

ACS Education Division Programs and Resources with Safety Components

Guidelines (overarching frameworks for organizations to use to build a safety foundation and culture)

- [NCW and Community Activity Safety Guidelines](#)
- [ACS Guidelines and Recommendations for Teaching Middle and High School Chemistry \(2018\)](#)
- [ACS Guidelines for Chemistry in Two-Year College Programs \(2015\)](#)
- [ACS Guidelines and Evaluation Procedures for Bachelor's Degree Programs \(2015\)](#)
- [Laboratory Safety \(2017\)](#)
- [ACS Student Chapter Report Review Criteria and Considerations](#)

Training (activities to prepare educators and learners to use tools and practice safety, building a safety foundation)

- [ACS Festival Training Institutes](#)
- [US National Chemistry Olympiad study camp](#)
- [AACT Webinars](#)
- *Chemistry in the Community* Webinars
- [Chemistry in Context Workshops](#)
- Safety sessions at [New Faculty Workshops](#)
- [ACS Professional Education](#) courses

Tools (resources for demos, classroom activities, and events)

- [Celebrating Chemistry \(Milli's Safety Tips \(2007\), activity safety tips\)](#)
- Volunteer tool-kit for science outreach (under development)
- [AACT Safety Statement](#)
- AACT Safety Contracts (Grades K-1, Grade 2-5)
- AACT Disposal Quick Reference Guide
- [K-8 Hands-on Activities](#) safety tips and notes
- [ChemClub Laboratory Safety Agreement](#)
- ChemClub Resource packets safety tips
- [ChemDemo Exchange](#) safety guidelines
- [Chemistry in Context](#), 9th Edition, and lab manual
- [Chemistry in the Community](#), 6th Edition (includes lab curriculum)

Information (introduction to safety concepts, tools, skills, and careers that develop safety awareness and knowledge)

- [Chemistry Solutions](#) (AACT) articles
- [ChemMatters](#) (high school) articles
- [inChemistry](#) (ACS Student Member Magazine) articles
- [College to Career](#) website
- [ChemIDP](#) online career planning tool
- ["Developing Skills" in Planning for Graduate Work](#)
- [Committee on Professional Training Newsletter](#) articles

Chemical Safety Education Resources from ACS Communities

No.	Title	Intended Audience	Publishing Group	Last Updated
1	<u>Guidelines for Chemical Laboratory Safety in Secondary Schools</u>	high school educators	ACS CCS	2016
This publication includes 53 learning outcomes for students and clear, concise explanations for teachers on select safety topics including basic safety information, RAMP, GHS, Fire Safety, NFPA, hazardous waste, and SDSs.				
2	<u>ACS Guidelines and Recommendations for Teaching Middle and High School Chemistry</u>	middle and high school educators	SOCED	2018
Laboratory safety is included extensively in these Guidelines with information on safety equipment and references as well as a discussion of "RAMP" principles. Revised in 2018.				
3	<u>Better Rainbow Demonstration and High School Safety outreach videos</u>	high school students and educators	ACS Education and Scientific Advancement Divisions	2016; forthcoming
The videos introduce chemical safety to the high school students and provide additional overview of some issues related to the safe use of chemicals in the high school environment.				
4	<u>ACS Guidelines for Chemistry in Two-Year College Programs</u>	two-year colleges educators	SOCED	2015
In addition to sections on Safety Culture and Laboratory Safety, the development of a safety culture in the institution is woven throughout the <i>Guidelines</i> .				
5	<u>Guidelines for Chemical Laboratory Safety in Academic Institutions</u>	undergraduate-graduate educators	CCS	2016
This publication presents 104 chemical safety learning objectives for undergraduate curriculum designers and instructors and outlines how learning should progress into graduate education based on RAMP. Published in 2016.				
6	<u>ACS Approval Program for Bachelor's Degree Programs</u> includes the Guidelines and supplements to the Guidelines.	undergraduate educators	CPT	2015 and 2017
The Guidelines represent the requirements for a department to offer an approved bachelor's degree program, and the characteristics of that program, including a mandatory safety skills requirement for the department to follow, and the students to learn about. The <u>Safety Supplement to ACS Guidelines</u> : describes in further detail the aspects of safety development that a program must implement, and for the students to understand as part of their education in chemistry.				

7	<u>Safety in Academic Chemistry Laboratories</u>	first- and second-year undergraduate students	CCS	2018
This 8th Edition of the CCS flagship publication Introduces RAMP and communicates practical laboratory safety information to first- and second-year undergraduate students. Includes Arabic translation.				
8	<i>Chemical Health and Safety Exam (or ACS Exams Institute Draft Safety Exam).</i>	undergraduate educators	ACS Exams Institute	Forthcoming
Currently (spring 2019) in trial testing, this 60 item multiple choice exam is designed to address safety topics typically addressed during the first two years of undergraduate chemistry coursework.				
9	<u>Teaching Chemical Safety and Information Skills Using Risk Assessment</u> (Chapter 3) in <i>Integrating Information Literacy into the Chemistry Curriculum</i>	undergraduate educators	ACS Symposium Series	2016
This chapter demonstrates how risk assessment (JHAs) can be used to teach information skills and safety competencies by providing rationale and examples (including assessment data) which can be incorporated into undergraduate learning..				
10	<u>Identifying and Evaluating Hazards in Research Laboratories publication and website</u>	undergraduate and graduate researchers	CCS	2014
This online reference presents a detailed introduction to the academic research community on risk assessment and provides practical examples using five techniques: Control Banding, Job Hazard Analysis, What-if, Checklists, and SOPs.				
11	<u>Risk Assessment video.</u>		CHAS	2018
Emphasizes importance of conducting a risk assessment of laboratory work and maintaining situational awareness as laboratory work proceeds.				
12	<u>Graduate Student Workshops</u>	graduate students and faculty	CHAS	ongoing
A three-hour workshop for graduate students and faculty about developing and maintaining laboratory safety programs in the research setting. Offered at the ACS National Meeting. Started in 2018 and ongoing.				
13	<u>Accessibility in the Laboratory</u>	all levels of education	ACS Symposium Series	2018
A valuable update to the 2001 4 th edition of “ <i>Teaching Chemistry to Students with Disabilities: A Manual for High Schools, Colleges, and Graduate Programs</i> ”, this symposium book integrates safety into broader best practice discussions for students with a range of				

accessibility issues, including topics such as visual and hearing impairments, invisible and physical disabilities, service dogs, and more.				
14	<i>ACS Style Guide Safety Chapter</i> Forthcoming.	authors and reviewers	ACS Pubs	Forthcoming
The 2019 Edition of the ACS Style Guide will include, for the first time, a chapter designed to provide guidance for authors and reviewers on how to prepare and include publication appropriate safety summaries in manuscripts.				
15	<u>CHED Demonstration Guidelines</u>	educators and students. All levels.	CHED	2016
A concise set of guidelines to aid experienced chemical practitioners in considering all components of demonstrations, including special notes for transportation and communication as well as best practices before and during a chemical demonstration.				
16	<u>Journal of Chemical Health and Safety</u>	safety professionals	CHAS	ongoing
JCHAS is a peer-reviewed journal that addresses chemical safety education topics among other topics chemical safety professionals are involved				
17	<u>The DCHAS-L e-mail list</u>	CHAS members	CHAS	ongoing
The list is available to members of the Division and provides an active discussion of technical and cultural issues faced in improving safety practices in all workplaces, with an emphasis on labs				
18	<u>CHAS Professional Development Workshops</u>	safety professionals	CHAS	ongoing
Daylong workshops for chemical safety professionals at national and regional meetings covering regulatory and technical topics.				
19	<u>C&EN SafetyZone blog and safety articles</u>	Chemical community	ACS Publications	ongoing
Ongoing coverage of chemical safety related news items				

Other Key Chemical Safety Education Resources

1	<p><u>Finster, D.; Hill. R. <i>Laboratory Safety for Chemistry Students</i>; Wiley 2010 and 2016</u> Laboratory and chemical hazards, routes of exposure, ways to manage these hazards, and handling common laboratory emergencies are covered. Emphasis on the ability to safely use hazardous chemicals in the laboratory by applying safety principles that prevent and minimize exposures.</p>
2	<p><u>Prudent Practices, National Academies Press, 2011</u> An authoritative reference on the handling and disposal of chemicals at the laboratory level. The revised edition has an expanded chapter on chemical management includes nanotechnology, laboratory security, and emergency planning.</p>
3	<p><u>Safe Science, National Academies Press, 2014</u> Examines the culture of safety in research institutions and makes recommendations for university leadership, laboratory researchers, and environmental health and safety professionals to support safety as a core value of their institutions.</p>
4	<p><u>Guide to Implementing Safety Culture, APLU, 2016</u> Roadmap for a university-wide effort to strengthen a culture of research safety. The guide has action steps, resources, and recommendations to help navigate the challenge of changing the culture of the institution. Includes reading lists, tools, strategies, illustrative examples, and/or best practices.</p>
5	<p><u>Inquiring Safely series, NSTA, 2003</u> Introduction of General Safety in the classroom for varying levels of education. Encourages safety within a climate of inquiry incorporates inclusion adjustments. Responsibility guidelines included.</p>
6	<p><u>Flinn High School Safety products</u>, Flinn Scientific A variety of products and resources related to chemical safety for teachers. Product site that may be filtered by education level.</p>
7	<p><u>Safety Videos library, Dow Chemicals, 2014</u> Videos that cover industrial safety culture and practices for laboratory safety. Each module covers information that has worked successfully at Dow. It includes basic explanations of the topics and relates them to safety. Dow's granted ACS an opportunity to use the videos in its upcoming e-learning safety course.</p>
8	<p><u>Green Chemistry education web page, ACS Green Chemistry Institute</u> Resources and programs give students and educators the opportunity to learn the chemistry concepts and skills that embrace life cycle thinking and provide a foundation for contributing to a sustainable future through chemistry.</p>
9	<p><u>Case studies and videos, Chemical Safety Board</u> Videos describing lessons from significant safety incidents, including academic and high school laboratories.</p>