



CSC Accreditation Guidelines — Resources

The following sections provide additional resources that can be used when preparing an application for CSC accreditation and improving programs in the areas listed.

Learning outcomes	1
Pedagogies	1
Equity, Diversity, and Inclusion	2
Indigenous students	3

Learning outcomes

- (1) <http://oucqa.ca/framework/appendix-1/>
- (2) <https://caqc.alberta.ca/learning-outcomes/>
- (3) Elmgren, M.; Ho, F.; Åkesson, E.; Schmid, S.; Towns, M. H. Comparison and Evaluation of Learning Outcomes from an International Perspective: Development of a Best-Practice Process. *J. Chem. Educ.* 2014, 92 (3), 427–432.
<http://pubs.acs.org/doi/abs/10.1021/ed500542b> (see SI for tables of learning outcomes)

Pedagogies

- (1) Waldrop, M. M. Why We Are Teaching Science Wrong, and How to Make It Right. *Nature* **2015**, 523 (7560), 272–274. <https://www.nature.com/news/why-we-are-teaching-science-wrong-and-how-to-make-it-right-1.17963>
- (2) Bradforth, S. E.; Miller, E. R.; Dichtel, W. R.; Leibovich, A. K.; Feig, A. L.; Martin, J. D.; Bjorkman, K. S.; Schultz, Z. D.; Smith, T. L. University Learning: Improve Undergraduate Science Education. *Nature* **2015**, 523 (7560), 282–284. <http://www.nature.com/doi/10.1038/523282a>
- (3) Freeman, S.; Eddy, S. L.; McDonough, M.; Smith, M. K.; Okoroafor, N.; Jordt, H.; Wenderoth, M. P. Active Learning Increases Student Performance in Science, Engineering, and Mathematics. *Proc. Natl. Acad. Sci. U. S. A.* **2014**, 111 (23), 8410–8415. <http://www.ncbi.nlm.nih.gov/pubmed/24821756>
- (4) Stains, B. M.; Harshman, J.; Barker, M. K.; Chasteen, S. V.; Cole, R.; DeChenne-Peters, S.

E.; Eagan Jr, M. K.; Esson, J. M.; Knight, J. K.; Laski, F. A.; *et al. Science*, **2018**, 359 (6383), 1468–1470. <http://science.sciencemag.org/content/359/6383/1468>]

Equity, Diversity, and Inclusion

Suggestions for improving Equity, Diversity, and Inclusion in Chemistry programs include:

- ☐ Provide evidence and/or tracking of related initiatives such as universal design, language, student advising, etc. Address access and safety in the chemical laboratory.
- ☐ Ask the departments to describe what they are doing to ensure that their program is accessible and welcoming to all persons.
- ☐ Suggestions for being equitable and inclusive include
- ☐ Activities aimed at involving and including equity-seeking groups.
- ☐ A considered selection of faculty and staff who are willing to be an ally for and mentor equity-seeking groups.
- ☐ Appropriate training for faculty and staff on equity and diversity issues. The departmental leaders are key persons that need to be educated on equity and diversity issues.
- ☐ Include a webpage for Equity and Diversity on the Department's website. The page could make it clear that the Department welcomes all persons. Resources for faculty, staff and students would be available on that web page including but not limited to resources for inclusive language, an LGBT+ glossary, a list of faculty and staff allies, links to relevant university resources on mental health, non-discrimination policies, the Equity Office, the Student Code of Conduct, a description of relevant activities in the department, an invitation for students to contact appropriate lab staff to accommodate physical disabilities in the labs.
- ☐ Ask the department to describe what efforts have been made to ensure that students with any range of disabilities can be accommodated in the undergraduate laboratory.
- ☐ Ask the department to describe what efforts have been made to ensure that the selection of undergraduate awardees and ranking of scholarship applicants has been an equitable process.
- ☐ Ask the department if the principles of equity and diversity have been considered for speakers in the departmental seminar series.
- ☐ Ask the departments to describe the diversity of the faculty including a description of appointment and promotion processes at the university. What efforts have been made to ensure adherence to equity policies relevant to appointments and promotion?
- ☐ Although perhaps outside of the scope of the Accreditation Committee, the admission policies for students, both graduate and undergraduate, should also be examined to determine if they are equitable and what efforts are being made to attract and retain underrepresented groups.
- ☐ If a university has multiple aboriginal students in the same program, i.e., a group of aboriginal pre-nursing students, the students would have to take Chemistry, Biology, Mathematics, Introductory Computer Science (*etc.*).
- ☐ A group of departments could make sure the students get access to small classes sizes for as many classes as possible and attempt to keep the students all together in the same cohort. Since they are all in the same classes (mostly) they get to know and

support each other. For example, the 6 would take intro Chemistry, Biology and Mathematics at the same time taught by a special instructor.

- ☐ Since this is chemistry accreditation, and it involves many academic units, it may not be fair to expect this to work throughout Canada. However, if departments are wondering how to support aboriginal students, this is one suggestion.
- (1) American Chemical Society Committee on Chemists with Disabilities. *Teaching Chemistry to Students with Disabilities: A Manual for High Schools, Colleges, and Graduate Programs*, 4th ed.; Miner, D. L., Nieman, R., Swanson, A. B., Eds.; The American Chemical Society, 2001.
- (2) Science and Engineering Leadership Initiative, U. of D. Resources for Students with Disabilities in STEM Fields | Science & Engineering Leadership Initiative (SELI) <https://sites.udel.edu/seli-ud/resources/> (accessed Nov 19, 2018).]

Indigenous students

- ☐ The Calls for Action of the Truth and Reconciliation Commission of Canada (<http://www.trc.ca>)
- ☐ Recognizing that many indigenous students coming from remote communities do not have the same opportunities for learning STEM disciplines due to the difficulties associated with attracting and retaining qualified STEM instructors, departments should be open to offering preparatory courses to small groups of indigenous students prior to their first year studies to assist in the transition to university-level STEM courses. Alternatively, the department, with the university, should make designated student teaching assistants available to indigenous students and funded using allocated university funds. Volunteer-driven learning communities can also be used to provide needed assistance to 1st year Indigenous students.
- ☐ Ensure access to elders, mentors (senior “cousins”) for indigenous students to aid in the transition from small communities to the university environment.
- ☐ Offer/participate in summer workshops for indigenous students and teachers employed at schools within indigenous communities.
- ☐ Offer/Participate in programs where a TA or instructor work with the community to provide a meaningful lab experience to indigenous students with the goal of training the teachers to improve and sustain the quality of STEM instruction.
- ☐ Provide personal, social, and cultural support to ensure the academic and personal success of indigenous students.

The CSC gratefully acknowledges the CSC’s Working group on Inclusion, Diversity, and Equity for their suggestions and resources.