we had:

- a discussion with **Dr. John Smol**, Queen's Department of Biology's distinguished Professor and Canada Research Chair in Environmental Change. Dr. Smol told us about his research in the Arctic and the changes he has seen during his time as a scientist there. Using vivid photographs and examples, he showed us the extent of the environmental damage in the Arctic caused by damaging human activities and suggested small, but effective steps that we could take at home to help slow climate change;
- a presentation by **Jasveen Brar**, a champion of environmental education, polar explorer and activist on behalf of ocean conservation, ocean literacy and ocean health. Jasveen's webinar, aimed at mentoring high school students, described Jasveen's own path: getting involved with groups and organizations around her, such as Students on Ice and Youth Science Canada. Her proactive participation, during her high school years and post-secondary program, enabled her to learn about the issues many communities were facing, topics that were not being discussed, and the knowledge and skills that she needed to develop. Jasveen encouraged those in attendance to learn always: there is so much available to us outside of a classroom, in books, from our peers, and especially from nature; and,
- an interactive workshop with scientist, Queen's Faculty of Education's "Author in Residence" for Science Literacy Week 2020 and award-winning children's author, **Dr. Lindsey Carmichael**. Most recently, Dr. Carmichael's book, The Boreal Forest, was designated as a Yellow Cedar honour book awarded by The Forest of Reading. As the author of the resource guide for Science Rendezvous' national Million Tree Project initiative, Lindsey introduced us to the animals and trees that live in the boreal forest, or taiga, the world's largest land biome—including the Chinese Eider duck who nests high in trees.

All of the "Centre Stage" speakers emphasized that the news about the health of the planet is not all "doom and gloom." Each one emphasized how science, technology, engineering and mathematics points us to a better path for building a more sustainable, more hopeful future for our planet and everything in it—reminding us that each one of us must do our part.

The presentations for all of the "Centre Stage" speakers are available "on demand" for viewing by visiting the appropriate booth on the Science Rendezvous Kingston floorplan. All video presentations include transcriptions to increase their access for populations needing alternative formats.

PROMOTIONAL FLYER >

M51, THE WHIRPOOL
ASTROPHOTOGRAPHY BY CONNOR STONE

10 YEAR ANNIVERSARY

SCIENCE RENDEZVOUS KINGSTON 2021

MAY 1 - 16, 2021

CENTRE STAGE

1PM MAY 12

CONNOR STONE
PhD Candidate

CENTRE STAGE PRESENTS

CONNOR STONE

Physics, Engineering Physics & Astronomy

Live: Queen's Observatory Virtual Planetarium

May 12 | 1 PM

BIO:

Connor Stone is a PhD candidate at Queen's University studying the nature of galaxies in our Universe. Galaxies are scattered throughout the Universe and are made up of millions to trillions of stars, generally swirling around a gigantic Black Hole. His work involves analyzing thousands of galaxies with Machine Learning and Bayesian statistics to determine the fundamental patterns that govern these titans of the night sky. Connor is also the Queen's Observatory coordinator, organizing outreach programs such as open houses, virtual planetarium tours for classrooms, and the Fast Radio Bursts podcast.

PRESENTATION:

Join me as we explore the night sky from home using the free software: Stellarium. In this presentation I will show you how to navigate the night sky, find nebulae and galaxies with nothing but a pair of binoculars, and prepare for rare celestial events. The night sky is a shared backyard for everyone around the world and through time, see how you can learn about sky stories from around the planet. Finally, we will dive into the science of astronomy and have Stellarium show us the spectacular images that astronomers today use to study the Universe.

REGISTER FOR THIS EVENT:

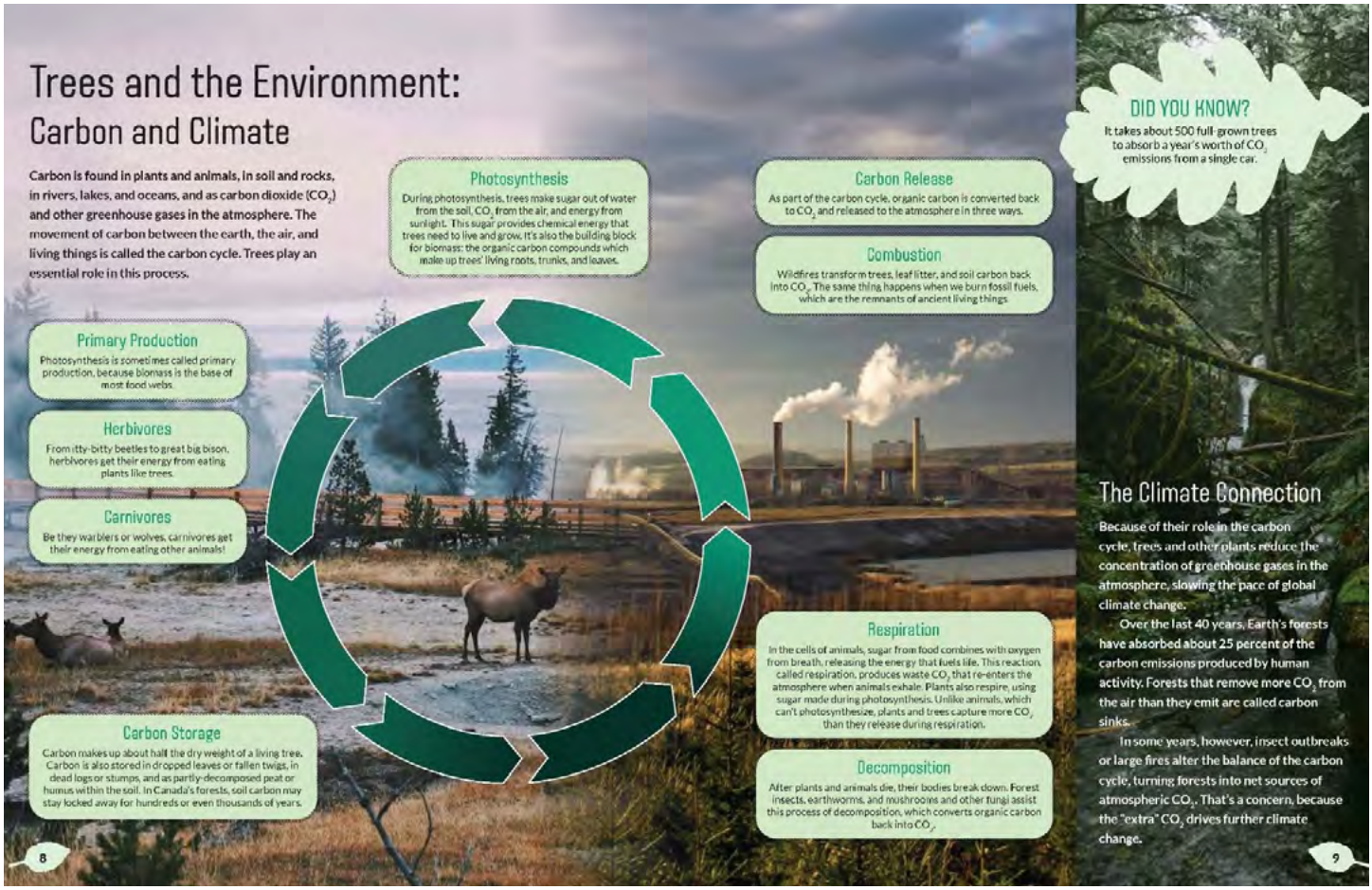
https://www.eventbrite.com/e/149075481779

@STEMYGK **educ.queensu.ca/coc/science-rendezvous**

THE MILLION TREE PROJECT

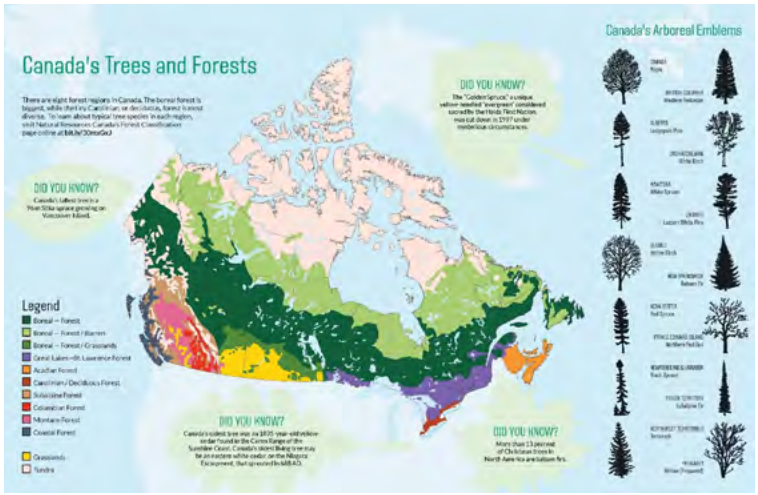
In 2021, Science Rendezvous launched a new "Canada Wide Experiment" called the Million Tree Project to celebrate trees and share information about them so that more people would understand why trees are so important. This goal of this new Canada Wide Experiment is designed to spark one million conversations about trees, environment and climate science, and create action! The Million Tree Project encourages Canadians to join in planting, caring for, and conserving one million trees by 2030.

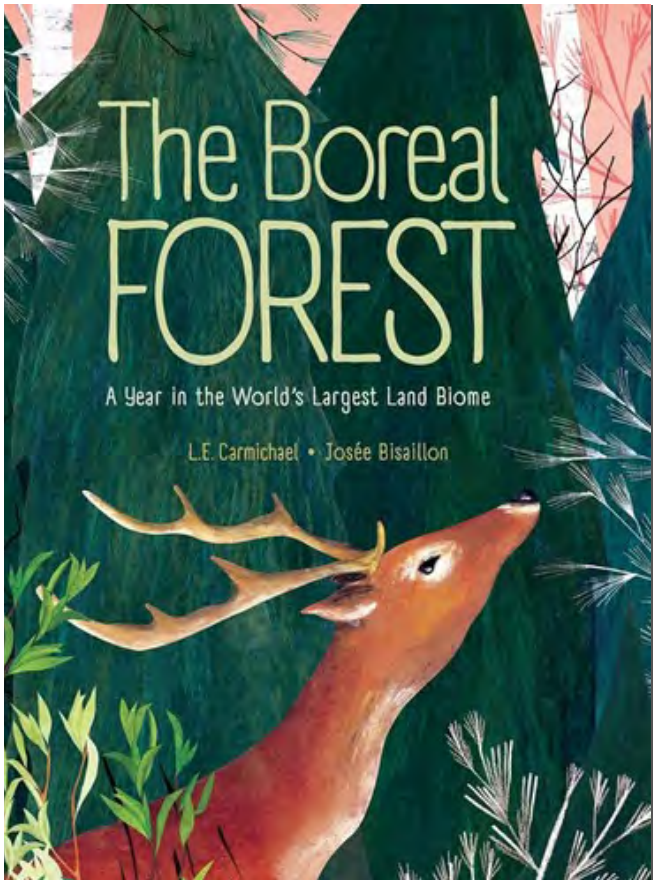
Over the next ten years of this project, Science Rendezvous is inviting everyone to learn, connect, conserve, plant and care for trees in their communities and across Canada. This project is an opportunity to invite everyone to be active participants in Canada's commitment to plant 2 billion trees, which will absorb 4 to 9 million tonnes of carbon per year by 2050.



Did you know that trees:

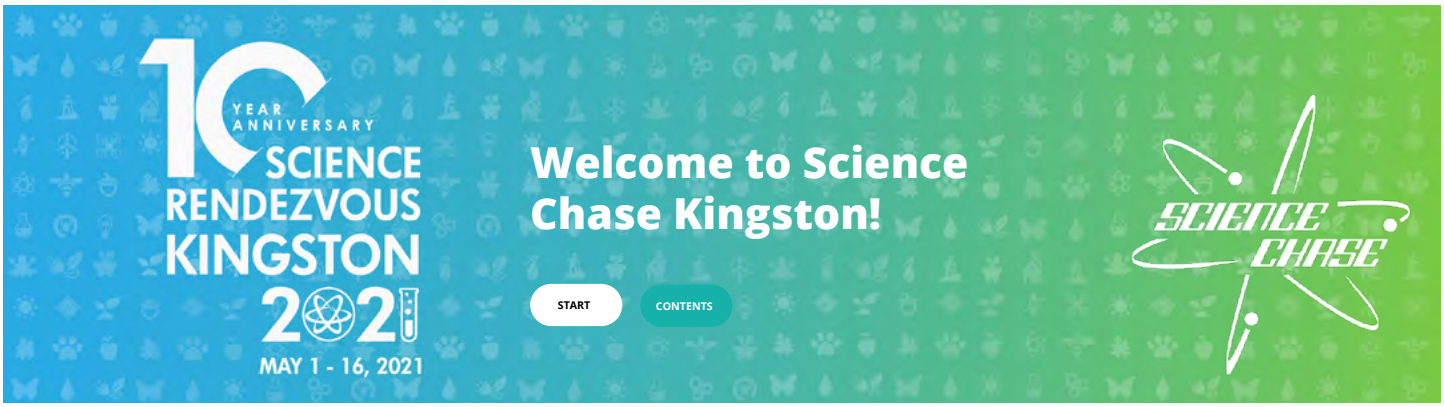
- Capture carbon dioxide and mitigate climate change?
- Help clean our water and prevent floods?
- Provide food and habitat for plants and animals?
- Cast shade and cool down cities?
- Support human health, recreation, education, and spirituality?
- Provide lumber, paper, and many other traditional and emerging forest products?





To encourage participation in the Million Tree Project, Science Rendezvous Kingston sponsored a special interactive workshop with the author of the Million Trees Resource Booklet, Dr. Lindsey Carmichael on Friday May 7, 2021. A familiar face to many Kingstonians because of her high profile during Science Literacy Week in 2020—leading workshops for students, educators, families and the public, Lindsey hosted a one-hour interactive webinar that focused on her specialization—The Boreal Forest (which is also the title of her award-winning book).

SCIENCE CHASE



This year, Science Rendezvous hosted a coast-to-coast Science Chase competition on Saturday May 8, 2021. Individuals, families, classrooms or clubs were encouraged to participate in more than 120 challenges and watch their names move up or down on a national leaderboard. There were more than one thousand competitors nationally, 700 of whom participated in the Science Chase Kingston events!

The 15 Science Chase Kingston activities for Science Rendezvous Kingston were designed by teacher candidates, Emma Bannerman (Grades 1-6) and Jonah Hudson (Grades 7-9). They designed their activities—about fossils, wind turbines, the night sky, recycling and off-setting fuel consumption as a cross-Canada exploration that celebrates the environment and conservation. Using the RISE and Articulate360 platforms, Emma and Jonah integrated multi-media resources to teach concepts in an interactive way, and they prepared challenges at the end of each "chase" to be engaging and accessible!

Science Chase Kingston will be available to families and educators until May 2022, providing thousands more people with the opportunity to learn and have fun.

Try one for yourself!

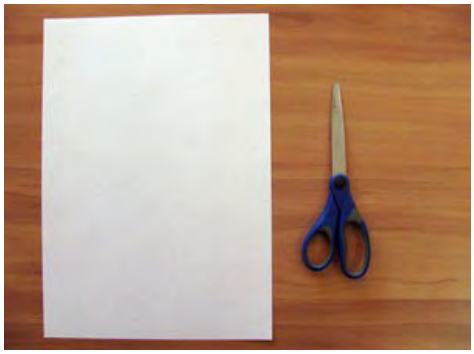
A person drives a pickup truck 100km every day for one year. How many mature trees are needed to remove the amount of carbon dioxide that has been produced by this person in the one year?

a) 5
b) 500
c) 30,000
d) 182,500

The correct answer is b) 500. The number of mature trees required to remove the amount of carbon dioxide that has been produced by driving 100km every day for a year is 500.

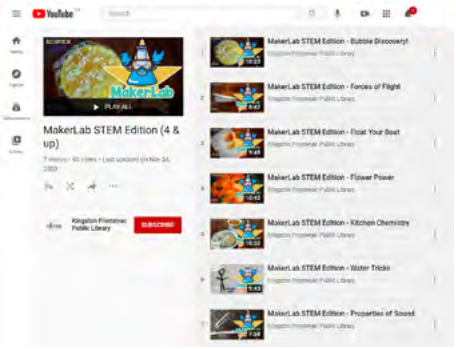
This number is equivalent to the number of trees required to remove the amount of carbon dioxide produced in one day by a pickup truck because all of the carbon produced in one day would be removed that same day, regardless of how many days pass.

Did you know that you can cut one hole in a regular piece of 8 ½ X 11 paper that will be large enough for you to walk through? All you need is a pair of scissors, a few careful snips and voilà…it's mathemagic! These photos reveal the secret behind the magic.



EDUCATION LIBRARY

Science Rendezvous Kingston seeks to inspire a love of STEM learning. The booths at our 2021 virtual event provided motivational and educational videos—including instructions for thought-provoking experiments to do at the kitchen table or in the garden; informative guides for birding and tree identification; puzzles to solve and games to try; and, books to read.



For each of the 16 days of Science Rendezvous Kingston 2021, Brenda Reed and Catherine Denoble from the Queen's Education Library prepared a list of books (including French language and Indigenous-focused) to complement the theme of the day. Using the 16-day planning calendar as the basis for their suggested reading list, Brenda and Catherine selected books that appealed across ages. They sought also to bring diversity, equity and inclusion to the reading materials by including stories from various cultures or ones that included under-represented populations in STEM fields; thereby inviting more children to see themselves on the pages they read. Brenda and Catherine provided the gift of possibility.

As the daily book collection was added to the Science Rendezvous Kingston platform each day, the book lists were shared through Social Media channels. We were grateful that our long-time Science Rendezvous Kingston partners at the Kingston Frontenac Public Library (KFPL) contributed to the success of the book lists by communicating what books were in their catalogue, available for free loan. The endorsement by KFPL was helpful to families—especially during a time when schools were closed, and school collections could not be accessed.

Science Rendezvous Reading: Day 12, Astronomy

	**The Big Bang Book**, by Asa Stahl and Carly Allen-Fletcher Published by Creston Books, 2020 Ages 4-9 From the publisher: "Moving out into the farthest reaches of space, then back home on Earth again, this is a picture book Carl Sagan would love, introducing the wonder of our pale blue dot to the youngest readers."
	**Exoplanets,** by Seymour Simon Published by HarperCollins Canada, 2019 Ages 8-12 From the publisher: "There are thousands of exoplanets scattered throughout the Milky Way galaxy, and scientists are on a constant quest to find one just like Earth. In *Exoplanets*, Simon examines the planets outside of our solar system and uncovers what makes them habitable, our efforts to discover new life, and more."
	**Incroyable espace**, by Jeunesse Collectifs; trans. Bruno Porlier Published by Gallimard Jeunesse, 2019 Ages 9-13 From the publisher: "Plus de 70 thèmes sont abordés, depuis la naissance de l'univers jusqu'aux missions spatiales les plus récentes en passant par la présentation des objets célestes les plus remarquables, pour répondre à toutes vos questions sur l'espace..."
	**Construis ton système solaire**, by C. Oxlade & D. Sanchez Limon; trans. B. Porlier Published by Gallimard Jeunesse, 2021 Ages 8-12 From the publisher: "Ce superbe coffret permet de comprendre comment s'est formé le Système solaire. Dans un grand voyage à travers l'espace, il propose de découvrir le Soleil et les huit planètes qui gravitent autour de lui ainsi que tous les autres objets célestes (comètes, astéroïdes, planètes naines) que les télescopes et les sondes observent ou vont analyser et cartographier!."
	**Warren Whistles at the Sky**, by David A. Robertson & Amber Green Published by Manitoba First Nations Education Resource Centre, 2016 Ages 5-8 From the publisher: "*Warren Whistles at the Sky* is about a young boy who remembers a story an Elder told him about the northern lights. But are they really spirits dancing? And will they come down and take him away if he whistles at them?."

Science Rendezvous Reading: Day 14, Dinosaurs Part 2 /Les dinosaures

	**Dinosaurs: A Visual Encyclopedia 2nd ed,** by DK staff Published by DK Children, 2018 Ages 9-12 From the publisher: "Kids can go on a visual tour of the prehistoric world, exploring the plants, the reptiles, the swimmers, the flyers, the dinosaurs, the mammals, and more in this comprehensive and fully updated visual celebration of prehistoric life.."
	**Elliott's Guide to Dinosaurs,** By Elliott Seah Published by Greystone Books, 2016 & see below for French edition Ages 8-11 From the publisher: "What did the world look like when dinosaurs roamed the Earth? Eight-year-old author Elliott Seah took it upon himself to find out, and in his first book, he takes readers on a fact-filled exploration of these amazing animals from our planet's distant past."
	**Mon premier pop-up dinosaures:** by Owen Davey Published by Gallimard Jeunesse, 2018 Ages 2-6 From the publisher: "Découvrez 15 dinosaures et reptiles préhistoriques grâce à d'incroyables pop-up illustrés par Owen Davey. Un livre parfait pour faire découvrir les dinosaures aux plus jeunes : de l'ankylosaure au vélociraptor, sans oublier le terrifiant tyrannosaure."
	**Le monde des dinosaures**, by Archie Blackwell; trans. by Bruno Porlier Published by Gallimard Jeunesse, 2014 Ages 9-12 From the publisher: "Des illustrations plein format, superbes et étonnantes de réalisme par leurs couleurs et leurs ambiances, des croquis de chercheurs expliqués par les notes d'un paléontologue passionné et des reproductions de fossiles, vous plongeront dans les profondeurs géologiques de la Terre pour participer à la chasse aux dinosaures disparus!"
	**Petit guide des dinosaures,** by Elliott Seah Published by Éditions MultiMondes, 2015 Ages 8-11 From the publisher: "Le jeune Elliott Seah vous fera découvrir plusieurs espèces de dinosaures, leurs prédécesseurs et leurs descendants. Les débutants, comme les plus avancés, comprendront aisément ses explications et ses découvertes. De quelle couleur étaient les dinosaures? Le Petit guide des dinosaures répond à ces questions et à bien d'autres"

"The Queen's University Education Library has been thrilled to support – and honored to participate in – Science Rendezvous for the past several years. Dr. Lynda Colgan and Kim Garrett are two of the most outstanding educators a librarian could ever dream of supporting with library resources, and the opportunity to be part of such a large-scale educational event as Science Rendezvous is beyond exciting. Science Rendezvous is an opportunity for Queen's University to share expertise and resources with the Kingston community – and well, this year, with the world! The number of top Canadian scientists who accept Lynda and Kim's invitations to participate in Science Rendezvous is nothing short of amazing – and this year's line-up is a great example of the powerful line-up of scientists who agree to participate. The opportunity for students in schools to hear Canada Research Chair Dr. John Smol talk about the impact of climate change, to hear James Raffan talk about exploring Canada's wilderness, and for young girls especially to hear Dr. Kristine Spekkens talk about her work exploring data related to black holes – this is all just pure inspiration for Canada's youth and their educators. The high quality of this professionally managed event is consistent year after year. The hands-on attention to detail provided by the organizers balanced with the extraordinary innovation and creativity seen in the exhibits and activities has made Science Rendezvous Kingston a premiere science event in Canada. The opportunities it offers our local students, in particular, is powerful. For our local students to see the relevance of science to our daily life, to imagine careers in science that they didn't even know existed, and to be introduced to the power of concepts like innovation and invention is a gift to our community and work that I with my Education Library team are thrilled to support. Creating booklists that extend the topics showcased at Science Rendezvous helps the Education Library to keep our collections current and offers us a wonderful opportunity to share our resource expertise with local educators and students. Science Rendezvous makes science come alive in Kingston every May, and its wild success has made it a fixture in community. I can't think of a better way for our Queen's community of scientists and innovators to share their passion with the next generation and ensure that Ontario and Canada continues to educate youth who will make the world a better place. Thank you Science Rendezvous for including "Further Reading" lists as part of your big tent of learning."

Science Rendezvous Reading: Day 6, Oceans / Les océans

Changing Tides: An ecologist's journey to make peace with the Anthropocene, by A. Frid
Published by New Society Publishers, 2019
Ages 15+
From the publisher:
"Frid draws from a deep well of personal experience and that of Indigenous colleagues, finding a glimmer of hope in Indigenous cultures that, despite the ravishes of colonialism, have for thousands of years developed intentional and socially complex practices for resource management that epitomize sustainability."

If You Take Away the Otter, by Susannah Buhrman-Deever & Matthew Trueman
Published by Candlewick, 2020
Ages 5-8
From the publisher:
"On the Pacific Coast of North America, sea otters play, dive, and hunt for sea urchins, crabs, abalone, and fish in the lush kelp forests beneath the waves. But there was a time when people hunted the otters almost to extinction. But when people protected the sea otters with new laws, their numbers began to recover, and so did the kelp forests."

Mission océan: Apprends les gestes qui sauvent le monde marin!
by Séverine de La Croix & Laurent Audouin
Published by Glénat Jeunesse, 2019 Ages 6-12
From the publisher:
"À cause de la surpêche, du braconnage, de la pollution et des changements climatiques, les océans sont en danger. Donc nous aussi. Parce que le monde de demain a besoin des océans pour vivre, le monde d'aujourd'hui doit agir en les protégeant. C'est notre rôle à tous."

Planète mer - Atlas pour les enfants, by A. Mojetta, E. Lavagno & S. et Vallarino
Published by, Nuinui jeunesse, 2019
Ages 3-6
From the publisher:
"Plonge dans les profonds abysses à la rencontre des plus incroyables formes de vie, en perçant les secrets de la biologie marine et en visitant des lieux mythiques et reculés, des Galapagos à la Polynésie, en passant par les barrières de corail et les paradis tropicaux les plus inaccessibles!"

We Are Water Protectors, by Carole Lindstrom & Michaela Goade
Published by Roaring Brook Press, 2020 (English); Bayard Presse, 2021 (French edition)
Ages 3-6
From the publisher:
"Inspired by the many Indigenous-led movements across North America, *We Are Water Protectors* issues an urgent rallying cry to safeguard the Earth's water from harm and corruption—a bold and lyrical picture book."

Science Rendezvous Reading: Day 7, Forests / Les forêsts

111 Trees, by Rina Singh & Marianne Ferrer
Published by Kids Can Press, 2020
Ages 5-8
From the publisher:
"In a small village in India, a boy grows up to make a huge difference in his community by planting trees to celebrate the birth of every girl. Based on a true story, this book celebrates environmental sustainability, community activism and ecofeminism."

Les arbres qui font nos forêts, by Emmanuelle Grundmann & Capucine Mazille
Published by Éditions du ricochet, 2020
Ages 6-10
From the publisher:
"Dans la forêt, qu'elle soit tropicale, humide ou encore tempérée, la vie fourmille : tout en haut, la canopée, habitée par des animaux voltigeurs ; tout en bas, les sous-sols colonisés par les recycleurs... Il y a tant à découvrir !."

The Boreal Forest: A Year in the World's Largest Land Biome
by L. E. Carmichael & J. Bisaillo
Published by Kids Can Press, 2018 Ages 8-11
From the publisher:
"The vast boreal forest ... [is] the planet's largest land biome. Besides providing homes for a diversity of species, this spectacular forest is also vitally important to the planet: its trees clean our air, its wetlands clean our water and its existence plays an important role in slowing global climate change."

Dan la forêt: livres d'activités, by Sophie Bordet & Cécile Boyer
Published by Gallimard Jeunesse, 2016
Ages 8-11
From the publisher:
"Ce livre d'activités vous fera découvrir plein de choses sur la forêt, son histoire, son exploitation par l'homme. On apprend à mieux connaître les arbres pour mieux les protéger, mais on le fait également en s'amusant grâce aux jeux (avec autocollants) et aux quiz! À vous de jouer!."

We are All Connected: Sto:lo, Riparian Forests and Black Bears
by Brenda Boreham, Terri Mack, & Rod Peters
Published by Strong Nations Publishing, 2017 Ages 8-10
From the publisher:
"[Part of a series that] "explores a specific ecosystem with a focus on one animal and its adaptations for survival within that ecosystem. Indigenous interviewees, each living within the same area, have responded to strategic questions as to how their community interacts with the land, their traditional territory."

ENGINEERING INNOVATORS AND INFLUENCERS

Studies have repeatedly reported that science, technology, engineering and mathematics are perceived as male domains, and scientists as predominantly male. The impact of this gender image of school science subjects on young women's career choices are clear—the gender-subject stereotypes of math and science strongly, and negatively influence young women's aspirations to enroll and excel in STEM disciplinesat post secondary institutions.

An important goal of Science Rendezvous Kingston 2021, was to showcase diversity in the scientific community. With the overwhelming support of Dean Kevin Deluzio we were able to feature a less-pronounced masculine image of engineering in order to allow young women to see themselves as future scientists and thereby increase the likelihood of STEM career aspirations.

Because of the significant number of women engineers who are involved in cutting edge research at Queen's Faculty of Engineering and Applied Science, Science Rendezvous Kingston featured seven contemporary engineering faculty members or Ph.D. candidates (Amy Wu, Mona Kanso, Heidi Ploeg, Suzan Eren, Charlotte Gibson, Roshni Rainbow and Sarah Jane Payne) and four pioneering engineers (Elsie McGill, Ada Lovelace, Roberta Bondar, Radia Perlman) in its Innovators and Influencers booth.

Each researcher was featured in a brief video describing their area of specialization and research—biomechanics, intelligent mining systems, COVID-19 research, aircraft design or computer programming—and links were provided to research labs to access additional information.

Science Rendezvous Kingston aimed to provide an opportunity for all youth to learn about the many disciplines of engineering. By inviting them to see the many different types of engineering, our goal was to deepen their understanding about the amazing things they can do as engineers and pick the discipline that truly motivates and excites them the most.

WOMEN IN GEOLOGY AND PALEONTOLOGY

One of the goals of Science Rendezvous is to raise awareness about careers in the science, technology, engineering and mathematics fields. In 2021, Science Rendezvous Kingston opted to celebrate the women who were and are innovators and influencers in three fields: Engineering and Geology & Paleontology.

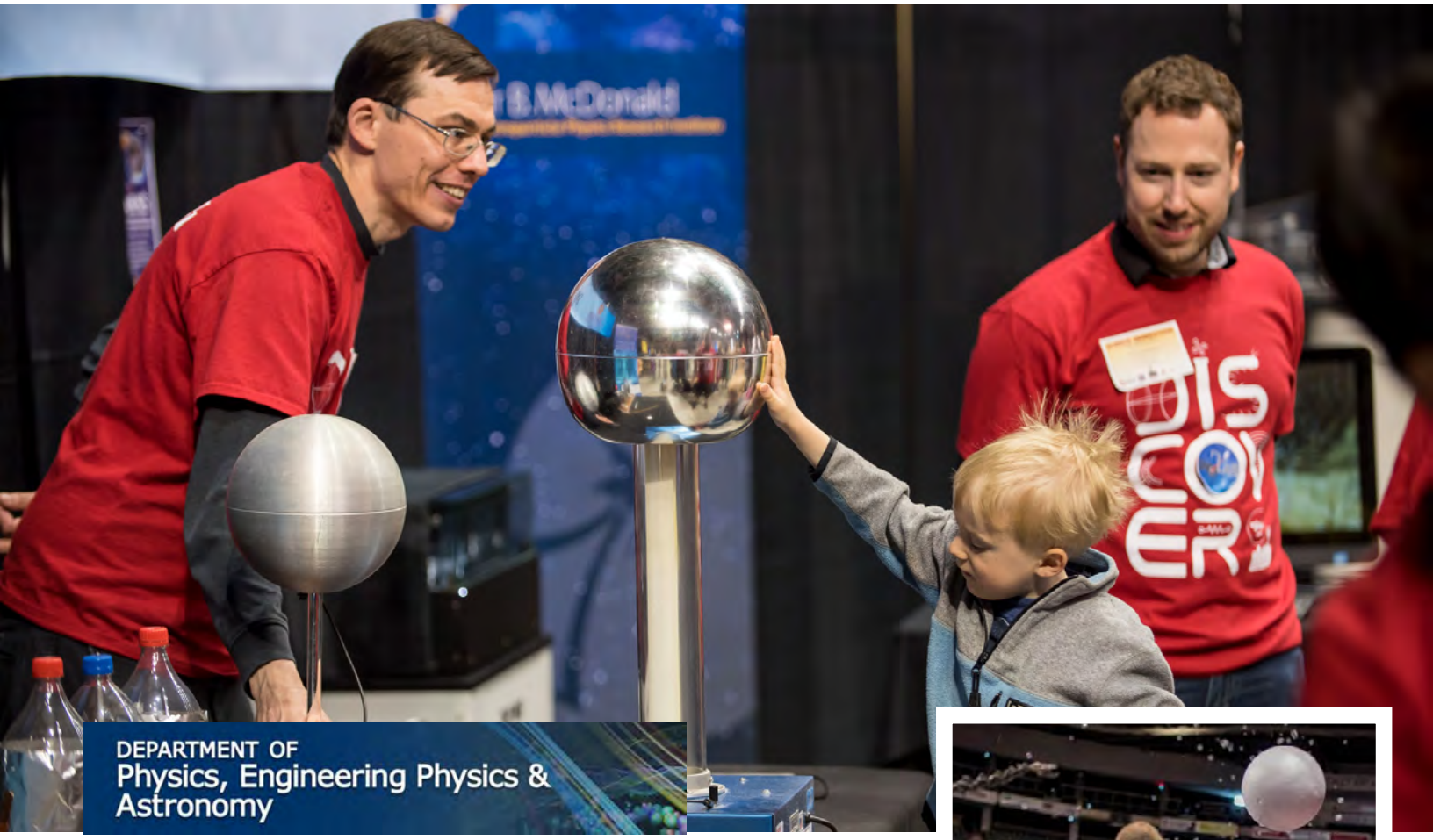
Hannah Riding, a secondary school teacher candidate at Queen's Faculty of Education worked on two separate, but related projects during her Alt Prac. Working with dinosaur builder and paleontologist Peter May from Research Casting International, a collaborator on an NSERC PromoScience project with Dr. Lynda Colgan (Learning with Dinosaurs: A gateway to multidisciplinary STEM learning), Hannah, developed a suite of nine videos chronicling the lives of women who were pioneers in geology and paleontology: Alice Wilson, Claudia Alexander, Frances Wagner, Gabriel Donnay, Grace Stewart, Helen Belyea, Lucille Hunter, Madeleine Fritz and Moira Dunbar.

To prepare the videos, Hannah turned to archives and primary sources from museums and universities to acquire biographical information as well as visual materials to support her work. The videos earned high praise from Dr. Michael Ryan, a professor of Paleontology at Carleton University because of the fact that Hannah showcased the importance of the seminal work of these groundbreaking (literally and figuratively) women who defied the odds to work and study in a "man's" field in order to follow their passion and dreams. The videos also garnered the attention of Dr. Bhairavi Shankar, who has a Ph.D. in Planetary Science and Diaspora Science. Dr. Shankar is also an active ambassador who mentors women in STEM, and instantly recognized, as did others, that the videos are simultaneously informative, inspirational and educational.

In addition to the development of the videos, Hannah has been working as a research assistant for Dr. Lindsey Carmichael, scientist and author. Dr. Carmichael is the lead author on the development of a Grade 9-11 teaching unit about Extinction, which focuses on the Pleistocene Epoch. Hannah worked with her, as well as Peter May, Dr. Michael Ryan and Dr. Linda Tsuji (Curator of the Miller Museum of Geology at Queen's University) to locate original research papers and appropriate fossil specimens to support the lessons, all of which feature Canadian paleontological discoveries including a giant beaver and a dire wolf.

The Pleistocene Extinction kit will be an important part of the Science Rendezvous Kingston 2022 showcase.

DEPARTMENT OF PHYSICS, ENGINEERING PHYSICS AND ASTRONOMY



Arthur B. McDonald
Canadian Astroparticle Physics Research Institute

Under the leadership, and with the enthusiasm of Dr. Alex Wright, The Department of Physics, Engineering Physics and Astronomy, as well as the Arthur B. McDonald Institute (represented by Dr. Mark Richardson), has been a long-time partners of Science Rendezvous Kingston, hosting interactive displays at our annual pop-up discovery centres and adding to the festive atmosphere at our 2019 S.T.E.A.M. BIG Awards Ceremony at the Agnes Etherington Art Centre.

To carry on their long-standing tradition of participation, in 2021, the Department of Physics, Engineering Physics and Astronomy contributed in multiple ways to the virtual event: providing videos to showcase some of their prominent Queen's innovatovative and inflluential researchers in Astronomy, Astrophysics & Relativity, Cosmology, and theoretical

nanophotonics, — Nobel Laurate Art McDonald, James Fraser (2017 winner of the prestigious 3M National Teaching Fellowship), Benjamin Tam, Kristine Spekkens, Chelsea Carlson, Laura Fissel, and Gopolang Mohlabeng; sharing instructional videos about experiments to try at home (Alexander Wright, Joe Bramante, Mark Richardson, Physics Department Head Rob Knoebel, Simran Nirval, Ingrida Semenec, and Connor Stone. The department menbers also took an instrumental advisory/mentorship role in the development of Space City, one of the two virtual worlds inside the apps developed for The Exploratorium.

Research tells us that there are far fewer high school students enrolled in physics than in chemistry or biology courses. In fact, students are completing the highest level math courses in larger numbers than those taking physics. It appears that a fear of physics exists within students and this fear seems to be related to a level of difficulty the students associate with physics.

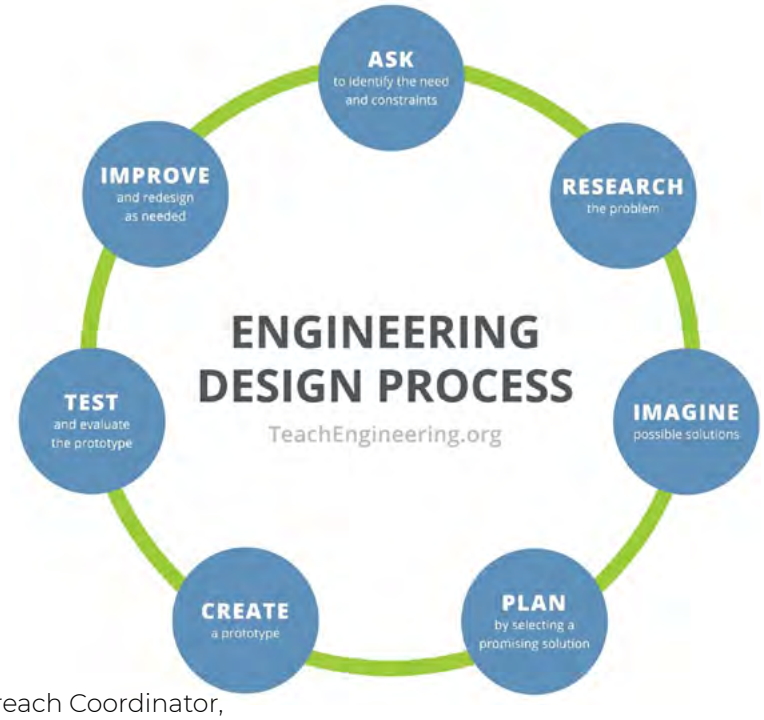
Science Rendezvous Kingston is grateful to the Department of Physics, Engineering Physics and Astronomy and the Arthur B. McDonald Institute and the Queen's Observatory for its outreach efforts through Science Rendezvous Kingston—making complex and abstract concepts accessible and understandable to a wide audience, and allowing students to imagine themselves as students of and professionals in this important field of study—one that is interesting, enjoyable and relevant.

In this 10th anniversary year, it is important to celebrate milestone events—especially those that honour long-time Science Rendezvous Kingston partners like the Department of Physics, Engineering Physics and Astronomy. The photo below was taken in 2016, when Science Rendezvous Kingston celebrated Dr. Arthur McDonald's Nobel Prize, by commissioning SNOBall—a modular sculpture by mathematician and artist, Dr. George Hart. The sculpture, constructed at Science Rendezvous Kingston by faculty, students and special guests from the community, now holds place of pride at the north west window in Sterling Hall. The design is evocative of a swirling ball of fluid, meant to symbolize the sun, where neutrinos originate, and the sphere of heavy water central to the underground detector where the SNO experiments were conducted. The 1.5m diameter sculpture is composed of thirty planar wooden components (arranged with icosahedral symmetry and twelve 5-fold swirls) plus six brass rods that pass through radially (arranged with the symmetry of a cube's right angles).

QUEEN'S ENGINEERING CONNECTIONS OUTREACH

Connections
QUEEN'S ENGINEERING EXPERIENCE PROGRAM

Scott Compeau, Outreach Manager for Queen's Connections Engineering Outreach program has been involved with Science Rendezvous Kingston since 2013. With team members, including Queen's undergraduate and graduate students, Scott has coordinated a number of highly engaging and popular activities for our annual event. In 2018 and 2019, Scott brought the Tech 'n' Tinker Trailer, a mobile "makerspace" to Science Rendezvous Kingston to provide opportunities for students to build circuits, work with 3D design software and printers, and code microcontrollers (mini computers) to act as wearable technologies.



For Science Rendezvous Kingston 2021, Scott and Outreach Coordinator, Carmen Maertz, not only carried on the Connections tradition, but made invaluable contributions to two other booths: The Faculty of Engineering and Applied Sciences “Innovators and Influencers” display and The Exploratorium.

For their own Connections display at Science Rendezvous Kingston 2021, Carmen prepared two engineering-focused “maker” videos. In one, Carmen invites viewers to become structural engineers and takes them through the engineering design process in order to make a bird-house. In another, Carmen teaches us how to apply the engineering design process to paper-airplanes: building, testing and improving their planes (gliders) by analyzing the results of experiments that allow children to see and figure out what makes airplanes fly and what can be changed to influence the flying characteristics and performance of airplanes.

In addition, Scott and Carmen provided information about their exciting outreach planned for the summer.

STEM @ HOME

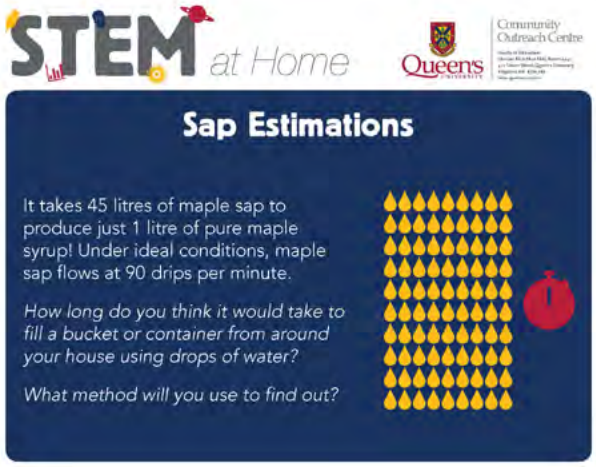
Did you know that children spend just 14% of their waking hours at school between Kindergarten and graduation from Grade 12? Here is the calculation to prove it:

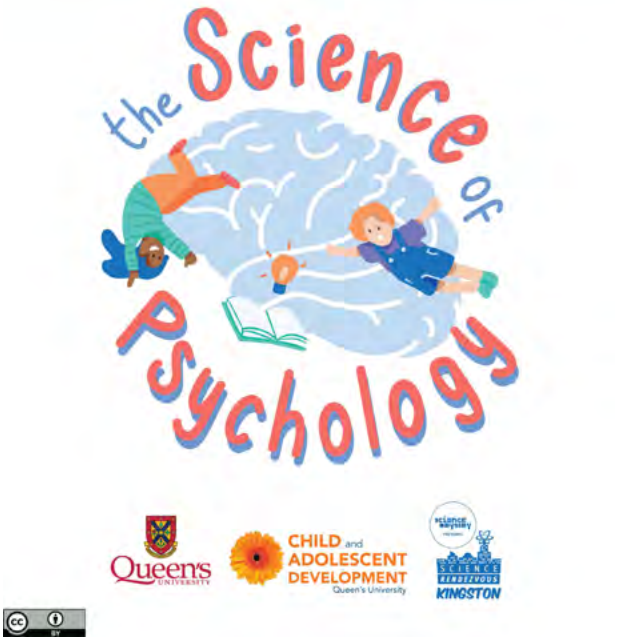
- Assume children sleep 8 hrs/day.
- 24 hrs/day – 8 hrs sleeping = 16 waking hrs/day
- 365 days/yr X 18 years = 6 570 days
- 6 570 days X 16 waking hrs/day = 105 120 waking hours by age 18
- Average 6 hrs per day at school.
- Average 190 school days/year
- 190 school days/yr X 6 hrs/school day = 1 140 hrs per school year
- 1 140 hrs/school year X 13 school years (1 yr Kindergarten + 12 years through to end of secondary school) = 14 820 school hours
- 14 820 school hours ÷ 105 120 waking hours = 0.1409817351598174 or just 14% of waking hours by age 18 spent in school

That means that learning outside of the classroom is essential for all aspects of a child's development—academic, socio-emotional, and physical. Every experience that a child has, from splashing in a puddle and visiting a Maple Sugar Bush to measuring flour for baking cookies and watching tadpoles grow into frogs is an opportunity to learn and grow. Lessons abound based on children's wonder and curiosity.

All of the STEM@Home resources at Science Rendezvous Kingston 2021 were designed to support informal educational lessons based on everyday objects and curiosity-inspiring topics to encourage "making," experimentation, observation, information-seeking and engagement with many branches of science, technology, engineering and mathematics. Videos, books, interactive websites, activity card decks and "how to" guides provide the basic ingredients for hundreds of hours of family fun and learning.

Research tells us that many students have limited views of how STEM is present in every dimension of the world and every aspect of their lives. They may also be unaware of what is possible in their futures by keeping the doors to STEM open. By providing rich first-hand experiences with many STEM fields, we hope to encourage people of all ages to recognize and capitalize upon the opportunities to learn science, technology engineering and math that present themselves every day.





OUTDOOR FUN

In previous years, the Biology Department at Queen's has encouraged us to use our hands, eyes and ears to explore the environment around us. Wanting to continue that good advice, we called upon our biology colleagues to support our virtual event through STEM opportunities that were outside and "off the screen." Children and their families were encouraged to discover flora and fauna right outside their doors—a great way to get active, have fun and learn.

Dr. Frances Bonier (Queen's Biology) created a uniquely local course for participants called Ten Things You Might Not Know About Kingston's Birds. The on-line course, complete with beautiful photographs and interesting facts, is a starting point for families to use in neighbourhood walks to find the surprising species that live in our community. Dr. Bonier also provided an additional guide to make our backyards bird friendly, complete with a recipe for making hummingbird nectar.

Avid birders and citizen scientists, Lindsay Mainhood (PhD candidate, Queen's) and Andrew Belyea (Resident, Family Medicine, Queen's Medicine) prepared three Ontario birding resources: an instructional video about birding; a birding checklist; and a guide to a successful bird "quest."

Emily Verhoek, Outreach & Stewardship Coordinator and the Queen's University Biological Station (QUBS) and her team inspirited all of us to learn about and appreciate our regional trees! They designed an extensive tree identification resource perfect for spring! Their helpful video and visual pocket guide encouraged visitors to Science Rendezvous Kingston to discover the various coniferous trees species indigenous to our region, and provided a link to the QUBS Youtube Channel where additional outdoor STEM activities and resources can be found.

This Outdoor fun content was a huge hit for the Science Rendezvous springtime event period with some 700 visitors to theses "get outside and learn" stations — a clear indication that many people were looking for fun and educational activities to do with friends and family safely, outdoors.

Science Rendezvous Kingston Bird Quest Checklist

Name: _____ Birding Location: _____ Time Spent: _____ Date: _____

Crows, Jays, and Cardinals
- American Crow
- Blue Jay
- Northern Cardinal

Ducks, Geese, and Swans
- American Black Duck
- American Wigeon
- Common Merganser
- Hooded Merganser
- Red-Breasted Merganser
- Canada Goose
- Mallard Duck
- Mute Swan

Chickadees, Creepers, and Nuthatches
- Black-Capped Chickadee
- Brown Creeper
- Red-Breasted Nuthatch
- White-Breasted Nuthatch

Swallows
- Barn Swallow
- Tree Swallow

Waxwings and Grackles
- Cedar Waxwing
- Common Grackle

Robins and Orioles
- American Robin
- Baltimore Oriole

Sparrows, Finches, and Redpolls
- American Tree Sparrow
- Common Redpoll
- Dark-Eyed Junco
- House Finch
- House Sparrow
- Pine Siskin
- Song Sparrow

Woodpeckers
- Downy Woodpecker
- Hairy Woodpecker
- Northern Flicker
- Pileated Woodpecker

Gulls
- Ring-Billed Gull

Doves and Pigeons
- Rock Dove
- Mourning Dove

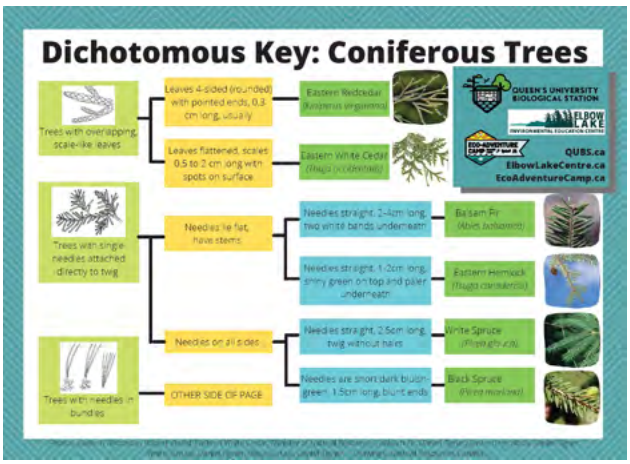
Kingbirds, Starlings and Grosbeaks
- Eastern Kingbird
- European Starling
- Rose-Breasted Grosbeak

Hummingbirds
- Ruby-Throated Hummingbird

Hawks and Vultures
- Red-Tailed Hawk
- Turkey Vulture

Blackbirds
- Red-Winged Blackbird
- Brown-Headed Cowbird

Warblers and Redstarts
- American Redstart
- Black-and-White Warbler
- Blackburnian Warbler
- Yellow-Rumped Warbler
- Yellow Warbler



Black-capped Chickadee. Photo by Paul Martin.

Did you know these birds will eat seeds right off your hands at some of Kingston's local conservation areas? (and many other places across Ontario) If you are in Kingston, Lemoine Point or Little Cataraqui Creek can be accessible places to experience this natural magic!

Northern Saw-whet Owl enjoying her dinner in a cedar tree on Brock Street. Photo by Paul Martin.

A family group of Trumpeter Swans in Chaffeys Lock (with a male Wood Duck). Photo by Paul Martin.

Indigenous Teacher Education Program

Liv Rondeau, (Kanien'kehá:ka, Wolf Clan) is the Coordinator of the Indigenous Teacher Education Program at the Faculty of Education, Queen's University.

In 2019, Liv organized a very popular hands-on display that featured artefacts and information about STEM concepts that are central to Indigenous culture and Ways of Knowing. The focus of Liv's presentation was to demonstrate how our lives are intrinsically intertwined with the natural world. Through the display, Liv reminded us that everything we need to survive is provided from the lands. A central tenet of Indigenous belief is that we have been able to maintain our ways of life for thousands of years by working to preserve balance with what we take and how we nurture and care for continued prosperity. Liv emphasized that it is through generational teachings we learn to live with and show respect for the land so that it can always thrive and be there to take care of all future generations.

We appreciate all of the contributions that Liv has made and continues to make as an active community STEM ambassador and we are especially grateful that in 2021, Liv ook on a much more prominent role. Throughout Science Rendezvous Kingston, Liv was a daily presence as she welcomed visitors to all of the "Centre Stage" presentations. At the start of each live webinar by one of our keynote speakers, Liv delivered a land acknowledgement to recognize and express gratitude to the First Nations, Inuit, or Métis land on which we are situated, and to commemorate Indigenous peoples' principal kinship to the land. **Niawen'kó:wa!**

Queen's University is situated on traditional Anishinaabe & Haudenosaunee Territory.

Ne Queen's University e'tho nońwe nikanónhsote tsi nońwe ne Haudenasaunee tánon Anishinaabek tehatihsnónhsahere ne óhontsa.

Gimaakwe Gchi-gkinoomaagegamig atemagad Naadowe miinwaa Anishinaabe aking.

Liv Rondeau, (Kanien'kehá:ka, Wolf Clan) is the Coordinator of the Indigenous Teacher Education Program at the Faculty of Education, Queen's University.

Did you know that the Ojibwe named months for each full moon? The term for April means "Maple Sap Boiling Moon," called iskigamizige-giizis.

With colleague, Logan Maracle, Liv esearched and produced a unique, educational video, Wahta Teachings and Stories, about the Maple Tree. Through the story, we learn the origin of the Anishinabe belief that the maple sugar was a gift from the Great Spirit and why the Anishinabe must work for their living – turning resources into usable food.

Science Rendezvous launched a new Canada Wide Experiment, the Million Tree Project (MTP), to celebrate trees and share information about them, helping people understand why trees are critical to our environment and climate science. A Science Literacy Week project in September 2021 will build on MTP by providing opportunities to learn about, connect with, conserve, plant and care for the sugar maple, Wahta— abundant in southeastern Ontario and, according to elder teachings, the leader of all the trees in the natural world. We will provide free digital materials (interactive video, resource manual, activity suggestions) to complement fall sapling plantings in the community.

THE MUSEUM OF NATURE

Science Rendezvous Kingston 2021 hosted the ninth edition of the Canadian Wildlife Photography of the Year contest—an exhibit made possible as a travelling exhibit on loan from The Canadian Museum of Nature in Ottawa.

The 30 photographs in the collection were selected from entries to a competition run by the Canadian Museum of Nature in partnership with Canadian Geographic and the Alliance of Natural History Museums of Canada.

Each edition of Canadian Wildlife Photography of the Year is comprised of the winners, runners-up and honourable mentions from the year's contest. The ninth edition featured the following categories: Animals in Action, Watery Wildlife, Things with Wings, Little Life and Youth. All photographs were captured by amateurs or semi-professionals. The competition is open to photographers of all ages, including a special category for young photographers. A short comment or anecdote about the species depicted, written by the photographer accompanies each photograph.
This exhibit helped Science Rendezvous Kingston to demonstrate why wildlife photography is important and how the photographers, who spend a lot of time observing nature provide unique insights and intensify our interest in the natural world.

We are certain that the photographs will continue to inspire curiosity and maybe even encourage children and families to pick up a camera and take a hike!

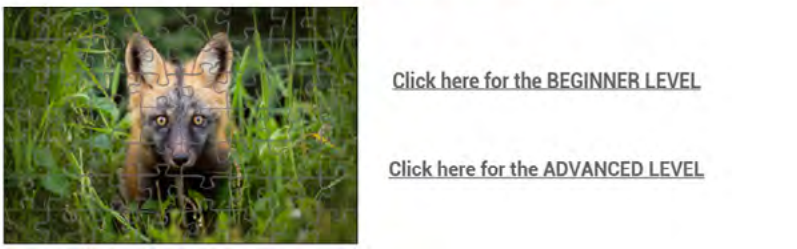
Special thanks to Joanna Michalski, IT Services, Faculty of Education, for creating the amazing, interactive SWAY photo collage of the winning photographs, making navigation through the exhibit a user-friendly and fun experience.

canadian museum of nature
nature
musée canadien de la nature

CANADIAN Geographic

Alliance of Natural History Museums of Canada

In addition to the tour of the virtual gallery, visitors to the Canadian Museum of Nature's virtual conference stand had the opportunity to assemble two puzzles made up of pieces from the winning photographs in our Imaginarium, with options to choose between two levels of difficulty. These fun and challenging puzzle applications were created for the exhibit by Cheryl Hallam, Hallam Design.



THE EXPLORATORIUM

One of the principal goals of Science Rendezvous Kingston and Science Rendezvous National is to increase student engagement in and enhance learning about STEM.

Knowing that many children between Grades 4 and 8 comprised a large proportion of our visitors to the in-person events of the past, we brainstormed ideas to appeal to that particular demographic. One of the first thing to come to mind was a video game. A little digging helped us to locate some persuasive research about the benefits of gaming for learning and we were encouraged by the findings of educational technology researchers who have found that video games allowed students to fully engage in learning that was both educational and fun. We also discovered that while players are highly receptive to learning embedded in a game scenario, technologies, games and other "screen-related" activities must be balanced with other types of learning opportunities.

We were confident that the many stations at Science Rendezvous Kingston could provide many rich, educational experiences for individual students, classes, families and community robotics groups such as W.A.F.F.L.E.S—providing informal STEM learning with the potential to increase interest and engagement as well as identity (e.g., "I could become a scientist.")

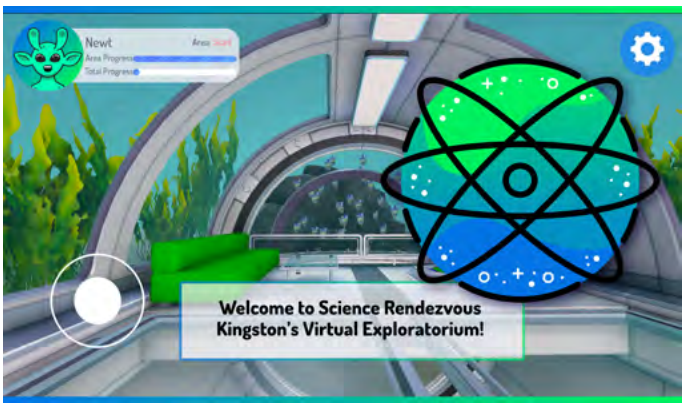
Moreover, we recognized that an interactive game environment would not only be a novel addition to the Science Rendezvous Kingston program, but a valuable asset to ignite STEM interest and learning.

Fortuitously, Coordinators Lynda Colgan and Kim Garrett met Ben Black and Kye Hallam, two Grade 11 students at Sydenham High School who were enrolled in the Computer Coding Focus Program offered by Limestone District School Board. Ben and Kye had the opportunity to supplement their course work with self-directed online learning for the first half of the school 2020 – 2021 school year. The students accepted the challenge of developing an app that would allow users to meet scientists, solve challenges, be wowed by science, technology, engineering and mathematics, have fun and learn.

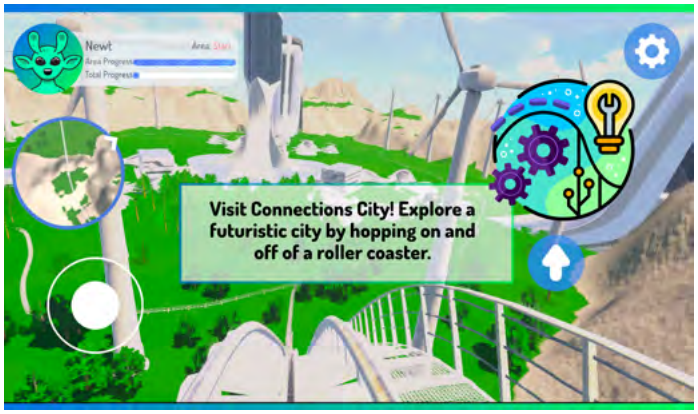
In consultation and collaboration with Queen's Engineering Outreach Manager Scott Compeau and Outreach Coordinator, Carmen Maerz; and, a team of faculty and graduate students from the department of Physics, engineering Physics and Astronomy Department, led by Assistant Professor Alexander Wright and M.Sc.student, Simran Nirval, Ben and Kye incorporated key concepts into the apps' content and challenges, based on an original game vision suggested by Dr. Lynda Colgan and Kim Garrett.

Science Rendezvous Kingston's Virtual Exploratorium is comprised of two single player, mobile games (or hubs) that invite people of all ages to explore the fascinating worlds of and people from engineering and physics.

In the Connections City hub, users can explore a futuristic metropolis by hopping on and off of a roller coaster. Leonardo Da Vinci, himself, hosts a tour with video presentations and mini-game challenges about engineers and the amazing work that they do.



The Rendezvous Hub



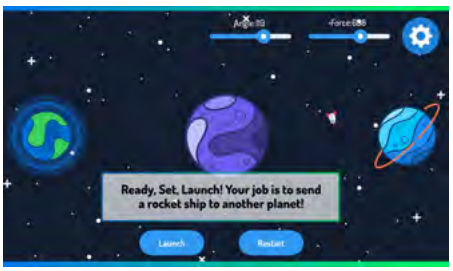
Connections City

Rock Fall

Gemstone Mining

Power Failure

Space Station Calling



Ready Set Launch!

Moon Rover

In Rock Fall, a key section of the roller coaster track is damaged from a storm. The user's job is to build a bridge to repair the damage by selecting the best materials and making the strongest shapes. Will your bridge support the roller coaster? Users are prompted with knowledge about structural engineering pertaining to bridges to get the roller coaster back on track.

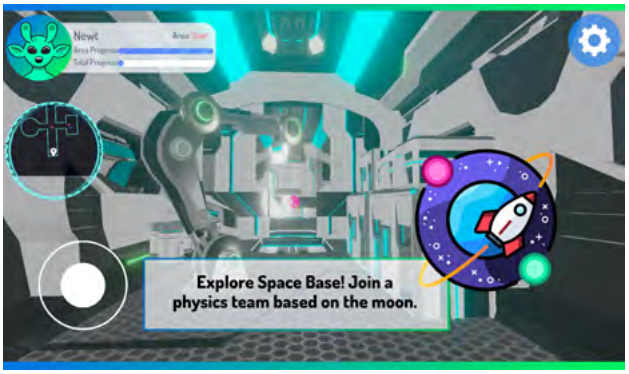
Users become mechanical engineers in Gemstone Mining, by controlling their own specialized mining robot. They direct the robot to use special tools and simple machines to collect gems from an underground mine and get them to the surface to ride a special car on the roller coaster.

Connections City needs the help of an electrical engineer in Power Failure to get the roller-coaster back up and running—and the player is "it." Players complete circuits to restore the light bulbs that give the signal that all systems are "go" to those in the control tower.

The second Exploratorium hub is Space Base where users join a physics team based on the moon. Guided by astrophysicist, Simran, players learn about physics and astronomy, collect fun space facts, meet Zero Gee (a "punny" alien friend who loves to tell science jokes) and apply their knowledge in three fun tasks.

In the first task, Space Station Calling, players need to send a signal back to Earth to report their success in space using a laser beam. Players use their knowledge of light to direct a signal to reflect off receivers on nearby planets and satellites to deliver a message successfully to the receiver on Earth.

In Ready, Set, Launch, the second task, players must send a rocket ship to another planet. By changing the mass and speed of the rocket, the path is changed. What will it take for the player to land their rocket successfully on the planet with the ring?



Space Base

The final task, involves Moon Rover a mobile robot that "sees" what is around it by sending out particles and using sensors to detect how the particles bounce off the objects. The player encounters the rover out for an exploration jaunt around the moon's surface. The player's job is to move the rover left and right to keep the flying objects from hitting and damaging it.

Although we were disappointed that technical and administrative issues delayed the launch of The Exploratorium, we are hopeful that its availability will be a reminder that Science Rendezvous Kingston is a continuous resource—ever growing and expanding to meet the needs of curious learners using innovative approaches.

Science Rendezvous Kingston is proud to say that The Exploratorium is the concretization of one of the principal goals of its national Science Rendezvous and Science Odyssey partners, i.e., to mentor and support and encourage youth to pursue interests and develop expertise in science, technology, engineering, and mathematics. Congratulations to Ben and Kye, our current STEM superstars and our future hope.

10 YEAR RETROSPECTIVE


Queens
Queens
Queens
Queens
Queens
935


SCIENCE
RENDEZVOUS
KINGSTON
MATHEMAT

ANALYTICS

IMPACT

Science Rendezvous Kingston 2021, gathered valuable information about its reach, featured activities and participants in a number of ways, employing web-based tools and metrics to present an overview that celebrates our collective success and provides direction to the Coordinators for future planning. We will continue to gather data over the next year as we add to the resources available on the site.

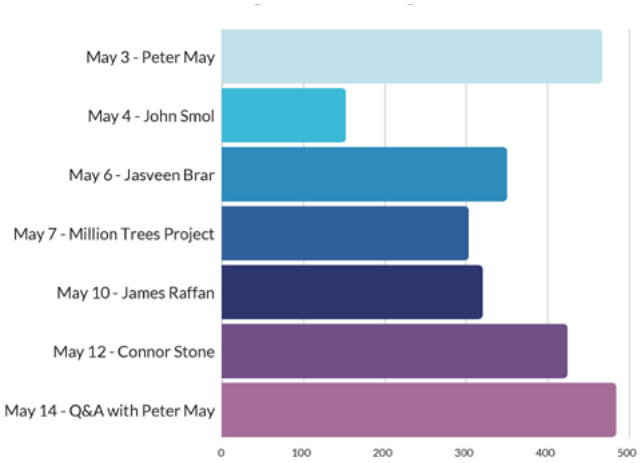
PROMOTION

In addition to support from Queen's Marketing and Communications, Queen's Faculty of Education, Global Kingston (CKWS), the Rogers Radio Group Kingston (K-Rock 107.5, Country 93.5, Kiss 102.7), The Kingston-Whig Standard, Kingston This Week, The Belleville Intelligencer, and CFRC Radio 101.9, the Coordinators, Lynda Colgan (@LyndaColgan) and Kim Garrett (@STEMygk) took an active role in posting to Science Rendezvous Kingston Facebook and Twitter accounts.

In 2021, between April 20th and May 17th, the Science Rendezvous Kingston Facebook page reached **15,643** people and its posts had 2426 engagements.

During this same time period, Science Rendezvous Kingston had **365,000** social media impressions on Twitter.

Centre Stage Event Registration



EVENTBRITE REGISTRATION

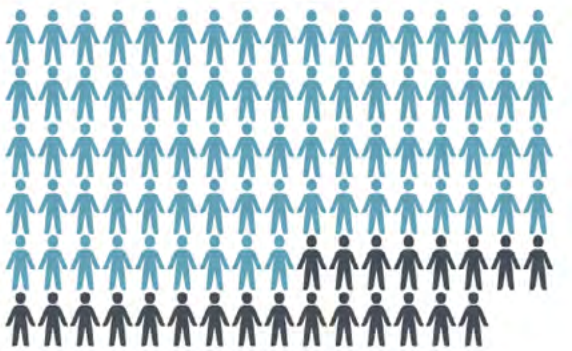
In order to accommodate the live Q&A sessions that were important components of every "Centre Stage" event, we used Eventbrite, an event management and ticketing website to register participants.

Overall, 2493 people registered for Centre stage events, with 103 educators and 1992 students. It is important to note that participants from several provinces registered for events, including, in particular, considerable engagement from classrooms in Nova Scotia, Saskatchewan, and Manitoba.

While the registration for Queen's distinguished Professor and Canada Research Chair John Smol's event (151 people) appears lower in comparison to the other listed events in the graph below, his presentation was the second most viewed of the entire event (562 views). Therefore, the registration numbers do not reflect the success of his session.

Approximately 4% of Centre Stage Event attendees were educators

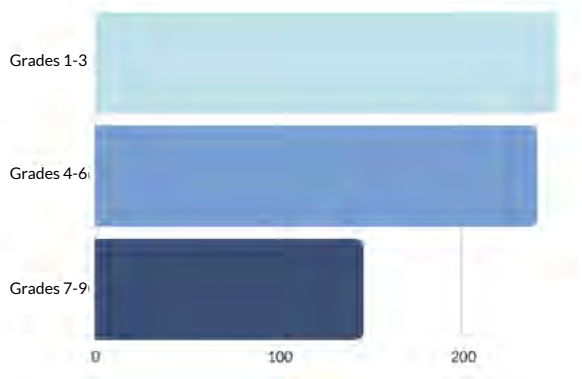
77% of Centre Stage Event attendees were students



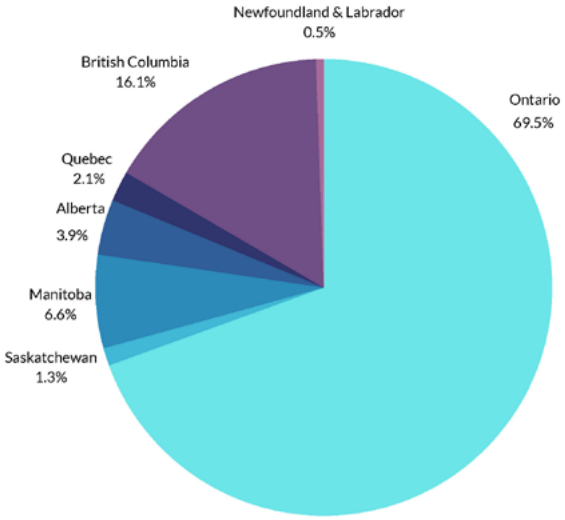
SCIENCE CHASE

This year, Science Rendezvous National hosted a coast-to-coast Science Chase competition on Saturday May 8, 2021. There were more than **1000** competitors nationally, **632** of whom, from across the globe participated in the Science Chase Kingston events designed by Queen's teacher candidates, Jonah Hudson (Intermediate, Grades 7-9) and Emma Bannerman (Primary, Grades 1-3 and Junior, Grades 4-6).

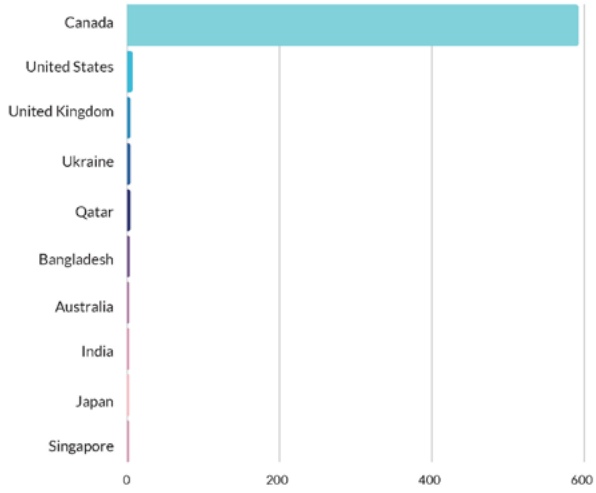
Participation by Grade Range



Science Chase: Team Participation by Province

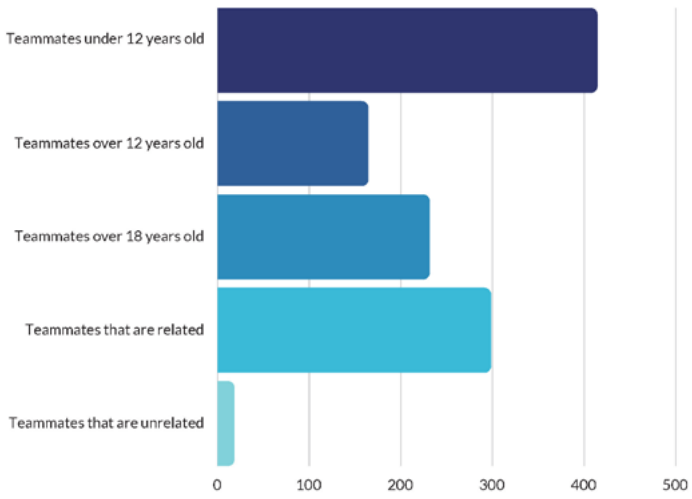


Science Chase: Team Participation by Country



Our data shows that for the 622 teams who participated in Science Chase Kingston, on average each team was composed of three people but the range was from 1 – 32, suggesting that individuals and classrooms participated as well as family or community teams. An equal number of male and female participants engaged with Science Chase Kingston, and team composition suggested that the appeal of the Chase was across ages.

Science Chase: Team Participation Composition by Age

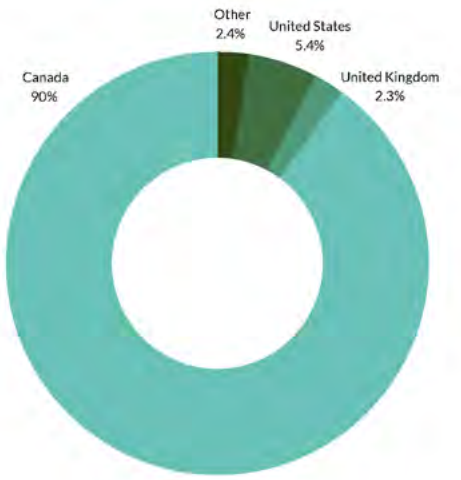


WEB ANALYTICS

With the help of Holly Shepard, IT Services, Faculty of Education, we employed Google Analytics to track and report website traffic at https://ygksciencerendezvous.expofp.com/. This information told us who was attending our events and demonstrated to us that all components of the program were successful and enjoyed a wide reach.

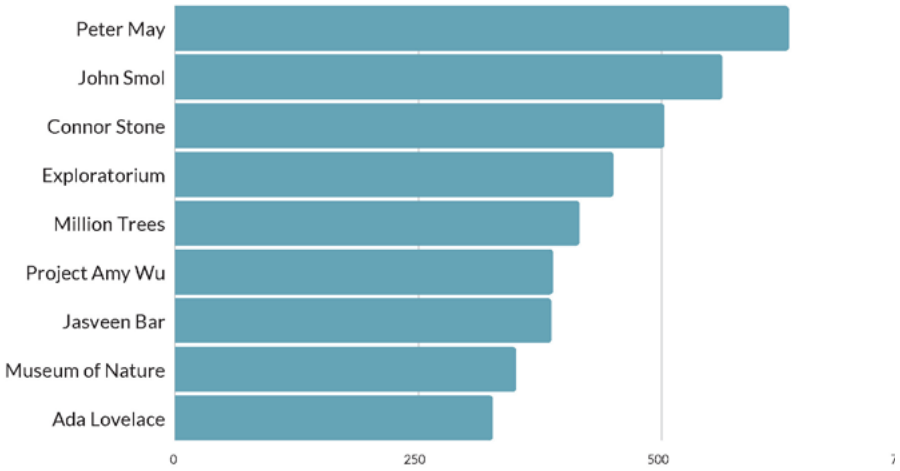
While most participants were Canadian, people from around the world took part in Science Rendezvous Kingston, as shown in the graph below. The "Other" category includes in order from highest to lowest: China, Brazil, Belgium, Columbia, Croatia, France, and Germany.

Users by Country

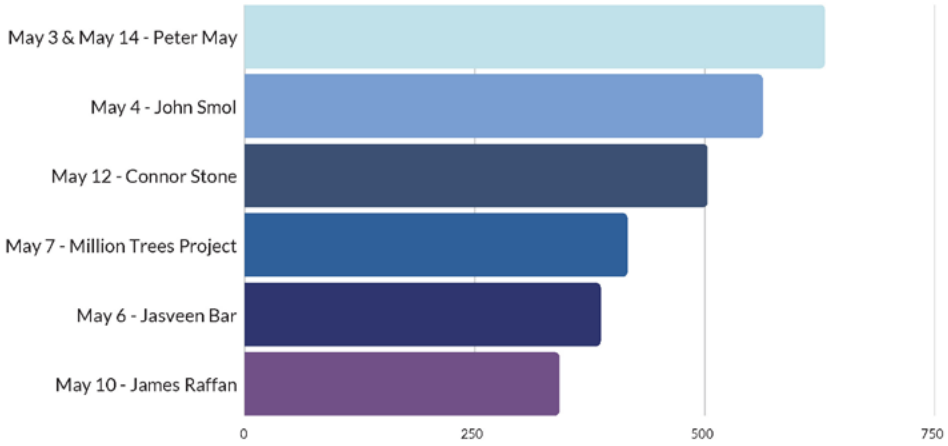


We include the following graphs to celebrate the success across all parts of the the virtual platform that was created by so many Queen's researchers, students, staff and community members.

Most Viewed Exhibits

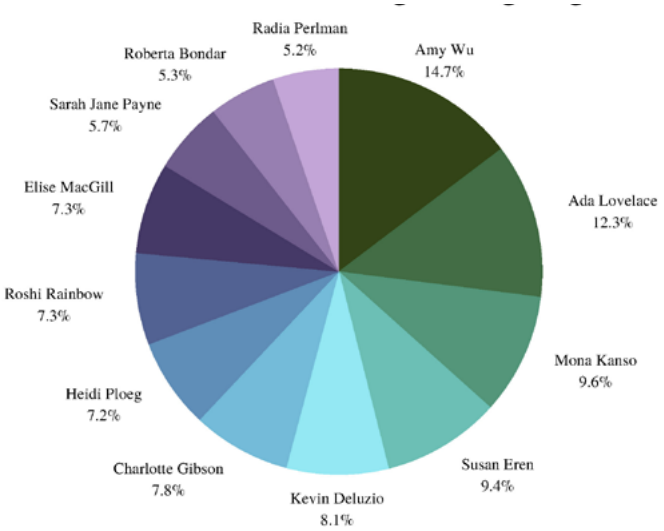


Centre Stage: Page Views

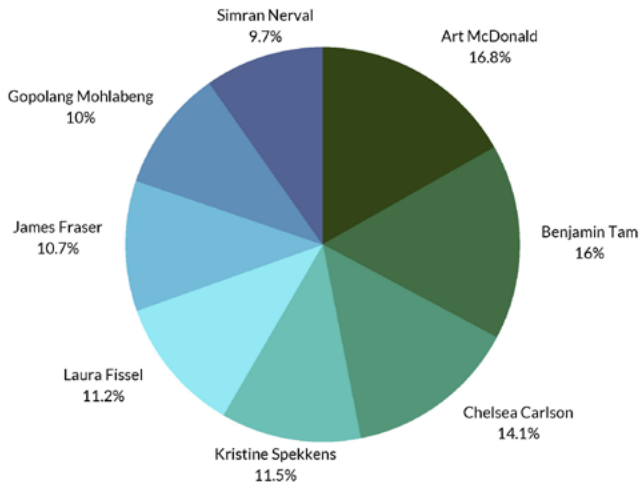


Innovators and Influencers

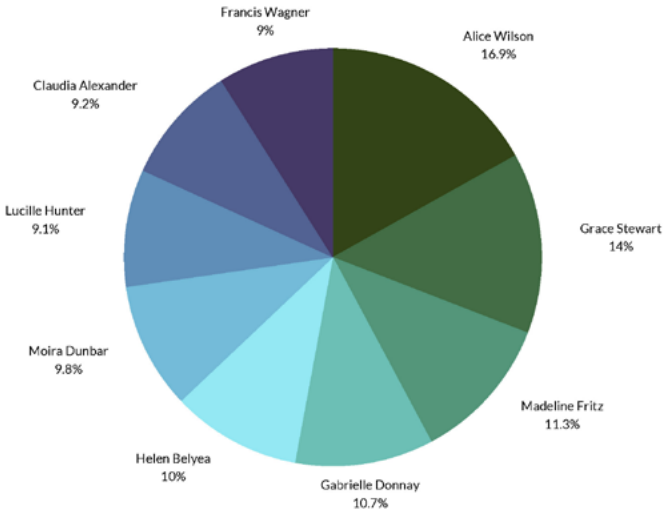
Engineering: Page Views



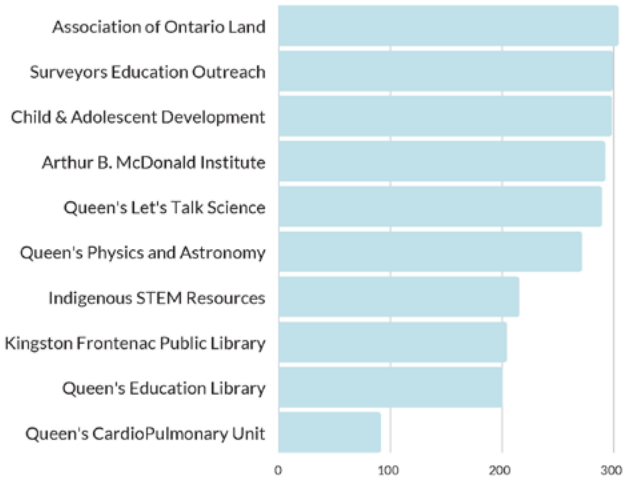
Physics: Page Views



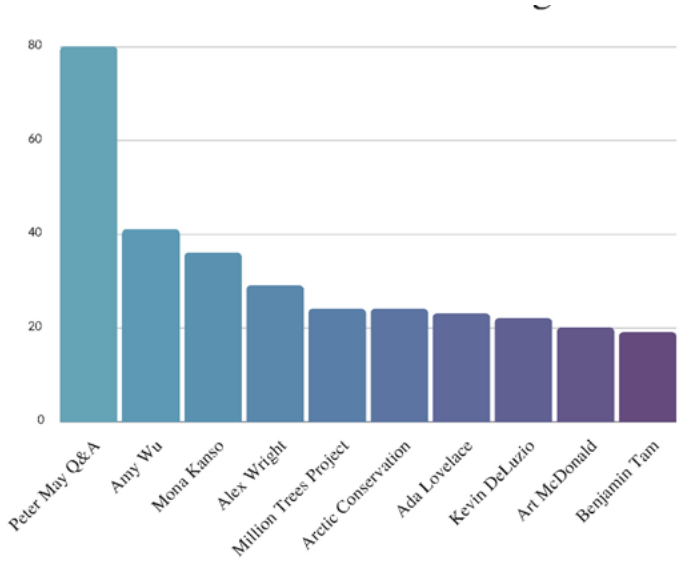
Women in Geology and Paleontology: Page Views



STEM @ Home: Page Views



Most Viewed Videos on Streaming Service



WHAT PEOPLE ARE SAYING

“

I just want to pass along that I am hearing so many great things about Sci Rendezvous! My own students have been invited to use it during inquiry exploration time in our virtual K class, and I think it has really inspired them. As per their request, we are now hosting a class science fair next month. I have never had a science fair in kindergarten, much less a virtual one! One Year 2 Kindergarten student, Emerson, made a poster that says "I am a scientist" which he hung on his wall in his at-home classroom. I, and our parents, are so happy to see these young children from all walks of life embracing science and engineering. Just wanted to let you know the wonderful impact that this event is having!!!

The sessions provided during Queen's Science Rendezvous were amazing! The presenters did an excellent job of connecting with young people - even in a virtual environment!. My students were engaged and were talking about the information in the sessions long after they were over. Thank you, Science Rendezvous Kingston, for providing us this opportunity. We can't wait until next year. (Jenn Frank, Thousand Islands ES Lansdowne, Ontario)

"It was great to be able to use the event to showcase some of our research and to see the engagement of the local community and the caliber of questions that were posed." John Smol

The Developmental Psychology team in the Department of Psychology has been involved in Science Rendezvous Kingston for over 10 years. It's easily one of the highlights of our year. The event, whether online or in-person, is our best opportunity for science outreach to the Kingston community, a community that makes our research at Queen's possible through generous participation in our studies.

At Science Rendezvous, we interact with children of all ages around the theme 'Think Like a Scientist', introducing the scientific method in fun and engaging ways. Of course, we emphasize the science of Psychology in particular, which can sometimes be overshadowed by the other STEM disciplines, yet may appeal to burgeoning young scientists who do not gravitate toward technology and engineering.

As a mentor, I should note that Science Rendezvous has provided a unique opportunity for professional development of our Queen's undergraduate and graduate students. Science communication skills are of increasing demand in research careers. Each year, our students enhance their written and oral communication skills and learn new data visualization and graphics/illustration techniques. This year, for example, one of our graduate students who is preparing for a career in scientific illustration was able to both learn a new software platform and build her portfolio with designs from our virtual activities.

We hope to take part in Science Rendezvous for many years to come. It's an event that makes our team proud to be a member of the Queen's community. (Professor Valerie Kuhlmeier)

See you next year!

May 7 to 22, 2022

STEM YGK

SCIENCE ODYSSEY PRESENTS
SCIENCE RENDEZVOUS KINGSTON