

2023 ANNUAL IMPACT REPORT



**Green Chemistry
Teaching and Learning
Community**

A joint initiative by



ACS Green Chemistry Institute
Chemistry for Life®

© Copyright 2024 Beyond Benign Incorporated. Beyond Benign Incorporated and the American Chemical Society Green Chemistry Institute declare no competing interest in the publishing of this document.

A Message from the GCTLG Team

The past year has been remarkable for the green chemistry education community, the Beyond Benign team, and in particular the Green Chemistry Teaching and Learning Community (GCTLG) online platform. We officially launched the new GCTLG to the world at 10:10 am ET on October 10, 2023. The sheer potential of the GCTLG to help transform chemistry education globally by accelerating adoption and knowledge exchange makes this a tremendously exciting moment for our team and the community.

The GCTLG already has over 500 users, representing over 50 countries worldwide, who are accessing over 165 open-access green chemistry educational resources and engaging in interactive community spaces on the platform. We would not have been able to get to where we are today without the dedicated work and support of our Leadership Committee, GCTLG internal project team staff, Chief Editor/Chief Moderator, contract staff and consultants, technical development team, partners, and all the advocates, champions, and experts who worked with us over the past three years. The immense amount of time and effort these leaders put into the development and promotion of the platform has been invaluable, and the GCTLG would not exist without their leadership and commitment. We want to thank them from the bottom of our hearts. We are proud to dedicate this 2023 Annual Impact Report to them.

In this document, we provide a first glimpse into the statistics and data from the platform that exemplifies the influence the green chemistry education community can have when we come together for collective action and transformation. We are excited to share these results with you as a follow-up to the [2021](#) and [2022](#) reports. With new users joining and content being added to the GCTLG each and every week, we see no limit to the potential power and impact this platform will have in the future.

We invite you to come on in, join us, and learn about all the great things happening on the GCTLG.



DR. JONATHON MOIR

Senior Program Manager,
GCTLG, Beyond Benign



DR. NIMRAT OBHI

Program Manager,
GCTLG, Beyond Benign

EXECUTIVE SUMMARY

The GCTLC Platform in 2023 at a Glance	5
--	---

OUR GROWING COMMUNITY

Over 500 User Profiles on the GCTLC	7
-------------------------------------	---

A Searchable Library of Open-Access Curriculum Materials	10
--	----

Resources in 2023 at a Glance	10
-------------------------------	----

Community Spaces on the GCTLC	13
-------------------------------	----

Meet the GCTLC's Chief Editor and Moderator	15
---	----

Meet the Advisory Committee	16
-----------------------------	----

Where Were We in 2023?	16
------------------------	----

DEVELOPMENT & SPONSORS

Our Founding Sponsors	18
-----------------------	----

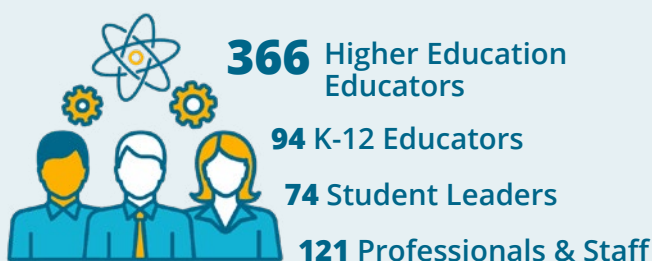
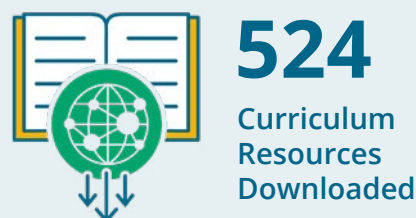
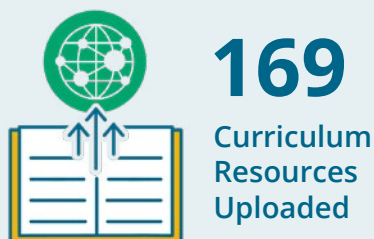
FUTURE OUTLOOK

19

APPENDIX

Meet the GCTLC Team: Internal Project Staff	20
---	----

The GCTLC Platform in 2023 at a Glance



Data as of December 31, 2023. Excludes Beyond Benign staff members. Note that many users selected multiple organizational affiliations.

The GCTLC is a virtual online community platform by the community, for the community that will transform chemistry education programs across the world. A collaborative effort by Beyond Benign and the American Chemical Society (ACS) Green Chemistry Institute, the GCTLC is the place for a supportive and nurturing community of teachers, educators, faculty, student leaders, industry stakeholders, and anyone with an interest in green chemistry education to share, connect, learn, and grow.

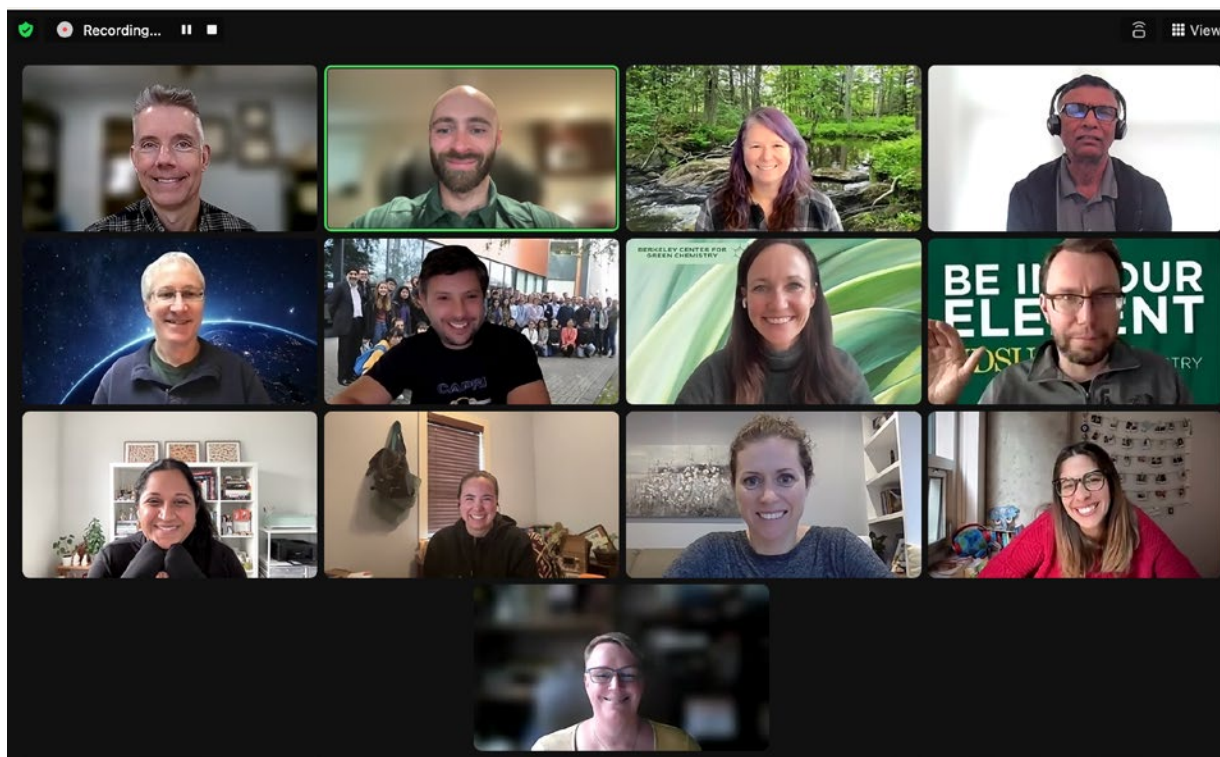
The GCTLC hosts a searchable digital online library of peer-reviewed, open-access green chemistry education materials, including greener lab experiments, lecture slides, assessments, and more. Collaboration, networking, mentorship, and peer-to-peer learning for GCTLC users is facilitated through interactive community spaces such as discussion forums, an events calendar, job boards, and opportunities for professional and leadership development.



In the months leading up to the **official launch**, GCTLC internal project staff, our inaugural Chief Editor/Chief Moderator Dr. Sarah Prescott, and the Leadership Committee developed policies and guidelines for supporting user engagement and participation in the platform as well as the governance and operation of the GCTLC. This included the development of a **Code of Conduct** policy by the subcommittee on Diversity, Equity, Belonging, and Respect (DEBR) that establishes safety for users and will help sustain a sense of belonging for community members throughout the years to come.

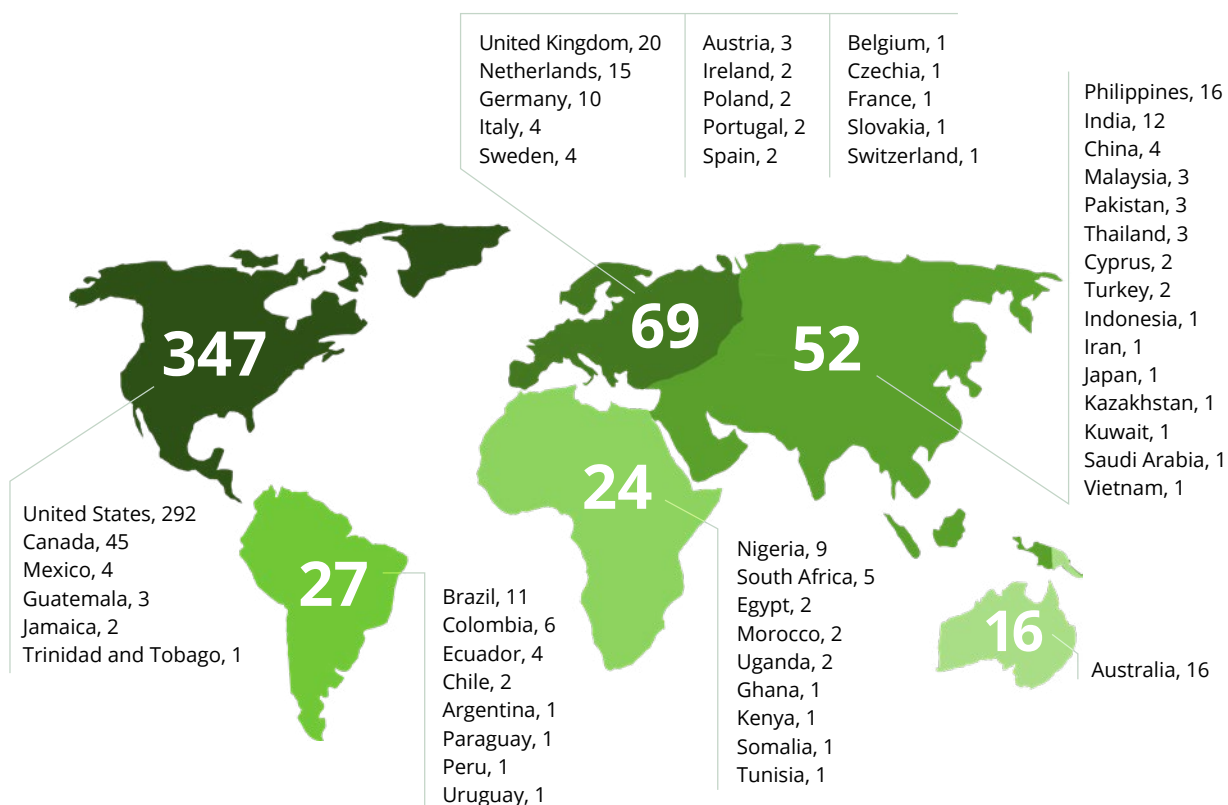
Following launch of the platform, the GCTLC's Leadership Committee ended their three-year term and transitioned to an Advisory Committee structure starting in 2024. The new committee will continue to meet regularly, providing long-term guidance to the GCTLC team and the Chief Editor/Chief Moderator on next steps for the platform's resource collection, engagement, and functionality.

Finally, the project team is excited to announce renewed support from the GCTLC's founding sponsors to continue development and growth of the platform, as well as ongoing partnerships that continue to grow and deepen – including the planned launch of a new sister platform in 2024 that will connect with the GCTLC and allow for further collaboration and expansion.



Participants in the November 21, 2023, GCTLC Leadership Committee meeting.

Over 500 User Profiles on the GCTLC!



Since the launch of the GCTLC, the community has grown to over 500 users worldwide. More than 50 countries are represented on the platform with the majority of GCTLC users from North America, Europe, and Asia.

User profiles are visible to everyone on the platform. A user's profile shows their activity and work across the GCTLC, including contributed curriculum resources (learning objects), events, and job postings. Having open user visibility and profiles on the platform helps to facilitate and foster connections between members. Users can also easily find each other through the search engine built into the GCTLC, enabling them to network and forge links based on shared interests, identities, and activities.

Nimrat Obhi
Program Manager, GCTLC

they/them (English); she/elle (Français)
Beyond Benign, Inc.

Contact: obhi@beyondbenign.org

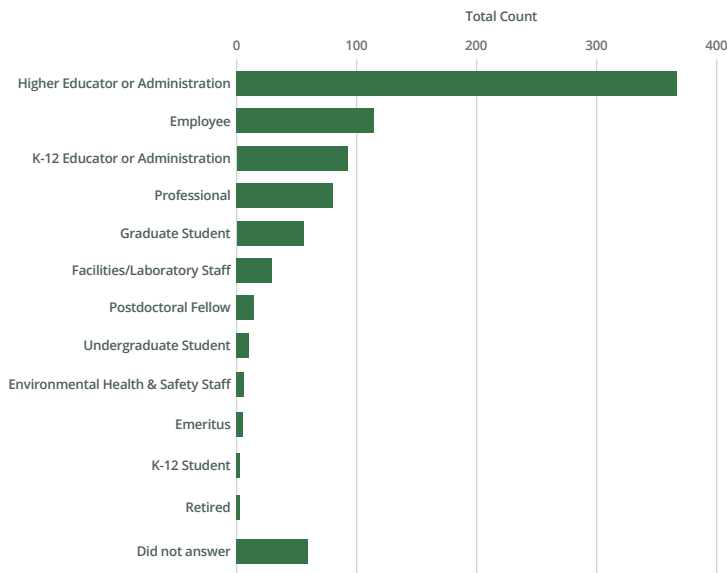
Social Media: [Google Scholar](#)
<https://scholar.google.com/citations?user=U3RZAMAAAJ000>

Bio
Nimrat is from Ottawa, Canada and obtained their BSc in Biomedical Sciences (Medical Chemistry) at the University of Ottawa in 2014. They completed their PhD in chemistry at the University of Toronto in 2020, where their research focused on the synthesis and investigation of carbon-based nanoconducting polymers with complex architectures for electronic applications. During this time, Nimrat also completed a Chemistry Teaching Fellowship Award to design and implement a green chemistry course module into an upper year chemistry course at the University of Toronto. They are committed to justice, equity, and diversity and have worked with local and national teams on advocacy and policy initiatives since 2014. Nimrat joined Beyond Benign as a Higher Education Program Manager in 2021 where their past work includes open-access curriculum development and supporting green chemistry education at Minority Serving Institutions. Currently, Nimrat is a Program Manager for the Green Chemistry Teaching and Learning Community (GCTLC), where they develop community engagement strategies and equity and justice initiatives for the platform - including co-chairing the Diversity, Equity, Belonging, and Respect (DEBR) subcommittee of the GCTLC's Advisory Board. Nimrat currently lives in Ottawa, Ontario, and outside of work they are an avid skier, cyclist, outdoor sports enthusiast, swimmer, stationary bike, and booklover.

Feel free to chat with Nimrat at Beyond Benign. They work on:
- Programmatic work for the GCTLC platform at large: community engagement, technical development
- Diversity, Equity, Belonging, and Respect for the GCTLC and with Beyond Benign
- The Minority Serving Institutions Initiative in the Green Chemistry Communities Program (past work)
- Toxicology for Chemistry Curriculum (past work)

About
GCTLC Roles
[Administer](#)

GCTLC USERS' ORGANIZATIONAL AFFILIATIONS

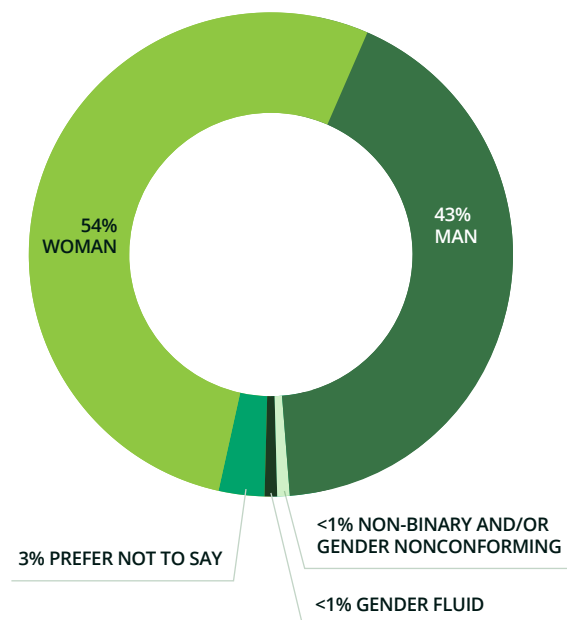


Users on the platform include higher education and K-12 educators and administrators, professionals, staff, students, and postdoctoral fellows, with more joining every day. Many GCTLC users hold multiple organizational affiliations and work across diverse professional sectors.

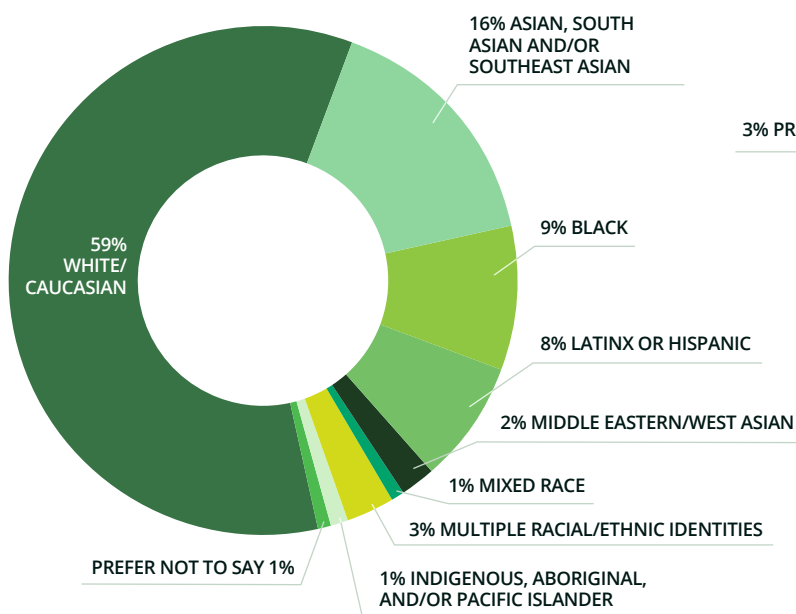
User data as of December 31, 2023, excluding Beyond Benign staff.

In addition to representing many countries and professions, GCTLC users on the platform also represent a diverse spectrum of gender and racial/ethnic identities.

GENDER IDENTITIES OF GCTLC USERS



RACIAL/ETHNIC IDENTITIES OF GCTLC USERS



As more users join the platform, the GCTLC's leadership and demographic diversity will support and sustain a flourishing community of green chemistry education practitioners.

Identities are voluntarily self-reported and provided in aggregated format (non-attributed). Data shown was extracted on January 11, 2024.

The front page of the site and the navigation menu were designed to reflect three important community needs: **learning** more about green chemistry and the organizations and people that support this work; **building, growing, and sustaining** a community of green chemistry education practitioners; and **finding, uploading, and sharing** open-access green chemistry resources worldwide to foster global learning and collective transformative change in chemistry education. Accessibility functionalities are part of the platform, including compatibility with screen readers, high-contrast colour choices, and readable fonts.

The screenshot shows the homepage of the Green Chemistry Teaching and Learning Community. At the top, there is a navigation menu with links for HOME, ABOUT, COMMUNITY, and RESOURCES, along with a search bar and a LOG IN / SIGN UP button. Below the navigation, there are logos for beyondbenign and ACS Green Chemistry Institute. The main heading reads "Welcome to Your Green Chemistry Teaching & Learning Community". A sub-heading states: "The GCTLC is the place for everyone in the green chemistry community to learn, share, connect and grow".

Under the heading "How can we help you?", there are four white cards with icons and text:

- Learn**: Search the Library, Read about Green Chemistry, Find more resources.
- Share**: Create a new resource, Post in a forum, Share an opportunity.
- Connect**: Find community members, Join a group, Attend an event.
- Grow**: Build your profile, Take a course, Become a leader.

Below this, a section titled "The Power of Transformation Happens Through Community" explains that through peer-to-peer learning, sharing, connection and mentorship, the GCTLC can collectively advance the integration of green chemistry across the education continuum. It includes links to the GCTLC's philosophy statement, mission, vision, and core values.

To the right of this text is a circular diagram with "GCTLC" in the center, surrounded by four overlapping circles: Collaborating (top), Learning (right), Networking (bottom), and Mentoring (left). Resource Sharing is also indicated near the center.

At the bottom, there is an icon of a hand holding three people, followed by the heading "Diversity, Equity, Belonging and Respect". The text below states: "DEBR is a core part of the GCTLC and principles of equity and inclusion have been integrated throughout the platform from the beginning. Read more [here!](#)"

A Searchable Library of Open-Access Curriculum Materials

Resources in 2023 at a Glance



105 Higher Education
72 K-12 Education
11 Professional/Other



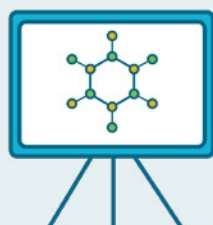
95
 Greener Lab Experiments



54
 Journal Articles



48
 Activity/Technology Resources



45
 Lecture or Course Slides/Notes



32
 Lesson Summaries

Data as of December 31, 2023. Note that many resources are tagged with multiple audience levels and types.

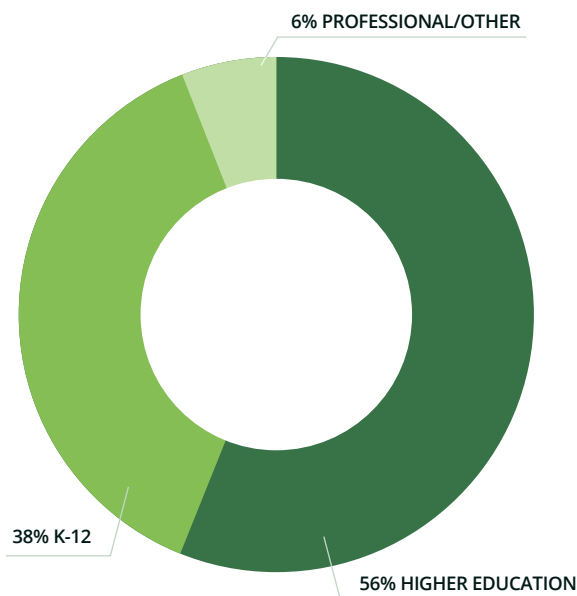
A full database of open-access green chemistry resources (“Learning Objects”) is available and quickly growing on the GCTL platform, with over 165 resources in the searchable library to date. Search parameters include Learning Object summaries, tags, and keywords that help users find the resources they need or seek similar resources.

Each Learning Object shows a user all the pedagogical details needed to adopt or adapt it for their own use. Comments are available to facilitate community discussion and interaction with the author of the uploaded work. Original work is peer-reviewed by volunteer community members, and users can choose to assign a Digital Object Identifier (DOI) to their Learning Object, which allows for the work to be cited and gives credibility to the author(s). The GCTL platform is currently growing its moderator and peer reviewer communities and welcomes the broader community to join!

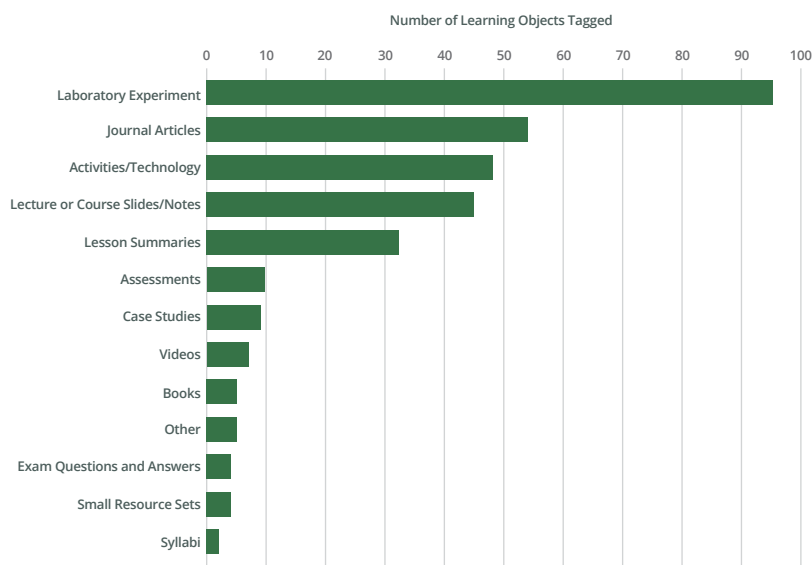
AUDIENCE LEVELS OF LEARNING OBJECTS ON THE GCTL

Currently, there are 105 Learning Objects “tagged” for a higher education audience level, 72 for a K-12 audience level, and 11 for professional/other audience levels. The most uploaded Learning Object types include those tagged as laboratory experiments, journal articles, activities, and lectures. Many Learning Objects are tagged for multiple audience levels, showing that resources being uploaded to the GCTL platform are interdisciplinary and can address multiple educator needs.

All data as of December 31, 2023.



TYPES OF LEARNING OBJECTS ON THE GCTLC



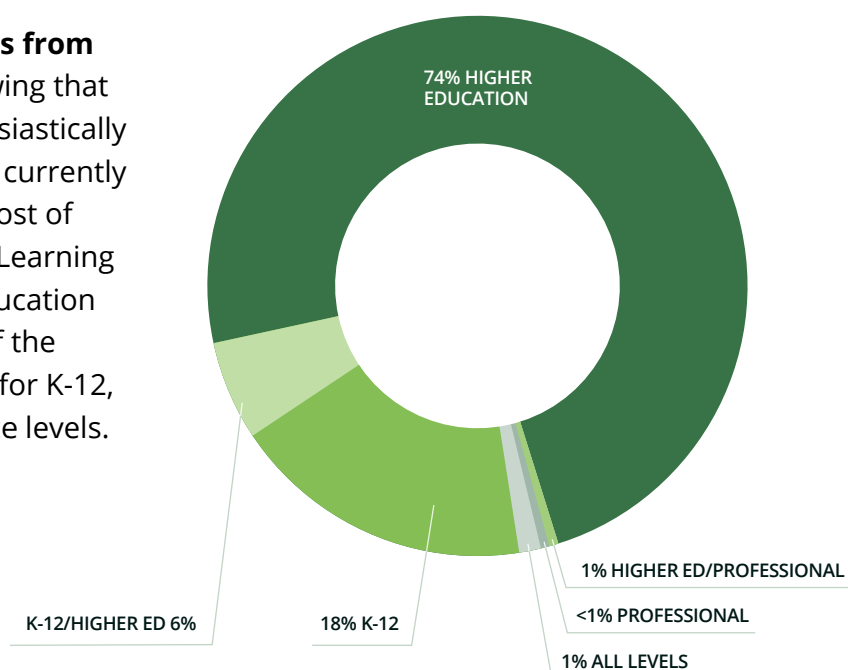
The majority of Learning Objects are tagged as laboratory experiments (95), journal articles (54), technical activities (48), lecture slides (45), and lesson summaries (32). Multiple other types of Learning Objects can also be found in the GCTLC library, with more being uploaded every week.

In late 2023, we hosted two virtual “resource hackathon” events for community members to come together and upload Learning Objects into the library. These events generated excitement toward building a repository of open-access green chemistry educational resources for all. The GCTLC team plans to run more resource hackathon events in coming years to continue to build the GCTLC Library.

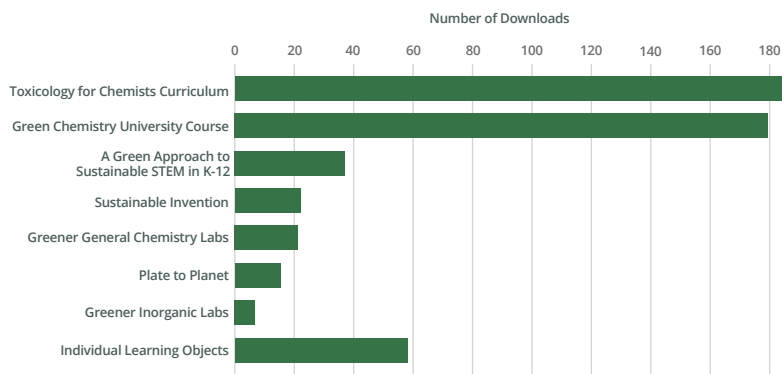
AUDIENCE LEVELS OF DOWNLOADED LEARNING OBJECTS ON THE GCTLC

There were over 520 downloads from the GCTLC library in 2023, showing that our growing community is enthusiastically using the open-access resources currently found on the GCTLC platform. Most of the files downloaded were from Learning Objects intended for a higher education audience level, while a quarter of the files downloaded were intended for K-12, professional, or multiple audience levels.

All data as of December 31, 2023.



LOCATIONS OF THE MOST DOWNLOADED LEARNING OBJECT FILES



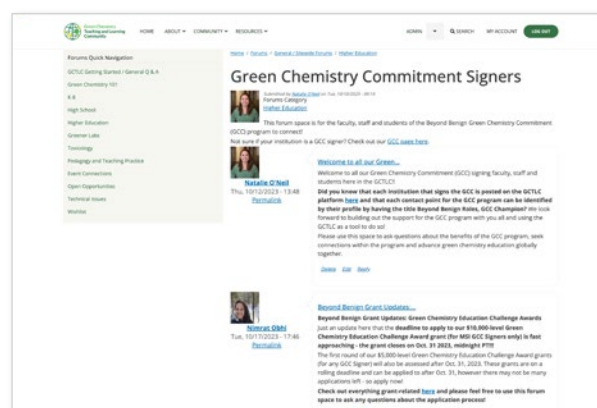
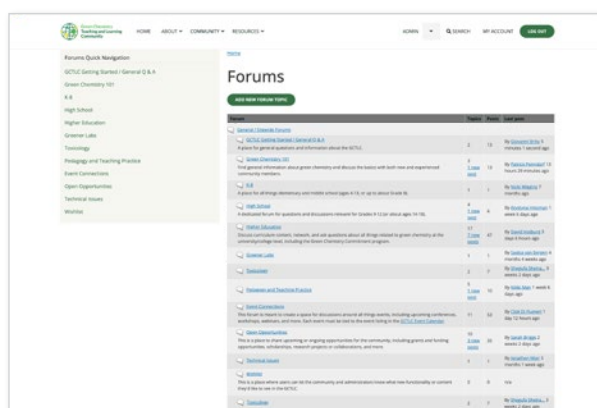
All data as of December 31, 2023.

As the platform expands and users upload more of their own resources to the platform, we look forward to seeing a growing number of resources being downloaded, adopted, and adapted by the community.

The most downloaded Learning Object files belong to several collections in the library, including Beyond Benign's Toxicology for Chemists Curriculum and the Introductory Green Chemistry University Course collection. The most downloaded K-12 Learning Objects are the Green Approach to Sustainable STEM in K-12 book chapters, the Sustainable Invention collection, and the Plate to Planet Curriculum collection. A significant number of resource downloads came from individual Learning Objects not belonging to a specific collection in the library.

Community Spaces on the GCTLC

Forums are the main sitewide community space available on the platform and are open to any user on the GCTLC. Many registered users have already created different forum discussions and threads to cover a wide variety of topics and categories. Members of the green chemistry community can be found engaging by writing posts, commenting on other users' posts, posting questions, and openly sharing opportunities.



Additionally, users can create, post, and promote sitewide opportunities to support their own events or job postings. The Events space was created for users to find upcoming conferences, webinars, workshops, in-person or virtual gatherings or meetings, and other green chemistry educational events either in their local regions or abroad. This space and the calendar visible to all users exist to support communities of like-minded people meeting, sharing, and connecting with one another.

Job postings can be found on the Job Opportunities page, created for community members looking for opportunities to apply their green chemistry skills and knowledge in their careers. Ultimately, when organizations post their green chemistry career opportunities on the Job Opportunities page, they will support and sustain the transition of an educated and skilled chemistry community into broader society where they can make transformative change.

Group spaces on the platform represent opportunities for users to create smaller, topic-centred community spaces with varying levels of privacy and permissions. Groups are currently under development and slated for an early 2024 launch.

Anyone who is a user on the GCTLC can become a moderator, where they can foster and facilitate engagement and discussions in community spaces, as well as share expertise in certain topics with other users on the platform. All moderators on the GCTLC have access to resources to guide their mentorship and professional development on the platform. We look forward to seeing a growing number of green chemistry education leaders on the GCTLC!

Meet the GCTLC's Chief Editor and Moderator!



In 2023, the GCTLC team hired Dr. Sarah Prescott as the inaugural Chief Editor and Moderator for the platform! Dr. Prescott is an Associate Professor of Chemistry at the University of New Hampshire. She is a passionate and dedicated professional with extensive experience in greening chemistry curricula, green chemistry outreach and engagement, comparative genomics, and inclusive and accessible pedagogies. Dr. Prescott is also the President and Executive Director for the BioQUEST Curriculum Consortium, a non-profit organization working in STEM education reform and inclusive pedagogy.

As Chief Editor on the GCTLC platform, Dr. Prescott oversees the submission, peer review, and publishing of all Learning Objects to the GCTLC, including managing a pool of peer reviewers. She also guides and provides recommendations for the overall direction of educational content and materials on the platform, while supporting authors and GCTLC users through her weekly virtual office hours. Dr. Prescott is also the Chief Moderator, where she manages the moderation of all community spaces on the platform and provides leadership and support to the forum and group moderators. Dr. Prescott's work in the community spaces goes a long way to ensuring the interactive aspects of the platform are inclusive, equitable, and enjoyable for all GCTLC users.

The team is absolutely delighted to have Dr. Prescott on board and to benefit from her incredible expertise and experience with online open-access community platforms and resources!

Meet the Advisory Committee

By the Community, For the Community

After the launch of the platform, the GCTLC's Leadership Committee transitioned to an Advisory Committee whose charge is to provide guidance to the ongoing growth, development, and advancement of the GCTLC platform. These 13 members represent various sectors of education, industry, and information management and represent diverse backgrounds and geographies (including the US, Canada, Brazil/Germany, and the UK). For the next two years, the GCTLC will benefit from their expert advice, guidance, and support.



Alexey Leontyev
North Dakota
State University



Ken Hoffman
STEM Innovation
Academy



Andrea Oseolorun
Prairie View
A&M University



Barb Morra
University of Toronto



Vania Zuin Zeidler
Leuphana University



Scott Carlson
W.H. Maxwell High
School



**Conchita
Jiménez-González**
GlaxoSmithKline



David Laviska
ACS Green Chemistry
Institute



Glenn Hurst
University of York



Laura Barnes
Illinois Sustainable
Technology Center



Raksmeý Derival
Innovation Academy
Charter School



**Ettigounder (Samy)
Ponnusamy**
MilliporeSigma



Megan Arnett
Berkeley Center for
Green Chemistry

Where Were We in 2023?

CANADIAN CHEMISTRY CONFERENCE AND EXHIBITION (CSC 2023) JUNE 4-8, 2023 – VANCOUVER, BC, CANADA

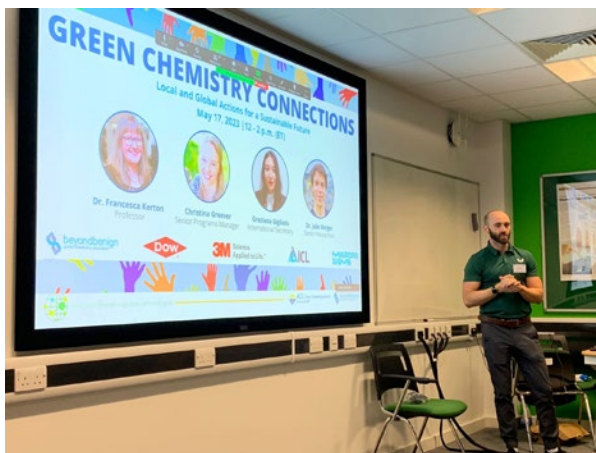
We connected with Canadian educators and researchers at the CSC 2023 to talk about green chemistry teaching and learning. This included a presentation on the GCTLC and a student workshop co-organized with GCTLC Leadership Committee member Dr. David Laviska (ACS GCI), focused on industry perspectives and case studies of green chemistry in practice.

GREEN CHEMISTRY COMMITMENT (GCC) SUMMIT**JUNE 12, 2023 – LONG BEACH, CA, UNITED STATES**

During this one-day event, delegates from GCC-signing institutions and the green chemistry education community attended presentations by long-time GCC signers as well as Beyond Benign staff looking to inspire and support new community members in their work in transforming chemistry education. During this event, the GCTLC was soft-launched and began its beta testing phase.

ACS GREEN CHEMISTRY & ENGINEERING (GC&E) CONFERENCE**JUNE 13-15, 2023 – LONG BEACH, CA, UNITED STATES**

The full Beyond Benign team was present at the 2023 GC&E conference and presented on a number of Beyond Benign's programs, including the GCTLC. Of particular note was the session on "Amplifying Voices of Scholars from Diverse Communities: Green Chemistry Education in Action", which showcased important work by BIPOC faculty and students in green chemistry education.



Senior Program Manager Dr. Jonathon Moir presents on Beyond Benign's programs at the Green Chemistry Centre of Excellence at the University of York (July 7, 2023).

"INTEGRATING GREEN CHEMISTRY INTO HIGHER EDUCATION" DAY**JULY 7, 2023 – YORK, UNITED KINGDOM**

Faculty at the Green Chemistry Centre of Excellence at the University of York (including GCTLC Leadership Committee member Prof. Glenn Hurst) hosted a one-day event in July geared toward increasing awareness and adoption of green chemistry in higher education at institutions in the United Kingdom.

Representatives from numerous institutions across the UK and globally participated both in-person and virtually,

and Senior Program Manager Dr. Jonathon Moir presented on the soft-launched GCTLC platform and the many benefits it would bring once fully launched.

CHEMED CONFERENCE**JULY 23-27, 2023 – GUELPH, ON, CANADA**

At the biennial ChemEd conference, GCTLC Leadership Committee member Ken Hoffman and Senior Program Manager Dr. Jonathon Moir co-presented two workshops. The first provided a walk-through of the new GCTLC platform, including its functionality and benefits. The second gave a demonstration of a greener lab experiment for a double displacement reaction.

Development & Sponsors

The GCTLC would not be where it is today without the unwavering commitment of our sponsors and grantors. Since the beginning, our founding sponsors have been the bedrock of support that made the launch of the GCTLC possible. We are eternally grateful for their dedication and passion for green chemistry education and look forward to continuing our great work with them for many years to come.

In addition to our founding sponsors, we are thrilled to announce additional support for the GCTLC in 2024:

MilliporeSigma is continuing their multi-year commitment to support Beyond Benign's programs, including the GCTLC, into the 2024 calendar year.

Cell Signaling Technology has renewed their support of the GCTLC.

If you are interested in sponsorship or partnership opportunities with the GCTLC, please reach out to Nicki Wiggins, Chief Operating Officer at Beyond Benign (nicki_wiggins@beyondbenign.org).

Our Founding Sponsors



THRIVE



GROW



NURTURE



SEED



Future Outlook

As the GCTLC continues to evolve and grow, we are excited for what comes next. With the upcoming launch of group spaces on the platform and regular ongoing formatting and styling improvements being made every month, the platform is a living and breathing system that promises to be an increasingly beneficial tool for users around the world.

Within the next year the team plans to complete the following:

- Launch group collaboration spaces to support higher education and K-12 educational communities.
- Continue to update the GCTLC user interface to enhance the online experience, including the redesign of forum discussion boards for ease of use and readability.
- Work with the Advisory Committee to create a community engagement strategy and strategic plan to continue to foster the community to transform chemistry education for a sustainable future.
- Conduct an annual GCTLC user survey to collect valuable feedback and suggestions on what is working well, what needs improvement, and how the GCTLC can continue to best serve the community.

With additional hackathons, in-person and virtual events, curated collections, and further user engagement and networking opportunities planned in the future, we are excited for everything the GCTLC has to offer for the global community of green chemistry and sustainability champions. We look forward to sharing more of these updates in the years to come and welcome you to come explore everything that is possible with us on the GCTLC.



Photo of the GCTLC sign-up table at the Beyond Benign booth, taken on March 18, 2024, at the ACS Spring National Meeting in New Orleans, LA, US (March 17-21, 2024).

Meet the GCTL Team: Internal Project Staff



Beyond Benign is a non-profit organization whose mission is to foster a green chemistry community that empowers educators to transform chemistry education for a sustainable future.



Dr. Jonathon Moir
Senior Program Manager



Amanda Trellopoulos
Head of Data and Finance



Dr. Nimrat Kaur Obhi
Program Manager



Dr. Amy Cannon
Executive Director and Co-Founder



Nicki Wiggins
Chief Operating Officer



AMERICAN CHEMICAL SOCIETY

The American Chemical Society Green Chemistry Institute catalyzes green chemistry and engineering to promote sustainability, prosperity and equity across the global chemistry enterprise.



Dr. Adelina Voutchkova
Director of Sustainable Development



Dr. David Laviska
Portfolio Manager for Green Chemistry and Sustainability in Education



Christiana Briddell
Senior Communications and Marketing Portfolio Manager



Green Chemistry Teaching and Learning Community

A joint initiative by



ACS Green Chemistry Institute
Chemistry for Life®