Advances in Biology Laboratory Education, A Publication of the Association for Biology Laboratory Education
Volume 46, Article 28, 2026

Decolonizing the lab: Exploring different approaches for facilitating Indigenization in laboratory curriculum

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Extended Abstract

The Truth and Reconciliation Commission (TRC) of Canada was created to address and repair the harm caused to victims, survivors, and descendants of residential schools (About the NTRC 2025). Residential schools were aimed at separating and assimilating Indigenous children in government or religious institutions, causing and perpetrating generational trauma for over 150 years. Science education has played a significant role in reinforcing colonial narratives and perpetuating systemic oppression (Ways of Knowing 2021). It is therefore crucial to incorporate truth and reconciliation into teaching strategies to promote decolonization and Indigenization. Activities completed in introductory laboratory courses encouraged students to examine the relationship between science and Indigenous knowledge and learn how to incorporate Indigenous perspectives into their work as scientists.

The Calls to Action in Biology Laboratories activity was inspired by the 10 Calls to Action to natural scientists working in Canada, published by the Kluane National Park and Reserve, Kluane First Nation, Lac des Mille Lacs First Nation, and the University of Waterloo (Wong et al 2020). The students are briefly introduced in the laboratory to the TRC Calls to Action (CTAs), a list of 94 actionable recommendations meant to advance healing and reconciliation (Crown-Indigenous Relations and Northern Affairs Canada 2025). Despite their inspirational objectives, the CTAs can be challenging to apply in personal life as the recommendations generally apply to higher levels of federal, provincial, or municipal governance. We asked students and participants of the mini workshop to work as a team of 4 to 5 participants to build a list of 4 CTAs they could directly apply to their work during an environmental sampling activity around the campus. Participants are invited to think outside the box and consider all steps of the scientific method, including what must be completed before and after completing an experiment. During the discussion students demonstrated awareness of actionable ways to improve different experimental procedures in the field, but showed a need for further discussion on how to integrate their research project within Indigenous communities (Table 1). The land acknowledgement CTA was included on every team's list, and 20% to 40% of students incorporated an acknowledgement or the ancestral territorial name into the three assignments submitted throughout the term.

Table 1. Calls to Action submitted during students' group discussions

Consistently mentioned	Mentioned but required discussion	Not mentioned
Land acknowledgement	Collaboration with the Indigenous communities	Evaluation of the relevance of the research question and project to the communities involved in the project
Consultation with Elders		
Seeking alternative locations		
Only collecting what is necessary		

A second activity prompted the students to reflect on the impacts of, and solutions for, the absence of Indigenous, Métis, and Inuit communities in genomic databases during the completion of a bioinformatics assignment on variants leading to genetic conditions. Despite Canadian First Nations, Métis, and Inuit making up approximately 5% of the Canadian population (Statistics Canada 2023), they are virtually absent from reference genomic databases, significantly impacting their genomic diagnostic (Morgan et al 2018). During the completion of their assignment, students are asked to 1) review educational material from the Silent Genome Project (Silent Genomes IBVL 2022) to familiarize themselves with the existing disparities in genomic healthcare experienced by Indigenous Peoples and 2) reflect on what lead to their underrepresentation in reference databases, the potential consequences to Indigenous Peoples and what could be done to help increase the Indigenous Canadians representation in the databases. Alternatively, students could classify feedback and opinions from participants of Indigenous ancestry to focus groups on genomic testing and databases into overarching themes (Morgan et al 2018) as tested during the Mini Workshop. This substitute activity would put forward Indigenous voices and showcase the different intricate themes relevant to the topic, such as database governance and implementation practices.

These strategies can help students by incorporating a critical lens in science education and centering the voices and experiences of Indigenous peoples, understanding the importance of respecting Indigenous knowledge systems and developing cultural competency skills essential for working with Indigenous communities respectfully and ethically. These activities help students develop skills that go beyond technical learning outcomes, fostering empathy, critical thinking, and cultural awareness. By engaging with the human and community contexts behind the information, students learn to view data points as representations of real individuals and lived experiences, rather than as abstract figures alone.

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Keywords: Indigenization, Calls to Action, Truth and Reconciliation, Land Acknowledgement, Genomics

Citation: Lepage M. 2026. Decolonizing the lab: exploring different approaches for facilitating indigenization in laboratory curriculum. Extended abstract 28 in: Cole M and O'Brien J, eds. *Advances in biology laboratory education*. Volume 46. Publication of the 46th Conference of the Association for Biology Laboratory Education (ABLE). DOI: https://doi.org/10.37590/able.v46.extabs28

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