Info Kit
Green Chemistry Commitment

What is the Green Chemistry Commitment?

The Green Chemistry Commitment (GCC) is a consortium program that unites the green chemistry community around shared goals and a common vision to:

- expand the community of green chemists
- grow departmental resources
- improve connections to industry and job opportunities in green chemistry
- affect systemic and lasting change in chemistry education

> *" The goal of Green Chemistry is for the term to disappear and it simply becomes how we practice chemistry."*
>
> **–John C. Warner**
> Co-author of "Green Chemistry: Theory and Practice"
> Co-Founder of Warner Babcock Institute for Green Chemistry

The GCC offers access to a broad and supportive community of chemistry experts and a flexible framework for green chemistry curriculum and training. With multiple pathways to the implementation of green chemistry education, the Green Chemistry Commitment sets a benchmark to track progress on specific learning and research objectives.

With the GCC, colleges and universities can band together to share resources and experiences to shift how and what the next generation of chemists learn. Students will enter the workforce armed with the necessary skills and knowledge to be leaders in making the principles of green chemistry standard practice in all branches of the chemical sciences.

Why the Green Chemistry Commitment?

During the last two decades, individual teachers, professors, and chemistry departments have introduced green chemistry concepts into lectures and lab activities, and many include green chemistry as the basis for academic research and outreach. The GCC seeks to build on the efforts of leaders in the field to systemically change chemistry education.

The GCC is helping to transform chemistry education in college and university chemistry departments who strive to:

- prepare world class chemists whose skills are well aligned with the needs of the planet and its inhabitants in the 21st century, and
- design and develop innovative, efficient, and environmentally sound solutions to the safety and effectiveness of chemical products and processes.

Who is part of the Green Chemistry Commitment?

Colleges and universities are signing the Green Chemistry Commitment for access to shared up-to-date resources, collaborative discussions, improved curriculum, and accountability to track progress on specific learning and research goals.

The Green Chemistry Commitment is shaped and led by an Advisory Board currently comprised of faculty members from chemistry departments across North America, representing large and small academic institutions, along with green chemistry professionals from government and industry.

The supporting organization for the Green Chemistry Commitment is Beyond Benign (www.beyondbenign.org), a non-profit organization with a mission to develop and disseminate resources that empower educators, students and the community to practice sustainability through green chemistry.

Beyond Benign envisions a world where the chemical building blocks of products used every day are healthy and safe for humans and the environment. Beyond Benign was co-founded by Dr. John Warner, a founder of the field of green chemistry and co-author of *Green Chemistry: Theory and Practice* and Dr. Amy Cannon, the world's first PhD in green chemistry.

Current Advisory Board Members

- Nicholas Anastas, Senior Advisor for Green Chemistry, U.S. EPA, Research & Development
- John Arnold, Professor, Dept. of Chemistry, University of California, Berkeley
- Ed Brush, Professor, Dept. of Chemistry, Bridgewater State University
- Rich Gurney, Associate Professor, Dept. of Chemistry and Physics, Simmons College
- Dalila Kovacs, Associate Professor, Dept. of Chemistry, Grand Valley State University
- Irv Levy, Professor and Chair, Dept. of Chemistry, Gordon College
- Anne Marteel-Parrish, Creegan Chair in Green Chemistry, Dept. of Chemistry, Washington College
- Doug Raynie, Research Associate Professor, Dept. of Chemistry and Biochemistry, South Dakota State University
- Ryan Trovitch, Assistant Professor, Dept. of Chemistry & Biochemistry, Arizona State University
- Saskia VanBergen, Hazardous Waste and Toxics Reduction, WA State Department of Ecology
- John Warner, President and CTO, Warner Babcock Institute for Green Chemistry
- Wei Zhang, Associate Professor, Dept. of Chemistry, Director of the Center for Green Chemistry, University of Massachusetts Boston

The Green Chemistry Student Learning Objectives

Signing institutions agree that upon graduation, all chemistry majors should have proficiency in the following essential green chemistry competencies:

Theory: Have a working knowledge of the twelve principles of Green Chemistry

Toxicology: Have an understanding of the principles of toxicology, the molecular mechanisms of how chemicals affect human health and the environment, and the resources to identify and assess molecular hazards

Laboratory Skills: Possess the ability to assess chemical products and processes and design greener alternatives when appropriate

Application: Be prepared to serve society in their professional capacity as scientists and professionals through the articulation, evaluation and employment of methods and chemicals that are benign for human health and the environment

The Green Chemistry Student Learning Objectives can be carried out through a number of different formats including, but not limited to:

Revision of existing departmental curriculum:

- Embed green chemistry throughout chemistry courses
- Include green chemistry exercises throughout laboratory courses
- Incorporate green chemistry principles into research projects and programs
- Build toxicology and environmental health science modules into existing chemistry courses

Creation of new departmental curriculum:

- Develop new courses dedicated to green chemistry
- Design toxicology and environmental health science courses
- Develop a seminar series on green chemistry and/or toxicology

Utilization of other institutional or external resources:

- Encourage students to take elective courses in toxicology and/or environmental health sciences from other departments or institutions

What are you signing up for?

As a signer of the Green Chemistry Commitment, there are a number of opportunities for your department and faculty:

- **A collective voice:** The Commitment offers an opportunity for the field to unite around common student learning objectives, which will be reviewed on a periodic basis by the Commitment's Advisory Board. Through a collective voice, the Commitment's signing institutions can help to inspire other institutions to get involved with green chemistry and transform their own institutions. Together, signing institutions of the Commitment can also help to influence other initiatives that affect academia, such as funding agencies, degree program certifying institutions, and other governmental and non-governmental organizations.
- **Tracking progress:** The Commitment will help to track progress at your own institution, and progress of the community as a whole. Through simple, streamlined reports, departments will track past accomplishment and map out future goals. The accomplishments of participating institutions will be highlighted on the Green Chemistry Commitment website through illustrations and case studies.

- **Shaping the Commitment:** Signers of the Commitment will have an opportunity to serve on the Advisory Board of the Commitment. The Advisory Board is responsible for periodically reviewing the Green Chemistry Student Learning Objectives, reviewing annual reports, guiding resources for member benefits, and providing direction for outreach and advocacy.
- **Collaborative Working Groups:** The GCC will host collaborative discussions and working groups comprised of signing institutions and outside experts to advance green chemistry in higher education, including a Toxicology for Chemists working group focused on the integration of toxicology concepts into chemistry courses and programs.
- **Member benefits:** The GCC will gather and create resources for faculty, departments, students and administrators that will be useful for advocating for and implementing green chemistry. Most benefits will remain open to the public, including non-signing institutions. Some benefits may arise that are open to only signing institutions. These member benefits include grants for faculty professional development, grants for faculty and student conference participation, grants for student research, etc. As sponsorship funds become available for these benefits, they will be announced to members and applications will be open to the members of the signing institutions.

How to commit?

The Green Chemistry Commitment is a voluntary, flexible framework for chemistry departments to progressively adopt green chemistry theory and practice. Recognizing that each institution has different capabilities and resources, the Commitment strives to unite the field around Green Chemistry Student Learning Objectives, which can be integrated through a number of different pathways and timelines.

By signing the Green Chemistry Commitment, chemistry departments will agree to commit to incorporating the Green Chemistry Student Learning Objectives within their own departments. Each department will submit a streamlined annual report at the end of each academic year that will highlight past accomplishments and focus on future goals. Through the Green Chemistry Commitment, the progress of individual departments, as well as the field as a whole, will be tracked and reported to the community.

Sign Up!

Contact Irv Levy, Green Chemistry Commitment Program Director, Irv_Levy@beyondbenign.org for questions and to submit the following forms:

- The chemistry department chair, along with one administrator must sign the **Pledge Form**
- Submit the **Contact Form** with your institution's primary contact person(s) information.
- An annual survey will be gathered electronically to gauge progress of the adoption of the green chemistry student learning objectives, learn about your work in green chemistry, and understand future goals.