

2020 Annual Report



ENGAGING COMMUNITIES SINCE 1967

Highlights of 2020

The highlights of 2020 are yet to come! This past year has shown us that people worldwide are resilient, driven and hopeful. Even though the Earth Sciences Museum has had closed doors since March 12th there has been a flurry of activity behind the scenes from cooperative students, volunteers, supporters, and student groups, working to move much of our content online and out towards our visitors. The highlights yet to come include:

- Discussions about our current mission and vision statements. This year the advisory board has spent a significant amount of time discussing the museum and are revisiting the mission and vision statements, so we are current and relevant to today's museum community.
- An online collection database. This database has been in the works for a number of years but the need for all museum content to move online has pushed it into serious action. Extra cooperative students, volunteers and the Science IST department are all working hard to create a website and database of the museum collection so that the public can engage with our much-loved rock, mineral, fossil, meteorite specimens and artifacts.
- The help of 3 Waterloo Knowledge Integration student groups working on 1) A virtual museum tour 2) The Laboratory of Life Exhibit which is one part of the Reimer Family Gallery and 3) The ORF Youth Outreach - Mine Cycle Travelling Exhibit. These student groups are completing an 8-month, 4th year course while helping to create exhibits and a virtual tour. Their collaborative thinking and experience outside of the museum and Earth Sciences is providing much appreciated perspectives that will improve the overall delivery.
- Revisiting our roots! 27 years ago, "Wally & Deanna's Groundwater Adventure to the Saturated Zone" was written by Peter Russell and Leanne Appleby. This year that book has gone international! The book is being translated into many different languages and all versions of the book are now available online to download through our website as well as the Groundwater Project website. Peter and I are also creating voice recordings of the book series which are available on our website.
- Continuing to educate myself on good museum practices. I have been able to continue to educate myself on the operations, policies and procedures of a museum. In 2019, "Artifacts", "Collections Management" and "Education Programming" were completed. This year completed courses include, "Care of Collections", "Museums in the Community", "Museums in Context", and by the end of December "Exhibit Planning & Design". By the end of 2021 I will be finished eight courses out of nine for a Certificate in Museum Studies.

Museum Acquisitions

With the generosity of supporters and mineral and fossil enthusiasts, the Museum gained 17 new acquisitions this year. Some minerals to note include a fossil belemnites of Jurassic age from Holzmaden, Germany, a beautifully large specimen of Stibnite from Jiangxi, China and a large Halite specimen from Rocanville Saskatchewan.

Education

Education and engagement were hard hit this year. Last year the museum engaged almost 50,000 people. This year the museum almost hit 4000. This demonstrates how important our physical space and outreach events are to engagement and overall museum reach.

As an institution that focuses primarily on tactile, hands-on programs, the museum was not prepared, and did not have the staff or resources to move content online rapidly.

Volunteers

Without our dedicated staff and volunteers the Earth Sciences Museum would not be operational. Although the pandemic significantly reduced staff and volunteer numbers it did not eliminate their activity. 2020 brought in 5 full and part-time staff as well as 35 volunteers from our community (both KW and UW communities). Our staff and volunteers are the ones who provide and maintain the frame for this Museum. Thank you so much for supporting the Earth Sciences Museum.

Overall, 2020 was hard but we are still here and kicking! Let's look forward to more change, for the better, in 2021.

Sincerely,

Corina McDonald
Earth Sciences Museum Curator
cmmcdona@uwaterloo.ca

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Museum Overview

Vision Statement

Bringing the science of planet Earth into the lives and careers of all by sharing knowledge and raising awareness of the Earth, its history, its resources, and the environmental issues facing society.

Mission Statement

The museum, through its collections, displays and programs, aims to foster a broad and diverse appreciation for all features and processes of planet Earth for all ages both within and outside the university community.

History

The Earth Sciences Museum started as a Centennial Project in 1967 together with what was called the Earth Sciences-Biology Museum. By the mid-1990s, the biology part of the museum ceased its activities, which left only the Earth sciences part of the museum, henceforth being referred to as the Earth Sciences Museum. The Earth Sciences Museum moved from its original location in the Biology 1 Building and was relocated in 2002 to its present position in the new EIT (Centre for

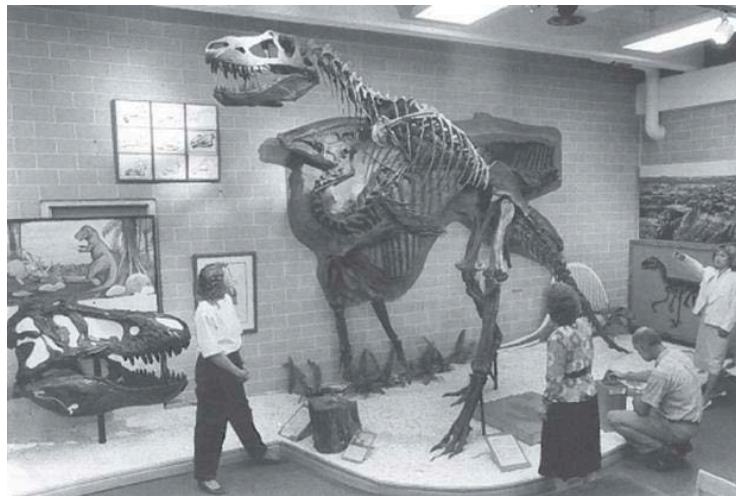


Photo: 1982 Earth Sciences Museum in Biology 1, Room 370

Environmental and Informational Technology) Building. The Peter Russell Rock Garden was added in 1982 to commemorate the 25th anniversary of the University of Waterloo and as an outdoor extension to the indoor collections in the Museum. Over the years, the Earth Sciences Museum continued to expand its collections that are primarily on display for educational purposes and for the general public.

Role in Science

The Earth Sciences Museum is the longest standing science outreach initiative at the University of Waterloo. Over the last 53 years the museum has grown in relevance, educational importance, reputation and its capacity to engage and educate our local and greater community.

The operation of the Earth Sciences Museum is aligned with the University of Waterloo's mission statement. It also aims to achieve many of the current goals and objectives set by the University and the Faculty of Science 5-year Strategic Plan:

- To advance learning and knowledge through teaching, research, and scholarship, nationally and internationally, in an environment of free expression and inquiry (UW's mission)
- Intentionally develop programming to inspire collaboration for shared research, teaching, learning and community building opportunities among our students, faculty, staff and alumni. (one of UW's objectives under the third themed area)
- Broaden our understanding and engagement of communities on our campuses and with our alumni, external partners, regional, national and international communities. (one of UW's objectives under the third themed area)
- Educate global citizens for the future of work and learning to thrive in an age of rapid change by putting learners at the center of everything we do. (one of UW's goals under the third themed area)
- Find new ways to work together and remove barriers to collaboration, interdisciplinarity and the integration of knowledge. (one of UW's objectives under the third themed area)
- Increase visibility for our academic programs in order to attract the highest quality students by increasing involvement of faculty and students in on and off campus academic events and outreach activities, and by strengthening ties to high schools to support undergraduate recruitment (Science Strategic Goal 6: Visibility and Reputation)
- To foster meaningful relationships and a strong track record of engagement with alumni, on-campus partners and external stakeholders. (Science Strategic Goal 7: Community and Engagement and UW's Primary goal)

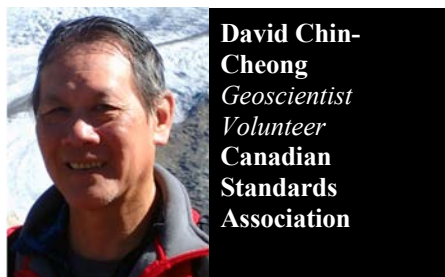
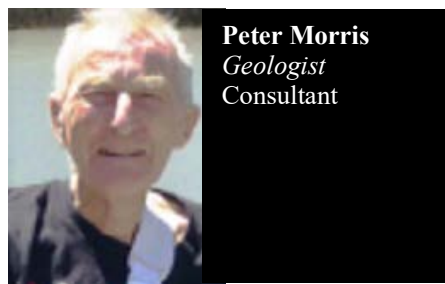
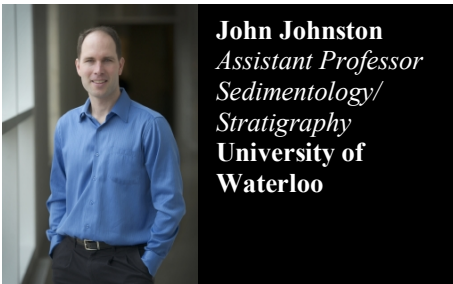
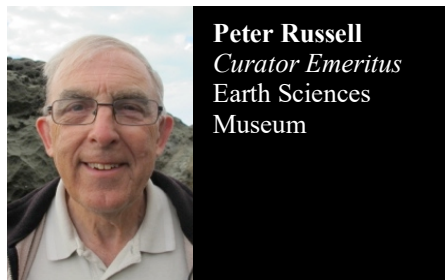
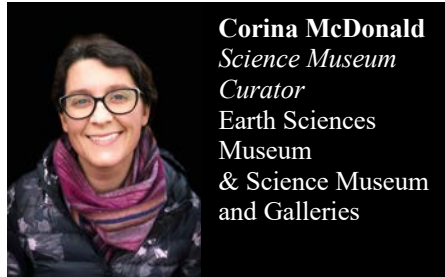
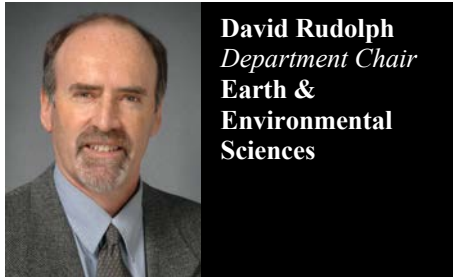
Authority

The Earth Sciences Museum is a component of the Department of Earth and Environmental Sciences within the Faculty of Science and the University of Waterloo. It operates as a unit reporting directly to the Department of Earth and Environmental Sciences and the Faculty of Science. The Earth Sciences Museum has an advisory board whose primary role is to give advice and assistance to ensure programs, exhibits, policies and research remain relevant and effective. The Department of Earth and Environmental Sciences employs a curator to manage the operation and day-to-day maintenance of the museum. The Chair of the Department of Earth and Environmental Sciences attends the museum's advisory board. Both the department chair and the museum coordinator are responsible for communications between the museum's advisory board and the Department of Earth and Environmental Sciences. The curator organizes and maintains relations with subcommittees, volunteers and paid staff of the Earth Sciences Museum.

Advisory Body

The Earth Sciences Museum advisory board is composed of persons who are associated with or have expertise in various disciplines of Earth and Environmental sciences or museology. Board members are non-paid and oversee the museum's functions and provide expertise and insight towards the museum's development.

Board Members



Programs and Tours

The museum offers curriculum-based programming to elementary and high school level classes at the museum but also in the classroom. The same programs are accessible to University visiting groups, community organizations and focus groups.

The programs that are offered through the museum are presented below on pages 5 to 8. The documents are posters used to advertise at events.



Photo: Children loving prospecting for gold.



Photo: Dino days



Photo: Learning about the Great Lakes



Photo: Mastodon marvels



Photo: Applied Geochemistry

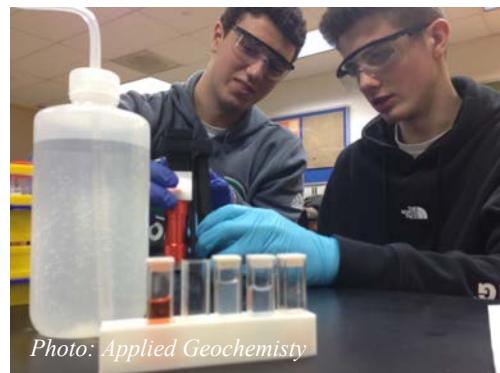


Photo: Applied Geochemistry



EARTH SCIENCES
museum

FREE
PROGRAMS

at the museum



ELEMENTARY SCHOOL PROGRAMS

| PROGRAM | DESCRIPTION | AGE GROUP | TIME (HRS) |
|------------------------------|--|------------------|------------|
| DINOSAURS AND FOSSILS | Learn about dinosaurs! Meet Albertosaurus, Parasaurolophus, Tyrannosaurus and the rest of their friends. You will see full sized skeletons and be able to touch real dinosaur fossils. | JK/SK and up | 1.5 |
| ROCKS AND MINERALS | Learn about minerals, rocks, and erosion. Includes touchable specimens and hands on activities. This program includes the exploration of our mine tunnel (where you get to dress up like a miner) and your choice of digging for fossil fish or panning for real gold. | Grade 4 and up | 2 |
| NATURAL DISASTERS | From volcanoes and earthquakes, through tornadoes, hurricanes, massive rainfall and drought. You can construct your own building and we will simulate an earthquake. | Grade 5/6 and up | 1.5 |
| WATER CONSERVATION | Follow Wally & Deanna and our instructor on an adventure to explore how we use, obtain, and conserve water. Compare a persons water use to how much fresh water is in the Great Lakes and on our Earth. Students will finish up by trying to tell the difference between bottled, tap and glacial water. | Grade 2 to 5 | 1.5 |

For more information, questions, or to book a school/group tour, contact us:

uwaterloo.ca/earth-sciences-museum

Phone: 519-888-4567, ext. 32469 Email: earthmuseum@uwaterloo.ca

Centre for Environmental and Information Technology (EIT)
200 University Avenue West, Waterloo, ON, Canada, N2L 3G1





SECONDARY SCHOOL PROGRAMS

| PROGRAM | DESCRIPTION | CURRICULUM CONNECTION | TIME (HRS) |
|--|--|--|------------|
| CANADIAN ENERGY RESOURCES | This action packed game first teaches students about Canadian energy: type, use, and transportation. The students then take charge and try to balance their provinces or territories needs with energy supply and demand. You will want to play this more than once! | CGC1D CGC1P SNC1D SNC1P | 1 |
| WATER RESOURCE SUSTAINABILITY | Students will learn about ground water/surface water interactions using a variety of learning tools, including a 3D sandbox, a groundwater model, and a Great Lakes Activity. Students will see and discuss the positive and negative impacts humans have on watersheds. | CGC1D CGC1P SNC1D SNC1P SVN3M SVN3E | 2 |
| FORCES OF NATURE | Earthquakes, volcanoes, and tsunamis! Students will learn about these dynamic processes and how they can impact nearby human populations and physical structures. | CGC1D CGC1P CGF3M SES4U SPH3U | 2 |
| GEOCHEMISTRY IN WATER RESOURCES | Waterloo Region is the largest community in Canada that relies on groundwater for drinking water. Explore where the water is stored in nature and how to protect and conserve this resource both chemically and physically. Students will test local water samples using lab equipment to determine the water quality. | SCH3U SCH4C SVN3M SVN3E SES4U | 2 |
| ROCKS, MINERALS AND MICROSCOPES | A hands-on, wide-eyed examination of where our Canadian rock and mineral resources come from, how we know what they are worth, and what products they are in. Students will investigate the properties and characteristics of rocks and minerals first hand through the microscope activity. | SES4U | 2 |
| GEOLOGY OF ONTARIO | Touring the replica mine tunnel and the Peter Russell Rock Garden, learn about the Geology of Ontario, the variety of minerals that are found in this province, and the history of mining and how it has shaped the communities in northern Ontario. | SES4U | 2 |

When you book a tour to the Earth Sciences Museum, consider extending the University of Waterloo experience by adding one of the following options:

- › General Earth Sciences Museum tour (1 hour)
- › Campus tour (2 hour)
- › Faculty of Science tour (1 hour)
- › Observe a first year lecture (1 hour)
- › Peter Russell Rock Garden lunch with scavenger hunt (45 minutes)

Please note: All program times are suggested but can be flexible depending on your schedule

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EARTH SCIENCES
museum

FREE
PROGRAMS

bring us
into your classroom

If you are unable to come to the museum for a tour, let us come to you! The following tables summarize the workshops we are able to bring into your classroom.



ELEMENTARY SCHOOL PROGRAMS

| PROGRAM | DESCRIPTION | AGE GROUP | TIME (HRS) |
|-----------------------|---|----------------|------------|
| DINOSAURS AND FOSSILS | Let's learn about dinosaurs! Meet Brachiosaurus, Parasaurolophus, Tyrannosaurus and the rest of their friends. You will be able to touch real dinosaur fossils and feed a baby Triceratops! | JK/SK and up | 1.5 |
| ROCKS AND MINERALS | Learn about minerals, rocks, and erosion. Includes touchable specimens and hands on activities. This program includes an activity of your choice: digging for fossil fish or panning for real gold. | Grade 4 and up | 1.5 |
| NATURAL DISASTERS | From volcanoes and earthquakes, through tornadoes, hurricanes, massive rainfall and drought. You can construct your own building and we will simulate an earthquake. | Grade 5/6 | 1.5 |

Book online today, or email us at earthmuseum@uwaterloo.ca

uwaterloo.ca/earth-sciences-museum





SECONDARY SCHOOL PROGRAMS

| PROGRAM | DESCRIPTION | CURRICULUM CONNECTION | TIME (HRS) |
|---------------------------------|--|--|------------|
| CANADIAN ENERGY RESOURCES | This action packed game first teaches students about Canadian energy: type, use, and transportation. The students then take charge and try to balance their provinces or territories needs with energy supply and demand. You will want to play this more than once! | CGC1D CGC1P SNC1D SNC1P | 1 |
| WATER RESOURCE SUSTAINABILITY | Students will learn about ground water/surface water interactions using a variety of learning tools, including a 3D sandbox, a groundwater model, and a Great Lakes Activity. Students will see and discuss the positive and negative impacts humans have on watersheds. | CGC1D CGC1P SNC1D SNC1P SVN3M SVN3E | 1 |
| FORCES OF NATURE | Earthquakes, volcanoes, and tsunamis! Students will learn about these dynamic processes and how they can impact nearby human populations and physical structures. | CGC1D CGC1P CGF3M SES4U SPH3U | 1 |
| GEOCHEMISTRY IN WATER RESOURCES | Waterloo Region is the largest community in Canada that relies on groundwater for drinking water. Explore where the water is stored in nature and how to protect and conserve this resource both chemically and physically. Students will test local water samples using lab equipment to determine the water quality. | SCH3U SCH4C SVN3M SVN3E SES4U | 1 |




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Year in Review

Outreach

| Date | Event |
|-------------------|--|
| January 15 | Campus Life Fair |
| February 8 | Waterloo Royal Canadian Institute for Science |
| March 4 - 5 | PDAC - Mining Matters |
| April 6 - 7 | Brantford Gem & Mineral Show |
| April 29 - May 2 | Whitefish First Nations |
| May 4 | KW Gem and Mineral Show |
| May 5 | Jane's walk-rock around Kitchener |
| May 24 - 30 | Waterloo Wellington Children's Groundwater Festival |
| May 31 | Curiosity Fair |
| July 19 - 21 | Sudbury Gem and Mineral Show |
| September 15 | Geology talk |
| September 18 | Campus Life Fair |
| September 21 - 22 | Scarborough Gem Show |
| October 4 - 6 | Ancaster Gem Show |
| October 9 - 12 | Detroit Gem Show |
| October 25 - 26 | Waterloo Gem and Mineral Show and Science Open House |
| November 16 - 17 | London Gem Show |
| December 1 | PhysiXX - Girls Matter |

Event Descriptions

Campus Life Fair

Each semester the University Student Life Center holds a fair in the SLC building to introduce students to various groups, organizations and clubs which they can participate in throughout their career as a university student. The Earth Sciences Museum holds a booth there a few times a year to encourage students to get involved and volunteer.

Waterloo Royal Canadian Institute for Science

The museum was invited to give a talk to families at the Waterloo Public Library on February 8th. The one-time event was well attended by 84 children and their parents. The Curator gave a talk about Snowflakes and provided a snowflake activity at the end.

PDAC - Mining Matters

The Prospectors & Developers Association of Canada (PDAC) represents the interests of the Canadian mineral exploration and development industry. Each year the PDAC conference, held in Toronto, brings in over 25,000 attendees. Mining Matters is a national branch of PDAC that broadens students understanding of Earth science and the vital role rocks, minerals and metals play in everyday life. It also exposes students to career opportunities in the minerals industry.

Museum staff participate with Mining Matters in teaching over 100 Greater Toronto Area elementary children about rocks and minerals and rock core investigation at the annual conference in Toronto. The museum also has a presence at the Earth & Environmental Sciences booth and reception where many UW alumni visit and reminisce.

Exhibits and Projects

| <i>Start Date</i> | <i>Estimated Completion Date</i> | <i>Completion Date</i> | <i>Project</i> |
|--------------------------|---|-------------------------------|---|
| May 2012 | Apr. 2013 | May 2013 | Interactive Groundwater Driven Mineralization Exhibit |
| Nov. 2012 | Apr. 30 th , 2013 | May 2013 | Mistaken Point Cast Exhibit |
| Nov. 2012 | May 2014 | Oct. 2014 | GGR Outreach Project |
| June 2013 | Jan. 2014 | Apr. 2014 | Copper Display Project |
| Jan. 2013 | Mar. 2014 | Sept. 2014 | Augmented Reality Mastodon Exhibit |
| Mar. 2013 | Feb. 2015 | Nov. 2015 | Petrified Wood Exhibit |
| Dec. 2014 | Feb. 2015 | Feb. 2015 | We Use That Much – Display Revision |
| Dec. 2014 | Feb. 2015 | Sept. 2015 | Great Lakes Travel Display |
| Jan. 2015 | May 2015 | July 2015 | Jade Display Update |
| May 2015 | Oct. 2015 | Dec. 2015 | Refurbished display cases |
| Mar. 2015 | Oct. 2015 | July 2016 | New Velociraptor |
| June 2016 | Dec. 2016 | Sept. 2016 | Rapid Fossilization – Santana Display |
| June 2015 | Jan. 2016 | Sept. 2016 | Eocene Display |
| Jan. 2015 | Jan. 2018 | Aug. 2018 | Beyond Walls Exhibits |
| Dec. 2016 | Dec. 2017 | Dec. 2018 | Projector Installation Project |
| Apr. 2017 | May 2018 | May 2018 | UW Blueprint – WWCGF App Project |
| June 2017 | May 2018 | May 2018 | Digital Watershed Sandbox – Reconstruction Exhibit |
| Oct. 2017 | Jan. 2018 | Apr. 2018 | Porosity & Permeability Display Project |
| Mar. 2018 | Oct. 2018 | Nov. 2018 | Mastodon App Online project |
| June 2018 | Sept. 2018 | Sept. 2018 | Women in Geology poster project |
| July 2018 | Oct. 2018 | Oct. 2018 | Revised Victoria Park/Petrified Wood project |
| Jan. 2018 | Jan. 2020 | May 2019 | Museum Security project |
| Nov. 2017 | Postponed to 2022 | TBD | Peter Rocks – Around the Museum Project |
| Nov. 2017 | Postponed to 2022 | TBD | Volcano! Exhibit |
| Aug. 2013 | Postponed to 2022 | TBD | Interactive Mine Tunnel Exhibit |
| Oct. 2018 | Postponed to 2022 | TBD | Peter Russell Rock Garden Signage Update project |

| | | | |
|------------|------------|---------|--------------------------------------|
| Sept. 2015 | Ongoing | Ongoing | Photographing the Collection Project |
| Jan. 2018 | Ongoing | Ongoing | Online Collection Database project |
| Sept. 2018 | Ongoing | Ongoing | Strategic Planning project |
| Mar. 2013 | June 2021 | TBD | Gold Scale exhibit - Revised |
| May 2014 | May 2022 | TBD | Laboratory of Life Exhibit * |
| Aug. 2017 | May 2022 | TBD | Reimer Family Gallery * |
| Apr. 2017 | Apr. 2022 | TBD | School Program Assessment Project |
| Sept. 2017 | Sept. 2023 | TBD | GGR Outreach – Travelling Exhibit * |
| Apr. 2018 | Feb. 2021 | TBD | Tyrannosaurus Rex exhibit - Revised |
| Apr. 2019 | Apr. 2022 | TBD | Epirock Drill Bit Exhibit |

Complete Exhibits and Projects

Ongoing Exhibit Descriptions:

Gold Scale Revival



Sometimes it is less expensive to get two things done at the same time. Because a glass case is being installed around our revised T-rex skeleton, it will be less costly to get a glass case installed around the gold scale at the same time. The gold scale has been on display for decades but has not been on display with all of its parts. This is due to the fact that the parts could easily walk away. With the glass case installed the gold scale will now be able to show off the scales, its weights and a few ‘gold bars’.

Laboratory of Life Exhibit



A part of the Reimer Family Gallery project (below) - this exhibit will move through early life on the Planet with a focus on Burgess Shale type deposits in Canada and worldwide. Elements will include; 3 touch screen displays representing early life pre 508 MY, the earths tectonic plates and what they looked like between 3.8 BY and 508 MY ago and then information about Burgess Shale type fossil

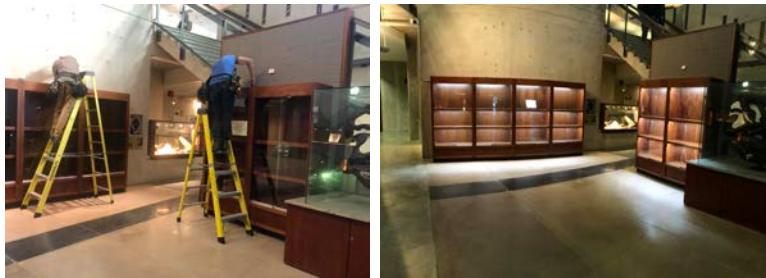
deposits. The exhibit will also house real and 3D printed fossils from the Burgess shale and Marble canyon sites and a piece of the Burgess Shale rock for visitors to touch.

Back in 2014, Manuel Arab, a 4th year Earth and Environmental Sciences student, was able to experience a paleontological dig at the new Burgess Shale site in Kootenay National Park, BC. The dig was led by Royal Ontario Museum curator Dr. Jean-Bernard Caron. The shale is a famous fossil bed known for its preservation of soft bodied animals dating back to the Cambrian Explosion about 505 million years ago. UW alumnus Jim Reimer supported the museum making it possible to send Manuel on this expedition. Jim's support will also contribute to a new permanent display that will showcase the various Burgess Shale sites, fossil specimens and field techniques.

Manuel Arab's field expedition at the Burgess Shale was documented in the UW Bulletin on December 12th, 2014. The article is titled "*Field experience unearthed life-long passion*" and can be found at www.bulletin.uwaterloo.ca in the Dec. 12th archives.

Reimer Family Gallery

The Reimer Family has been a major donor to the Earth Sciences Museum over the years, with contributions of support, mineral specimens and display units. The gallery space will involve 4 wall



spaces in the museum; Wall 1 will focus on groundwater mineralization, Wall 2 will be a complete exhibit on the Laboratory of Life (see above), Wall 3 will focus on fossilized plants and Wall 4 will display minerals collected by Jim and his father. This past year saw the installation of new mineral display units for the gallery space. This year and the next will be focused on the design and installation of signage to accompany the display units as well as the Laboratory of Life exhibit.

GGR Outreach – Travelling Exhibit

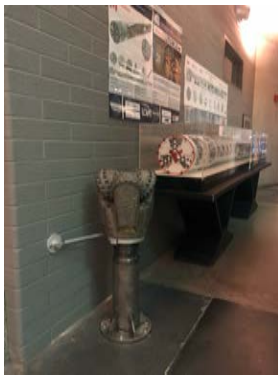
The Groundwater Geochemistry and Remediation (GGR) group applied for an Ontario Research Fund in 2017. As a portion of the grant 1% of the total funds were to be directed towards Outreach. The Museum was approached to fulfill that Outreach and provided an Outreach plan for the submitted proposal. The plan outlines the collaborative creation of a travelling exhibit between Carleton University, Mining Matters and the Earth Sciences Museum. The GGR group received the grant and the museum was notified this past year. Over the next year all participants will define the project goals and assign tasks.

Tyrannosaurus Rex Exhibit – Revised



In response to the Reimer family gallery and the changes happening to the 1st floor atrium the location of the Tyrannosaurus Rex skull will move from the 1st floor to the 2nd floor. To enhance this new location paleo-artist Mark Rehkopf created three T-rex images; one of a T-rex skeleton, one of a T-rex dinosaur with skin and one of a T-rex dinosaur with skin and feathers. The three images have been used to create a lenticular image (transition image) behind the T-rex skull. This coming year will see this exhibit installed with glass surrounding the image as well as the skull.

Epirock Drill Bit



This 300 lb drill bit was donated by Epirock. The donation process was started from a Geological Engineering student who wanted to see more information about geological engineering in the Earth Sciences Museum so that other students and visitors could be inspired to learn more about the field. This is the first installation on the wall that will become our geological engineering wall. Information about the drill bit itself and geological practices will follow.

Ongoing Project Descriptions:

Photographing the Collection

What started as a small project to document current incoming specimens has turned into a project that has encompassed the entire Museum collection. Back in 2015 Peter and Gary were asked to take photos of many of the specimens to add and update the collection database. In 2016 Karen Fox was engaged to take photos of the Museums specimens. She takes wonderful photos and has continued to help catalogue our collection this coming year.

School Program Assessment

Programs offered in 2017 were assessed by popularity to determine where our human resources should be directed. The museum retired a few of our high school programs due to low enrollment and created 3 new high school level programs with the help of teacher interns and Waterloo Region District School Board staff. These programs target Grade 9 Geography, Grade 11 Geography and Grade 11 or 12 Chemistry courses. The reasoning behind this is out of the 22 public and catholic high schools in the KW Region only 3 of them offer an Earth & Space Science course and most focus on Space with the excitement of Chris Hadfield in Canadian media. To bring Earth Science education into

the lives of high school aged students the Museum aims to demonstrate how Earth Sciences integrates with Geography and Chemistry studies.

The new Grade 9 Geography program is called Water Resources and focuses on case studies of water movement through the Water Cycle and how humans affect and manage water as a public resource. The new Grade 11 Geography program is called Natural Disasters and focuses on Earthquakes, Landslides and Volcano's. The new Grade 11/12 Chemistry program is called Geochemistry - Tracing Pollution in our Water focuses on how we use geochemistry to track pollution in surface and groundwater systems.

So far, the Geochemistry program has increased in popularity, Natural Disasters has not had a single request and the Water Resources program started with good numbers and then fizzled. The museum will continue to advertise and monitor these programs.

Online Collection Database

While photographing the collection in 2015, museum volunteers started to notice that some of the specimens on display were not catalogued and so we started to update the existing excel database. In Jan. 2018 Science IST was contacted to determine if they could create an online database for the Earth Sciences Museum with hopes it could then be applied to the rest of science later. Since then, museum staff and volunteers have been working with Science and Environment IST to create an online collection database.

With the onset of the pandemic and a significantly changed perception of how we communicate online, digital outreach has become a foundational component that is needed to engage the public.

A digital collection database and public digital collection database website (see the examples linked below for concept) for the museums in Science will provide the following benefits to the University community, Faculty of Science, and museum visitors:

1. **Clarify the size and content** of the approximately ~15,000-specimen collection across Science.
2. **Improve the organization, knowledge, understanding, and scope of specimens**, and the need to **preserve or remove** (safety, redundancy, lack of info) specimens held in storage throughout the Science Faculty (ESM, SMG and MVS).
3. Provide **public visibility and accessibility** to the Faculty's collections (many of which are donations from faculty supporters) to enable wider public appreciation of the quality and significance of collection specimens.
4. Enable wider public recognition of donor support and **encourage philanthropic interest** and potential support for the collections and/or science outreach.
5. Be a **resource for educators** at UW, other post-secondary institutions, museums, and public and private school systems locally and globally.
6. Encourage university faculty and student **research** on the specimens in the collections.
7. Bring clarity on size and value of collections for **security, insurance, and liability** purposes.
8. Improve **museum standards requirements** for the Community Museum Operating Grant and fulfil Ontario Museum Association, Collection Standards and Conservation Standards requirements.

Examples we are working to mimic to some extent:

https://search.museums.ualberta.ca/search?initial_submit=true&search=Search&type_view=items&items_view=list&item_groups_view=list In particular, the “Filter Your Results” options on the left are very useful. Our specimens all have photographs.

<https://bridge.botany.ubc.ca/herbarium/index.php>

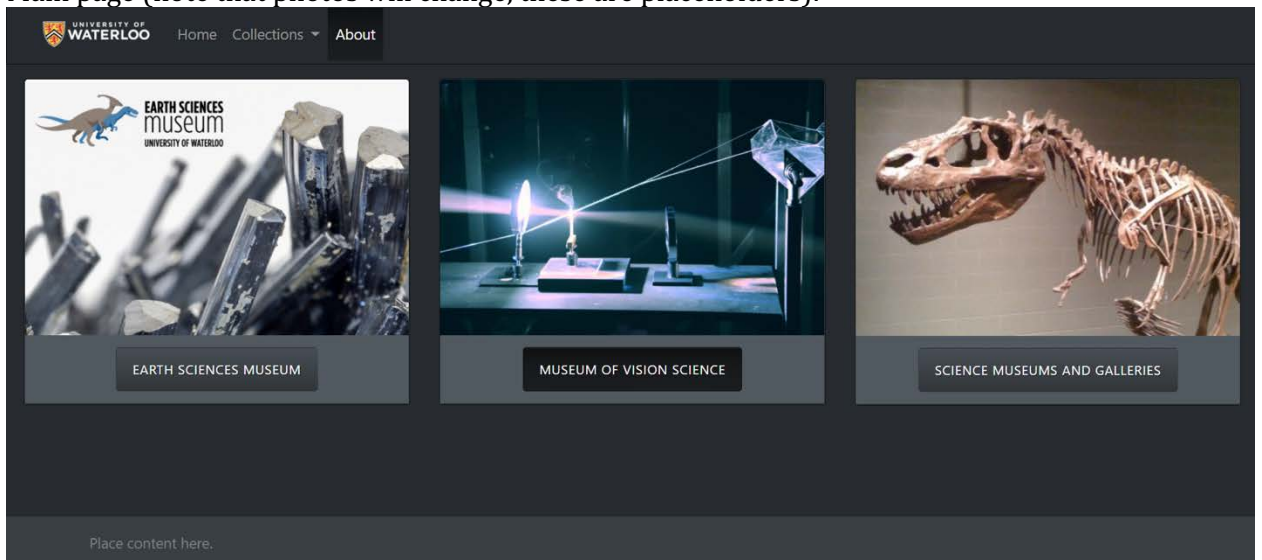
Progress so far:

Nice front for the website (see images below), platform in place to show various info depending on filters chosen, needs to be linked to/populated with info from the database catalogue itself (about 10% complete). The extensive database, developed by Science Computing, is Faculty owned and operated and exists within SciBase which is a database used by Science faculty/staff only. We anticipate that **the database platform and the publicly-accessible website will be complete by mid-2021**, but populating the database (cataloguing the specimens in all our collections: ESM, SMG, MVS) is a long-term project. For example, in one term we were able to catalogue 10% of the ESM collections. **One goal for 2021 is to have all ESM specimens that are currently viewable in the museum, publicly available through this online database.**

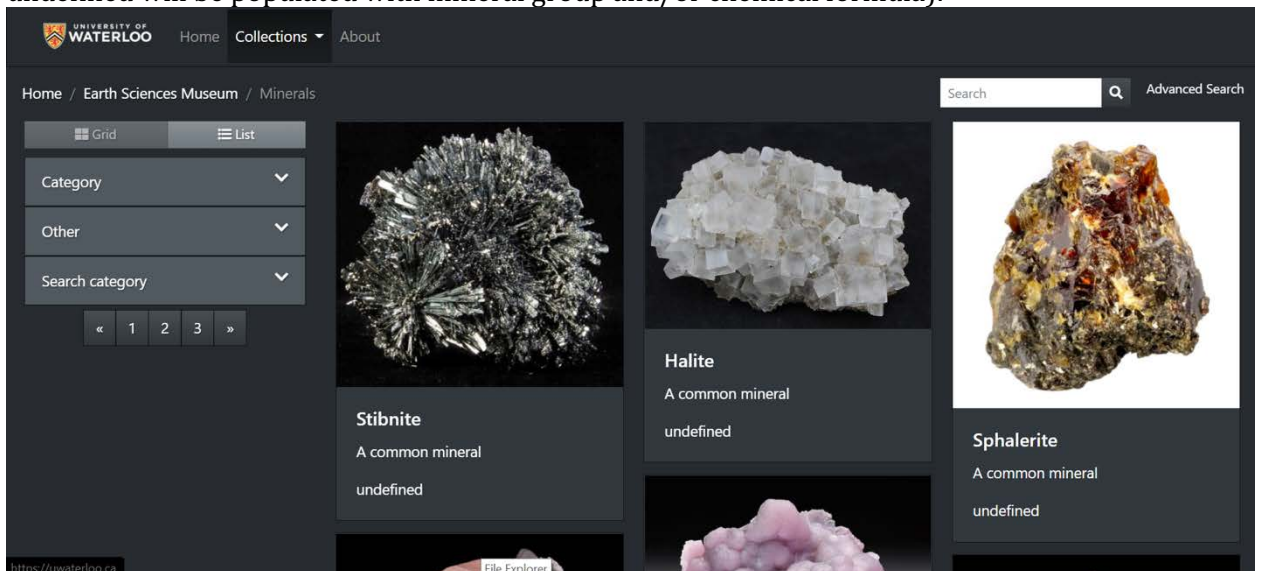
Database (behind the scenes info):

| Polymorphic Ctype | Catalog Number | Listing Image | Number Of Objects | Collection | Sub Collection | Status | Access | Location | Common Name | Keywords | Locality | City Municipality | County State Province Region | Country | Length | Width |
|-------------------|----------------|---------------|-------------------|------------|----------------|------------|--------|-----------------------------|--------------------------------|--|--|-------------------|------------------------------|---------|--------|-------|
| fossil | 019.02.051.01 | | 2 | Permanent | | On display | Public | | fossil fish | | Santana Formation, Romualdo member, Chapada do Araripe | | Ceará | Brazil | 0.0 | 0.0 |
| fossil | 019.02.051.02 | | 2 | Permanent | | On display | Public | 153 Axelrod Fish | fossil fish | | Chapada do Araripe | | Ceará | Brazil | 0.0 | 0.0 |
| fossil | 018.02.002.01 | | 1 | Permanent | B. Pelley | On display | Public | EIT 2809 175 1 Pelley Coll. | fossil shrimp | | | | | | 0.0 | 0.0 |
| fossil | 018.02.014.01 | | 1 | Permanent | B. Pelley | Loaned-out | Public | EIT 2809 175 3 Pelley Coll. | fossil fish | | | | | | 0.0 | 0.0 |
| fossil | 020.02.001.01 | | 1 | Permanent | | On display | Public | EIT 1805 123 1 Dinosaurs | Tyrannosaurus Rex Skull (Cast) | T-rex, dinosaur, skull, Tyrannosaurus, rex, cast | Hell Creek | | Montana | U.S.A. | 0.0 | 0.0 |

Main page (note that photos will change, these are placeholders):



Filtered (left bar) showing specific category (again, text placeholders. For example, undefined will be populated with mineral group and/or chemical formula):



Individual specimen info:

Strategic Planning Committee

In June of 2018 the Community Museum Operating Grant requested that the Earth Sciences Museum provide a strategic plan for the next 3 to 5 years. Considering that the museum had never gone through this process before and after chatting with the Ministries representative the Ministry provided the Earth Museum with more time and simply requested a strategic plan for the next year as the requirement for the Operating Grant given that in 2019 a more detailed strategic plan covering the next 5 years would be presented.

In September the first Strategic Planning committee meeting was held. It was clear that the committee needed to be sure the correct stakeholders were a part of the committee and decided to meet again to determine what was needed to create a strategic plan. The fall became too busy however and a second meeting was not held. Museum staff are hoping to start this process again early January.

In December of 2019 the board met and started this strategic planning exercise by first looking at the University mission statement and then the museums. In January of 2020 the board met again to define the vision and mission of the museum. We will then move forward to define the museums goals for the future. In the meantime, museum staff are working off a temporary strategic plan composed by the curator.

Postponed Exhibits or Projects:

Due to the pandemic and limited access to the museum throughout the year many projects are temporarily postponed until there is more time, resources, staff and funding secured.

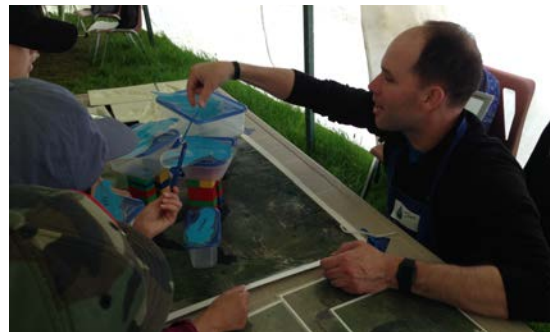
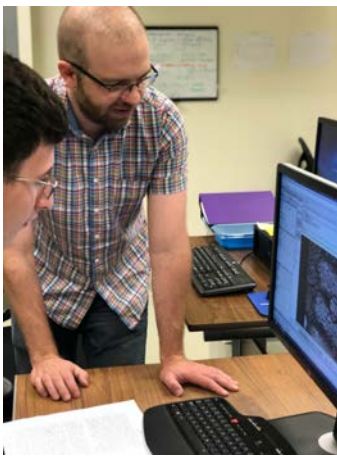
Acquisitions

| Item | Donor | Number of Items |
|---|--|------------------------|
| Vivianite, Bolivia | <i>Purchased by museum</i> | 1 |
| Chalcanthite | <i>Purchased by museum</i> | 1 |
| Ichthyosaur vertebrae | <i>Purchased by museum</i> | 2 |
| Miner's Calcium Carbide tin (empty) | <i>Purchased by museum</i> | 1 |
| Sudbury mining Maclean's magazine posters - 1957 | <i>Purchased by museum</i> | 2 |
| Pentlandite & Chalcopyrite from the Coleman mine in Sudbury | <i>Purchased by museum</i> | 1 |
| Drusy pyrite nodules, Volga River, Russia | <i>Purchased by museum</i> | 3 |
| Pink Amethyst, Argentina | <i>Purchased by museum</i> | 2 |
| Scolecite, Pune India | <i>Donated by Barry Warner</i> | 1 |
| Belemnite, Germany, Jurassic | <i>Donated by Barry Warner</i> | 1 |
| Petrified Wood, Australia | <i>Donated with support by Bill and Dorreen Motz</i> | 1 |
| Stibnite, China | <i>Donated with support by Bill and Dorreen Motz</i> | 1 |

Student, Employee and Volunteer Support

It is always a pleasure being part of the University of Waterloo Earth Sciences Museum but without our dedicated staff and volunteers this Museum would not be operational. 2020 brought in 5 full and part-time staff and interns and 35 volunteers from our community (both KW and UW communities). Our staff and volunteers are the ones who provide and maintain the frame for this Museum. Thank you so much for supporting the Earth Sciences Museum.

Many of the 35 volunteers are students that help out from one day to the next but we also have fantastic support from long-term volunteers who have been helping for years. I would like to take a moment to say how beneficial this long-term support is for the Museum's success. Thank you for sticking with us!!



Volunteer Support

Long-term Project Based Volunteers:

Peter Russell – Curator Emeritus 41 Years, Volunteer 7 Years

Peter can and does indeed help with everything. Recently he has been helping with the collection database and the revision of the Peter Russell Rock Garden signs. Peter volunteers on average 1 day a week – but sometimes more.

John Motz – Volunteer 17 Years

John conducts background research, edits and accuracy checks on any topic that the museum is trying to present publicly. He has created almost every poster that exists in the museum. Currently he is working on updating dated displays in the museum. He volunteers 1 day a week.

Karen Fox – Volunteer 6 Years

Karen has been instrumental in moving the online collection database forward. She is a self-taught mineral/rock/fossil photographer and has captured almost all of the museum's collection. She is currently working on the organization and structure of the online collection database, which is no small feat. Karen volunteers on average 2 days a week.

Janine La Marre and David Chin-Cheong – Volunteer 3 Year

Janine and Dave are a retired couple that volunteer their time for one day a week. They have been helping with the collection database for the past 2 years cataloguing a large number of specimens that are on display in the museum. Their work is helping to update the database.

Student Support

Full-time and Part-time cooperative students:

Photos and their quotes about themselves or working at the museum

Jennifer Rhynas – 4th year Environment, Resources and Sustainability



“I am a student in the School of Environment, Resources and Sustainability program, and I will be starting my fourth year of study in Fall 2020. I have a passion for educating youth about the environment and earth systems, especially through hands-on and experience-based activities.”

Kian Drew – 4th year Earth and Environmental Science – Geology



“I am a fourth-year undergraduate student studying Honours Earth Science, specializing in Geology. The Earth Science Museum is such an incredible place that has taught me many different skills (even through a pandemic). I have a passion for learning about the Earth, rocks, and their histories.”

Shelby Robertson – 3rd year Earth and Environmental Sciences – Ecology



“Hi! I am in my third year of Environmental Science with a specialization in Ecology and I am very excited to spend the semester bringing the Earth Sciences Museum to you online!”

Part-time work-study students:

Jenny Huynh – 4th Year Biomedical Sciences



“I wanted to work with the ESM because I have volunteered with the museum in the past and thoroughly enjoyed it. I also love working with children! Children benefit from the programs we offer, so I want to contribute to the museum and improve it so that we can provide the best experience for all visitors.”

Website

Figure 1 displays data for the Earth Sciences Museum website from 2016 to 2020. This data is collected annually from January 1st to mid-December. There has been a 14.5% increase in Total Page Views and a 19.1% increase in Unique Page Views (people visiting the website for the first time) since mid-December 2019. Social media, Figure 2, has played a role in bringing the museum into the community especially during this year of remote living. Our followers for twitter and Instagram have increased and it has helped to have a regular postings and engaging content each week. We also started to create YouTube videos since the end of October 2020.

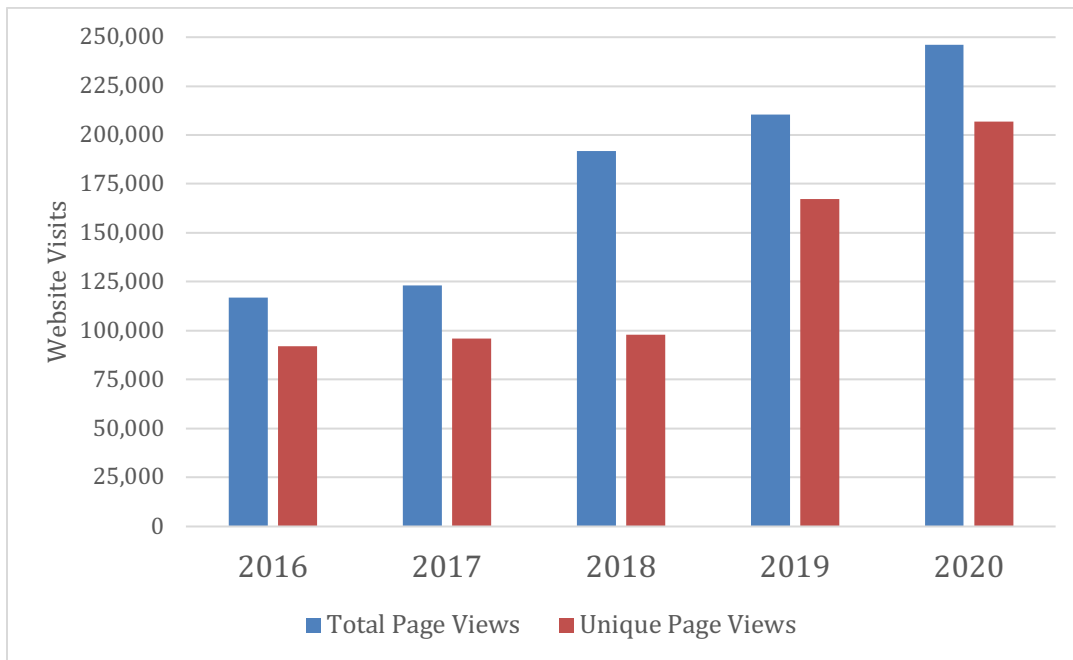


Figure 1 – Annual Earth Sciences Museum website traffic.

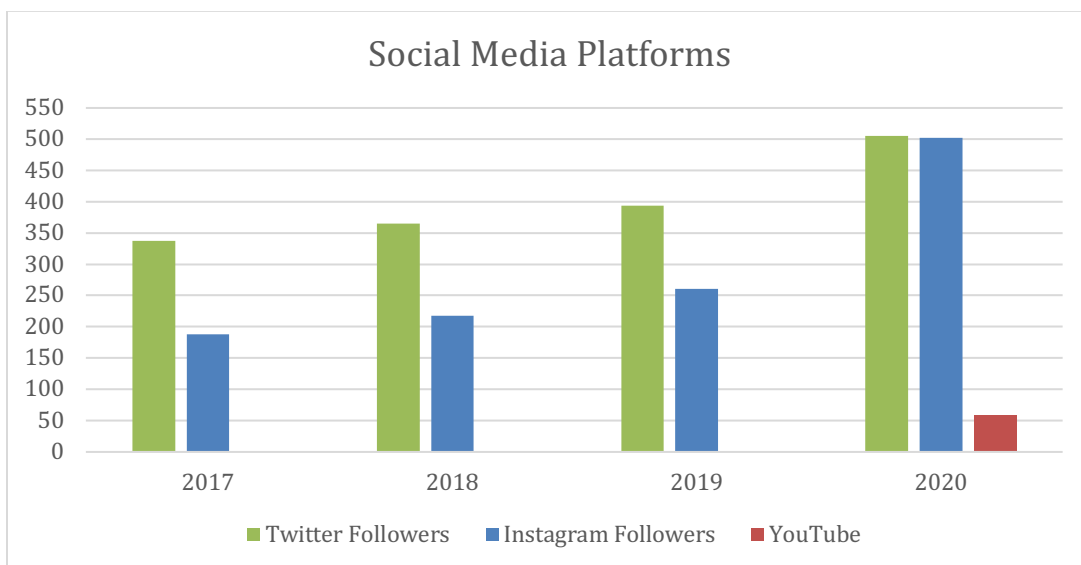


Figure 2 – Annual Earth Sciences Museum social media traffic.

Visitor Data

The Earth Sciences Museum reached around **3863** people this year. This data includes participants of educational programs, outreach events, campus tours and campus events between January 1 and mid-March. Due to provincial school strikes and then the pandemic, total engagement has been severely affected. As an example, classroom and group museum tours had been booked mid-June pre-pandemic with projected numbers of **3074**. This number mimics 2019 data. The museum was also committed to attending 13 scheduled outreach events and 7 museum events which typically engages with over **40,000** people.

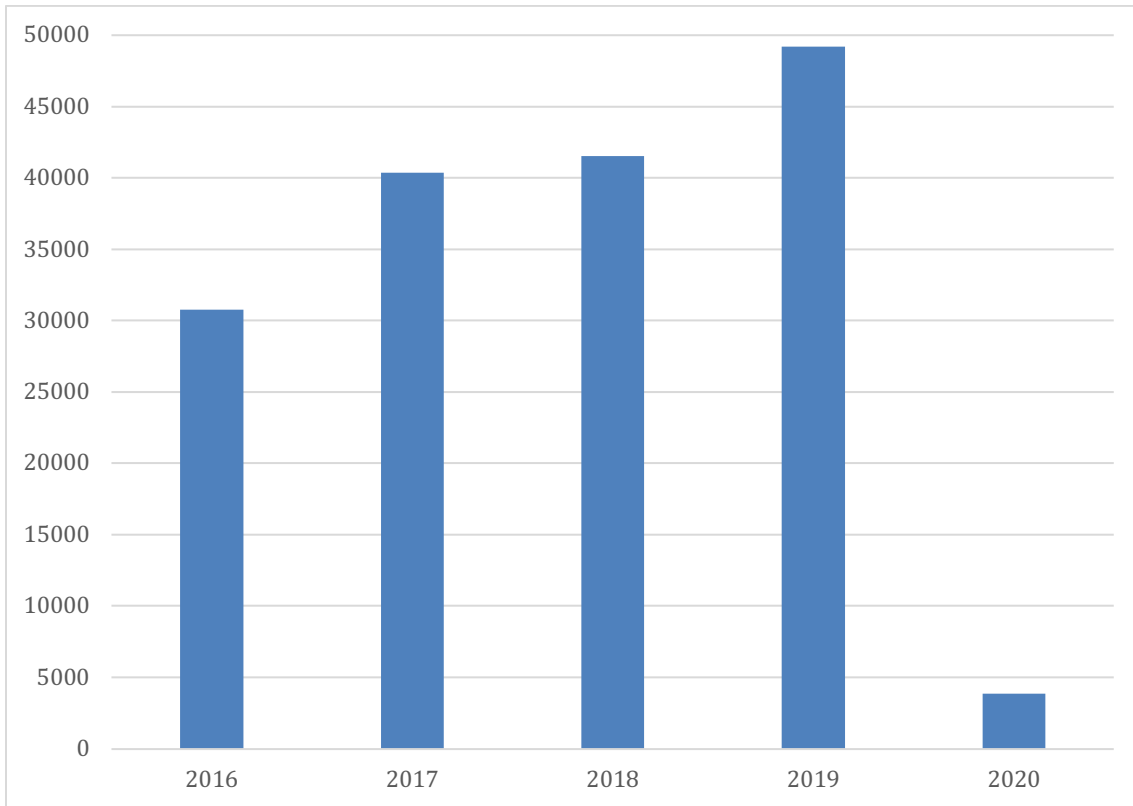


Figure 3 – Total Annual Engagement

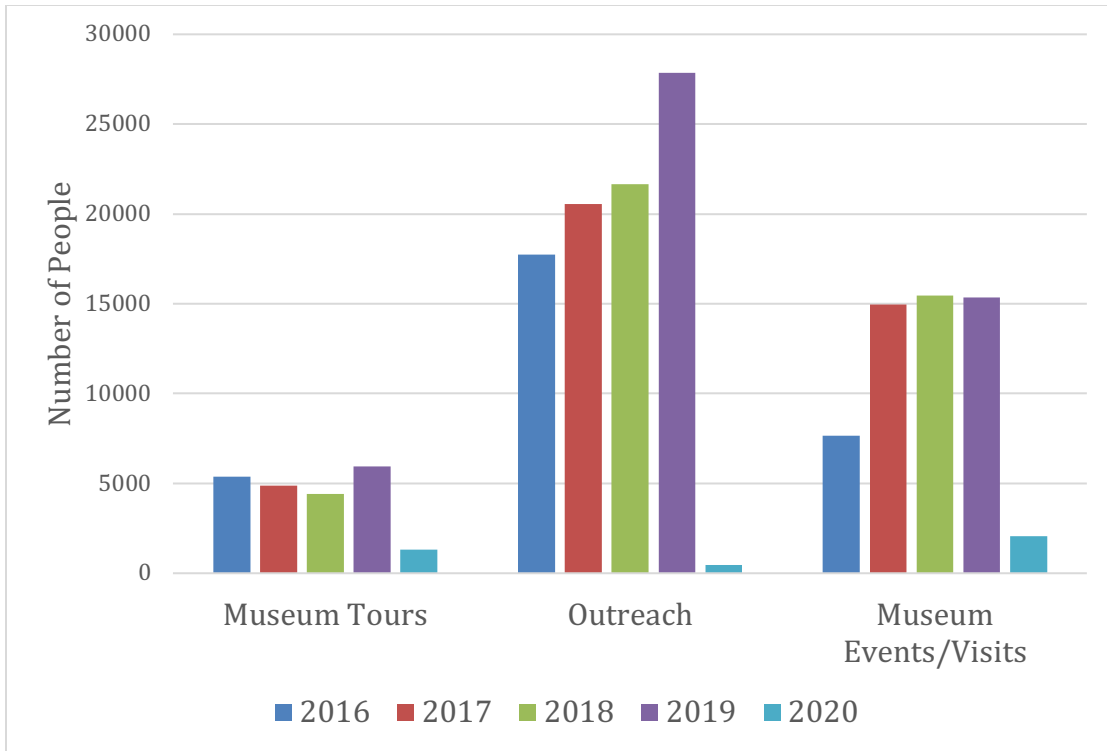


Figure 4 – Type of Engagement

In 2020 our internal education programs brought in **1318** students from Kitchener-Waterloo-Cambridge and surrounding regions. This includes elementary, secondary, post-secondary schools, community groups (such as Girl Guides of Canada or the KW-Nature) and general visitors. Visitors range in age from 3 years of age to adult. *Figure 5* describes where in the region groups are sourced and *Figure 6* defines the visitor demographics.

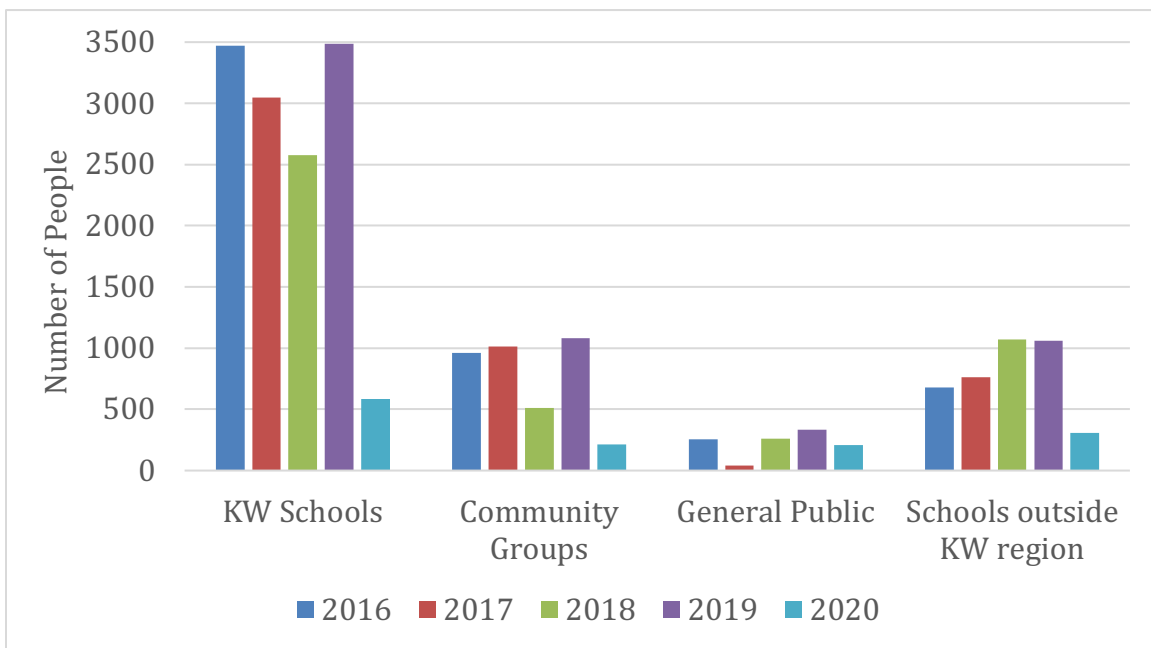


Figure 5 – Visitor Source Location

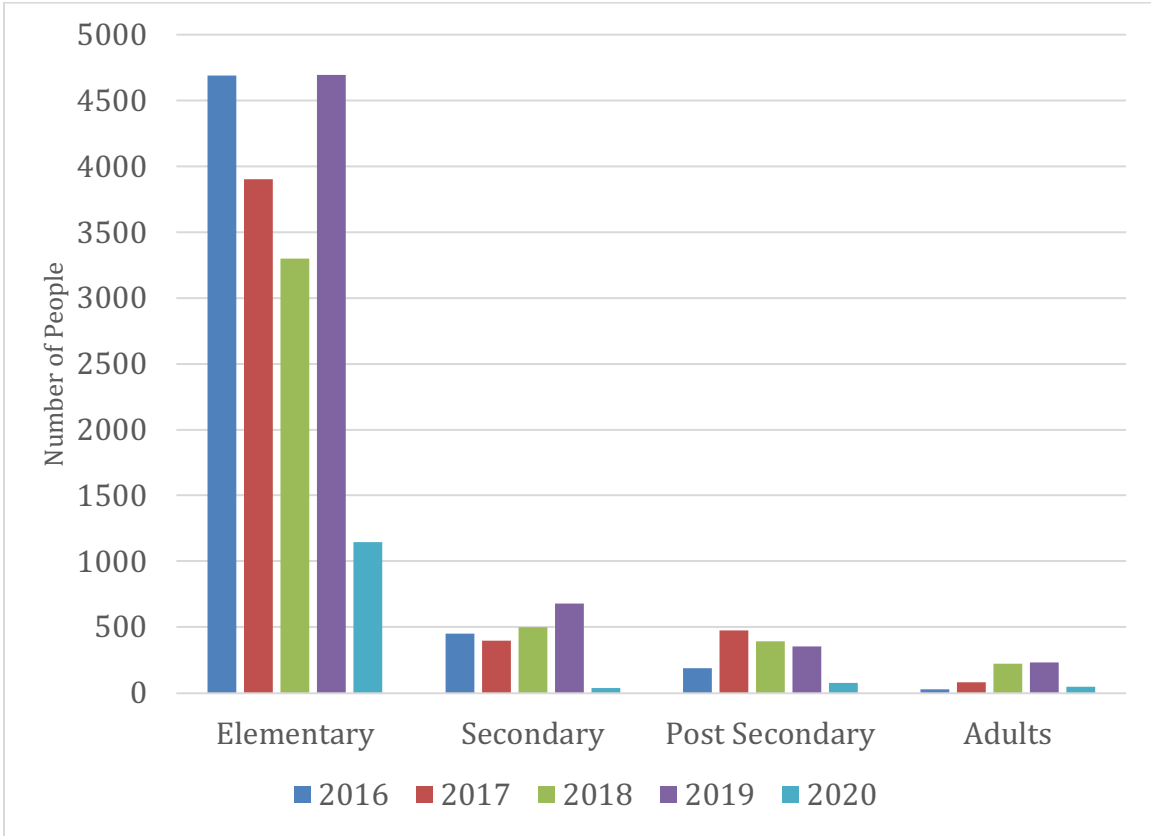


Figure 6 – Visitor Demographics

Community Outreach

Supporters



J.P. Bickell Foundation



Cobalt Mining Museum



Program Partners



Upper Grand
District School Board



Region of Waterloo

