Teaching Dossier
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1 Introduction

Ever since my first opportunity to teach in the Fall of 2019, I have found myself captivated by higher education. While it's been six years since then, and a lot has changed, my passion for chemical education, and in particular accessibility, remains high. I've taught in a variety of settings across two major institutions, while also being research active in both traditional and pedagogical roles. In the following sections, I hope to give a brief glimpse into my teaching philosophy, experience, and goals.

2 Teaching Philosophy

When I was hired for the first time as a teaching assistant during my undergraduate degree, I don't think I can describe the excitement I felt for the job. It was a personal dream to be able to work in my discipline throughout the school year. I took my position very seriously, and wanted to be the best educator I could so that others might join the chemistry department. When I first started teaching, however, I was very inexperienced and lacked a clear idea of teaching. I was told about what concepts I was responsible to teach, and I was familiar with the subject matter, but no one ever sat me down and said "Hey, here is how to be a good teacher." Starting out, I found this frustrating, and so I decided to take matters into my own hands.

During the same term that I had started teaching, I asked several professors whom I admired as educators if they would be willing to sit down with me and discuss how they taught. What did they think was important to student education? How did they accomplish these goals? Did they ever receive pushback from their methods, and if so how did they adapt and improve upon their teaching style? These discussions were crucial in forming my initial teaching philosophy, and the more conversations I started to have the more I started to come into my own with respect to teaching.

One of the pillars of my teaching philosophy shaped from these conversations is the difference between intelligence and experience. Every single student I have taught, whether directly or indirectly, is as smart if not smarter than I am. The difference between myself and my students is therefore a matter of experience. I know more than they do because I have been studying the material longer than they have been, not because I am smarter than them. This is essential to my approach with students when tackling challenging concepts. I consider it an insult to their intelligence and potential to give them the answer to a problem. They are competent, they are scientific thinkers, they can solve what we ask of them. It therefore becomes my job to act as a guide, not only for the course material, but also a guide to navigate self-doubt. Students ask questions often because they want reassurance in what they are saying/rationalizing, which is completely normal when presented with new material. It is my job to show them that making mistakes is part of the process, and to instill confidence in their ability to critically think.

After a year of teaching experience, I was more confident in my abilities as an educator and eager to apply them in following years. Unfortunately, around this time the COVID-19 pandemic struck, and Dalhousie moved to an online learning format. Despite this, it seems that my attitude had impressed the course coordinator, and I was given

the opportunity to develop the 1st year chemistry labs for an online setting. I eagerly accepted, and from this experience I started to expand upon my previous teaching ideas. I was given a large amount of freedom in terms of developing online content, and from this stemmed something I had wanted to do for a long time: implement higher level non-testable concepts into the introductory class. I have dubbed this the "more is more" approach, with the goal being to increase student engagement within chemistry. I wanted students to understand that "Yes we're giving you a proper introductory model for *insert relevant Chemistry topic*, but you should know that it is far more complicated than what we're teaching you here." Giving a more complete picture is imperative to building intrinsic motivation within students, which is crucial for student success. I want students to learn not because they have to, but because they want to. I want them to look at those more advanced examples and go "Oh that's really interesting, how does that work?" and proceed to ask a teaching assistant more about that subject. In this light, we had a student in the 1st year online course who, during their lab report, rationalized their results by using a higher-level optional model we had implemented. This was not only a highlight of that term, but remains one of the highlights of my career as an educator thus far.

While I was implementing new material into the course to enhance student learning, I simultaneously focused on another aspect that matters greatly to me: accessibility. Many of the experiments in the 1st year chemistry laboratory at Dalhousie rely heavily on the fact that most people have full colour vision. As someone who is red-green colour-blind (deuteranopic), having the opportunity to make the online modules as colour-blind friendly as possible was something I really pushed for. We implemented several features and options into 8 (out of 16) experiments that reduced barriers in the way of colour-blind students by adding the ability to hover over a reaction, and having a text box appear that would tell them the colour. It is important to recognize here that telling the students the colour does not explicitly tell them the result; they are still required to interpret and rationalize what they're being told and how that relates to the experimental outcome. This is important as it creates equity within the course space, and allows students of all colour vision types to succeed. At the same time that I was editing these modules modules, I was also in Ottawa that summer for a research exchange. This is relevant as before I was allowed to work at my host institution (Carleton), I had to undergo accessibility training. This opened my eyes to so many more aspects of accessibility, most notably to making documents screen reader friendly. I then made it a point to make sure all of our modules had screen reader friendly scripts on top of the regular content. I was even asked to update the department wide Laboratory Safety Module in an accessible manner.

These forays into course accessibility have extended far past the initial online ideas. Since then, I've been invited by *Nature* to share my ideas on colour accessibility, and I've also contributed to a book on the topic. I was also incredibly fortunate to have won the Gilead Early Career for Excellence in Equity, Diversity and Inclusion (EDI), and gave a lecture for the Working for Inclusion, Diversity, and Equity (WIDE) seminar series. In addition to my focus on vision impairments, my Master's has focused on the design of automated accessible devices for both research and education, with one educational tool receiving very good feedback from the larger chemistry education community. Indeed, during my MSc I was often asked by my peers about making their figures or papers more accessible, which I was always very happy to help with. In addition, I was a part of the EDI commit-

tee during my MSc, and helped to contribute awareness and resources to the department regarding accessible paper and poster making.

I think it's very important that students get opportunities beyond the classroom to learn about science. In my experience, the exciting part of science is getting to do things like design a study and perform experiments to falsify your hypothesis. To this end, I always make it a point to show eager students more of what science is about, and in some cases to mentor them on scientific projects. I've done lab tours, helped build CV's, helped with graduate program recommendations/applications, designed projects for them to work on that align with their interests, and even advising prospective high school students. It brings me great joy to watch these students become successful in their own light, and I know very well how challenging navigating the academic landscape can be. I was fortunate enough to have fantastic mentors; the least I can do is try my best to mentor those new students as I was mentored.

A very wise person once told me that: "It's my responsibility to raise and train the next generation of scientific thinkers. The very least I can offer them is my time." Likewise, I will continue to put time and effort into training the next generation of scientists, by treating them as equals, keeping my teaching practice accessible and giving them opportunities to excel. After all, they will be the ones to change the world.

3 Teaching Experience

3.1 Teaching Appointments

1. **The University of Victoria**

   1.1. **Introduction to Organic Chemistry (CHEM 231) Teaching Assistant** Fall 2024

   1.2. **Synthetic Chemistry Laboratory (CHEM 260) Teaching Assistant** Fall 2023 – Winter 2024

2. **Dalhousie University**

   2.1. **First Year Neuroscience/Psychology Laboratory Prefect** Fall 2022 – Winter 2023

   - Winter 2023 – Introduction to Psychology and Neuroscience II (IN-PERSON CLASS – 30 Students)
   - Fall 2022 – Introduction to Psychology and Neuroscience I (IN-PERSON CLASS – 30 Students)

   2.2. **Senior Teaching Assistant Chem 1011/1021 and Chem 1012/1022 Laboratory** Fall 2020 – Winter 2023

   - Winter 2023 – Concepts in Chemistry II: Energy and Equilibrium Laboratory (IN-PERSON CLASS – 100 Students)
   - Fall 2022 – Concepts in Chemistry I: Structure and Reactivity Laboratory (IN-PERSON CLASS – 100 Students)

- Summer 2022 – Concepts in Chemistry I: Structure and Reactivity Laboratory (IN-PERSON CLASS – 100 Students)
- Winter 2022 – Concepts in Chemistry II: Energy and Equilibrium Laboratory (BLENDED CLASS – 1200 Students)
- Fall 2021 – Concepts in Chemistry I: Structure and Reactivity Laboratory (BLENDED CLASS – 1200 Students)
- Winter 2021 – Concepts in Chemistry II: Energy and Equilibrium Laboratory (ONLINE CLASS – 1200 Students)
- Fall 2020 – Concepts in Chemistry I: Structure and Reactivity Laboratory (ONLINE CLASS – 1200 Students)

2.3. **First Year Chemistry Teaching Assistant Online Training Developer** June 2022 – August 2022

2.4. **First Year Chemistry Online/In-Person Course Developer** Summer 2020 – April 2023

2.5. **Teaching Assistant Chem 1011/1021 and Chem 1012/1022 Laboratory**

- Summer 2022 – Concepts in Chemistry II: Energy and Equilibrium Laboratory (IN-PERSON CLASS – 100 Students)
- Winter 2020 – Concepts in Chemistry II: Energy and Equilibrium Laboratory (INPERSON CLASS – 100 Students)
- Fall 2019 – Concepts in Chemistry I: Structure and Reactivity Laboratory (IN PERSON CLASS – 100 Students)

3.2 Teaching Responsibilities

3.2.1 In-person Course Delivery

Tutorial Teaching Assistant Responsibilities for CHEM 231: As a teaching assistant for CHEM 231, my primary responsibility was teaching 3 tutorial sections (90 students) on a weekly basis. This involved blackboard style lessons combined with worksheets to help students better understand the concepts they were learning in class. In addition, I was responsible for marking quizzes and exams, invigilating exams, and attending weekly meetings about the course material.

Laboratory Teaching Assistant Responsibilities for CHEM 260: As a teaching assistant for CHEM 260, my responsibilities included instructing, marking and discussing with 16 undergraduate students completely independently of the other course instructors. This involved my giving the pre-lab talk, marking all students' reports, replying to emails and teaching them how to perform the experiments on a bi-weekly basis. It also involved teaching students during a tutorial section on top of their normally scheduled lab session.

Laboratory Prefect Responsibilities for PSYO 1011/1012: As the sole laboratory prefect for a section of the PSYO course, my responsibilities included emailing students (and replying to their inquiries via email), marking reports, teaching laboratory content and host-

ing office hours to answer questions. I also had to be knowledgeable about the subject matter at hand, requiring many hours of practice as well as study.

Senior Teaching Assistant Lab Responsibilities for Chem 1011/1012: As Senior TA of a lab section, I managed a team of 3 TAs per semester, which involved my answering questions that they had about the content or about some of the more unusual circumstances that students presented. I was also in charge of pre-lab talks for every experiment, in which I would give an overview of what the class would be doing this week. The other usual tasks of a TA (e.g answering student questions in lab, making sure the lab is a safe environment etc.) were also a part of my responsibilities.

Teaching Assistant Lab Responsibilities for Chem 1011/1012: As an in-lab TA, some of my duties included showing up prepared to every lab, answering student questions, aiding in developing student lab skills and marking lab reports.

3.2.2 Online Course Delivery

Online Senior Teaching Assistant Monitoring of Discussion Boards for Chem 1011/1012: A large responsibility of this position was monitoring the discussion boards for the lab portion of the class. Outside of my scheduled 2 hour time slot, as Senior TA overseeing the discussion boards (and discussion board TA team), I did this task daily so that students always had a line of support any day of the week that they needed it.

Online Senior Teaching Assistant Responsibilities for Chem 1011/1012: I managed a team of 9 TAs this semester, which involved me answering questions that they had about the content or about some of the more unusual circumstances that students presented (modules not working, handing in late work etc.)

3.2.3 Concept Room Tutorials

Senior Teaching Assistant Office Hours for Chem 1011/1012 As a Senior TA, I have concept room hours. These are similar to office hours that an instructor would have; I would be in our in-house concept room for 1.5 hours every week to answer student questions. While I am a lab TA, and my section was mostly meant to prioritize lab questions, I also provided support in answering lecture-based questions throughout the term if students were having a difficult time with the material. If the in-person sessions were slow (i.e. students did not show up), I would answer questions on our online discussion boards.

3.3 Student Mentorship

Graduate Mentor for a CHEM 290/390 Project Summer – Fall 2024
Description: Over the summer and fall of 2024, I devised and mentored an undergraduate student research project in creating an automative device. Responsibilities included design, teaching the student CAD/3D printing and general project oversight.

Graduate Mentor for a First year undergraduate student Summer 2024
Description: Over the summer of 2024, I (along with two other graduate students) shared in mentoring duties with a full time first year research student. Responsibilities included

teaching them general lab techniques, teaching them background on chemistry subjects they've not covered, and ensuring their safety during over the course of the summer.

Graduate Mentor for a CHEM 499 Project Winter – Summer, 2024
Description: CHEM 499 is the honours program at the University of Victoria. I mentored an Honours student during the Winter and Summer terms (Jan - August, 2024). Responsibilities included direct oversight of their research project, teaching them how to 3D print/prototype parts, reviewing their thesis and providing general guidance on the day to day.

Graduate Mentor for a CHEM 490 Project Fall 2023
Description: I mentored a senior undergraduate student during the Fall term of 2023 as part of their course credit. Responsibilities included teaching them how to use LaTeX via Overleaf, Zotero for reference management and general scientific reading/writing skills.

Graduate Mentor for a CHEM 399 Project Fall 2023
Description: I mentored a senior undergraduate student during the Fall term of 2023 as part of their course credit. Responsibilities included designing experiments, discussing chemistry with the student and training the student in open-air benchtop techniques (e.g. reflux, sampling automation, field work).

Senior Undergraduate Mentor for the Colour Vision Deficiency Project Summer 2022
Description: During the summer of 2022, I recruited and mentored an undergraduate student to be a part of the Colour vision deficiency (CVD) project that the first year team had started. Responsibilities for this included teaching the student how to make our filters, help them with writing for some of our in progress reports and acting as a resource for CVD in the laboratory.

Senior Undergraduate Mentor for the Chitnis Group Winter 2022
Description: During the Winter term of 2022, I was asked to mentor a new undergraduate student in the Chitnis group for a project that we would be working on together. Responsibilities involved training the student in air- sensitive synthetic techniques, writing a standard operating procedure (SOP) with them, helping to analyse data (e.g. nuclear magnetic resonance (NMR) data, kinetic data), teaching them how to properly use a Bunsen burner and acting as a general source of support with respect to lab techniques and the Chemistry of the group.

3.4 Contributions to Course Development and Course Re-design

3.4.1 PSYO 1011/1012 Laboratory Content Developer

Course Development: As part of the Experiential Learning in Science Communication I/II courses, students are required to develop a new laboratory for the PSYO 1011/1012 courses. Along with three other students, we developed a lab on social psychology, with the goal of demonstrating the effect of conformity. My responsibilities included a tutorial video on excel, making an excel graphing template, and developing the slide deck for the experiment. Website: Experiential Learning in Science Communication Syllabus

3.4.2 Chemistry Essential Skills Course Developer

Course Development: I was asked by a faculty member to help develop the Essential Skills Course in Chemistry, which was designed as a non-credit course meant to teach students various skills that will be helpful for them in their Chemistry degrees. These skills included how to use academic search engines (e.g. SciFinder), the basics of Excel/programming, an overview of math they should know, and some useful resources that undergraduate students have found over the years. My responsibilities for this included developing content for all of the above, as well as giving a lecture on how to search for academic references (Summer 2022).

3.4.3 Chem 1011/1012 TA Training Modules

Module Development: I have developed independently and collaboratively all of the TA training modules for the Chem 1011/1012 course. The work here consisted of developing TA training modules from scratch (coming up with the format, content, problems), writing scripts for all 16 experiments, making every module interactive, and taking modules made by other developers and making them interactive (Summer 2022).

3.4.4 Chem 1011/1012 Online Laboratory

Module Development: I have developed, either independently or collaboratively (i.e. editing modules made by other developers), all 16 experiments for Dalhousie's Chem 1011/1012 as well as 4 administrative modules for the course. The work involved here includes bringing content to an online format, updating/changing parts of the experiments, creating scripts/slide decks, creating practice problems for students, managing and inputting raw data sets for students, and bringing the Laboratory Safety and Laboratory Techniques modules into the online format while making all of the above accessible for screen readers.

3.4.5 Chem 1011/1012 Lab Manual

Lab Manual Author/Editor: As one of the lab content developers, editing our lab manual for the Fall 2021/Winter 2022 terms was part of my responsibilities. This involved adding new, novel content into the course as well as proof-reading the content within the manual (making sure that: there weren't typos, spacing was appropriate, nothing was difficult to read/understand etc.).

3.4.6 Cool Reaction of the Week for Chem 1011/1012

Cool Reaction of the Week: Some experiments are less demanding on students than others, and as such some weeks will be slower for TAs than others (with respect to student questions). In an attempt to garner interest in Chemistry and to practice my own knowledge of Organic/Inorganic Chemistry, I started doing a "cool reaction of the week" on the blackboard in lab to try and get students to ask questions or think about more advanced subjects in Chemistry.

3.4.7 Tutorial Recordings for Chem 1011/1012

Tutorial Recordings: Over the winter break of 2020, I recorded a video tutorial series for the post-lab of Experiment 10. This has been, historically, one of the more challenging post labs, and so we wanted to update the pre-existing videos which were sorely out of date. Some of the responsibilities of this included creating slide decks for the math portion of the post lab explanation and writing and recording a video covering the theory of the post-lab (the latter was newly introduced). Student reception of this series was overwhelmingly positive, with 4000 views within a single week. A more explicit example can be found on page 15.

4 Evidence for Teaching Effectiveness

4.1 Certificate in University Teaching and Learning, Dalhousie University

Throughout my undergraduate education I have pursued Dalhousie's most prestigious teaching certificate, despite it typically being reserved for graduate students. This is a highly demanding program, requiring intensive theory, practice and professional development, as well as the creation of a teaching dossier. Below you can find the completed certificate. Website: Certificate in University Teaching and Learning – Dalhousie University

DALHOUSIE UNIVERSITY | CENTRE FOR LEARNING AND TEACHING

This is to certify that

Nicholas J. Roberts

has been awarded the

Certificate in University Teaching and Learning

March 2023

Due to the current circumstances and suspension of in-person activities at Dalhousie, this interim digital certificate confirms completion of the CUTL program and can be used in dossiers. A formal, signed certificate will be issued at a later date.

Contact clt@dal.ca for more information.

4.2 Student Feedback

4.2.1 Summary of Evaluation Data for the CHEM 231 Tutorial

Academic Term	Course	Position	Average Rating	# of Ratings
Fall 2024	Chem 231 (IP)	TA	4.7	16

Table 1: Summary of student feedback for the Chem 231 tutorials. 'IP' is an abbreviation for 'in-person'; 'TA' is an abbreviation for 'Teaching Assistant'. The results here are from custom surveys that I had made (results were anonymized when collecting data), and ratings are out of 5.

Academic Term	Course	Position	Average Rating	# of Ratings
Fall 2024	Chem 231 (IP)	TA	4.41	7

Table 2: Summary of student feedback for the Chem 231 tutorials. 'O' and 'IP' are abbreviations for 'online' and 'in-person', respectively; 'STA' and 'TA' are abbreviations for 'Senior Teaching Assistant' and 'Teaching Assistant'. The results here are taken from the departmental evaluations, and ratings are out of 5.

4.2.2 Summary of Evaluation Data for the CHEM 260 Laboratory

Academic Term	Course	Position	Average Rating	# of Ratings
Winter 2024	Chem 260 (IP)	TA	3.93	3
Fall 2023	Chem 260 (IP)	TA	4.93	6

Table 3: Summary of student feedback for the Chem 260 laboratory. 'IP' is an abbreviation for 'in-person'; 'TA' is an abbreviation for 'Teaching Assistant'. The results here are from custom surveys that I had made (results were anonymized when collecting data), and ratings are out of 5.

Academic Term	Course	Position	Average Rating	# of Ratings
Fall 2023	Chem 260 (IP)	TA	4.66	4

Table 4: Summary of student feedback for the 260 laboratory. 'O' and 'IP' are abbreviations for 'online' and 'in-person', respectively; 'STA' and 'TA' are abbreviations for 'Senior Teaching Assistant' and 'Teaching Assistant'. The results here are taken from the departmental evaluations, and ratings are out of 5.

4.2.3 Summary of Evaluation Data for the Chem 1011/1012 Laboratory

Academic Term	Course	Position	Average Rating	# of Ratings
Winter 2023	Chem 1012/1022 (IP)	STA	4.64/5	2
Fall 2022	Chem 1011/1021 (IP)	STA	4.82/5	10
Summer 2022	Chem 1012/1022 (IP)	TA	4.98/5	7
Summer 2022	Chem 1011/1021 (IP)	STA	5/5	2
Winter 2022	Chem 1012/1022 (IP)	STA	4.65/5	4
Fall 2021	Chem 1011/1021 (IP)	STA	4.75/5	12
Winter 2021	Chem 1012/1022 (O)	STA	4.87/5	20
Fall 2020	Chem 1011/1021 (O)	STA	4.79/5	19
Winter 2020	Chem 1012/1022 (IP)	TA	4.4/5	14
Fall 2019	Chem 1011/1021 (IP)	TA	4.65/5	8

Table 5: Summary of student feedback for the Chem 1011/1012 laboratory. 'O' and 'IP' are abbreviations for 'online' and 'in-person', respectively; 'STA' and 'TA' are abbreviations for 'Senior Teaching Assistant' and 'Teaching Assistant'. The results here are all internal student ratings of instruction (SRI).

4.2.4 Summary of Evaluation Data for the PSYO 1011/1012 Laboratory

Academic Term	Course	Position	Average Rating	# of Ratings
Winter 2023	PSYO 1012 (IP)	Prefect	4.3/5	23
Fall 2022	PSYO 1011 (IP)	Prefect	4.15/5	25

Table 6: Summary of student feedback for the PSYO 1011/1012 laboratory. 'IP' is an abbreviation for 'in-person'. The results here are all internal student ratings of instruction (SRI). Note here that a 'Prefect' is an unpaid position; teaching responsibilities were part of a course credit.

4.2.5 Evidence for the Effective Implementation of an Asynchronous Tutorial for Chem 1012/1022

During Winter 2021, I recorded and implemented a tutorial for Experiment 10 for the Chem 1012/1022 course. In order to assess its effectiveness, the difference between grades of those who used the tutorial (tutorial users, TU) and those who did not (non-tutorial users, NTU) were evaluated. The major results were as follows:

Winter 2021			**Winter 2022**		
TU (%)	**NTU** (%)	**Difference** (%)	**TU** (%)	**NTU** (%)	**Difference** (%)
92.34	78.45	13.91	88.30	78.61	9.70

4.3 Teaching Honours and Awards

STLHE D2L Innovation Award, National 2022
Description: An award that "celebrates excellence in collaborative teaching and learning in post-secondary education", given out to a team of educators (A. Crane, J. MacDonald, M. Wall, J. Tassone, A. Allison, R. Karaballi, M. Charlton, I. Curtis, R. Foisy, L. Getz, P. Giesbrecht, K. Jones, E. Lyle, M. Margeson, S. Martell, **N. Roberts**, J. Weatherby). Website: 2022 D2L Innovation Award Recipients – STLHE

President's Graduate/Undergraduate Student Teaching Award, Dalhousie University 2022
Description: An award given once a year to Dalhousie's top teaching assistants, based on contribution to the field of education as well as the Scholarship of Teaching and Learning (SoTL). I was the first undergraduate student in Dalhousie's history to have won this award. Website: President's Graduate Student Teaching Award Recipients

Educational Leadership Award for Collaborative Teaching, Dalhousie University 2021
Description: An award given to a team of educators (A. Crane, J. MacDonald, M. Wall, J. Tassone, A. Allison, R. Karaballi, M. Charlton, I. Curtis, R. Foisy, L. Getz, P. Giesbrecht, K. Jones, E. Lyle, M. Margeson, S. Martell, **N. Roberts**, J. Weatherby) on the merit of inclusive and accessible learning opportunities for all students. Website: Educational Leadership Award for Collaborative Teaching Recipients

College Chemistry Canada (C3) General Student Scholarship, National 2021
Description: The C3 general student scholarship is an annual scholarship given to a student pursuing Chemistry at a post-secondary institution. Some of the highlights of the award package for this national award include: contributions to Chemical education (both in person and online course delivery), community building and outreach, academic research and accessibility. Website: College Chemistry Canada - Awards

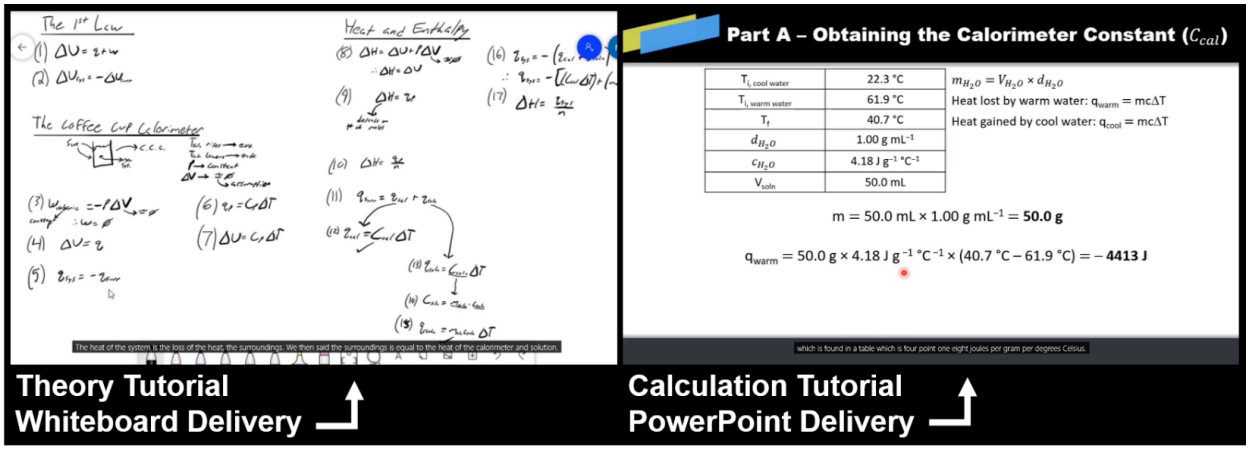
Undergraduate Student Award for Teaching Excellence in Chemistry, Dalhousie University 2021
Description: An award meant to: "celebrate the outstanding contributions made to undergraduate education in the Department of Chemistry by a Teaching Assistant through their teaching and/or teaching and learning research." Website: Scholarships, Awards and Prizes - Department of Chemistry

Spirit of Chemistry Award, Dalhousie University 2020
Description: An award given to: "a student who has demonstrated enthusiasm and dedication in the promotion of Chemistry both socially and academically." Some noteworthy parts involved in the nomination include: teaching excellence, outreach, volunteering, research, and recruitment/retention initiatives. Website: Scholarships, Awards and Prizes - Department of Chemistry

5 Sample of Teaching Material

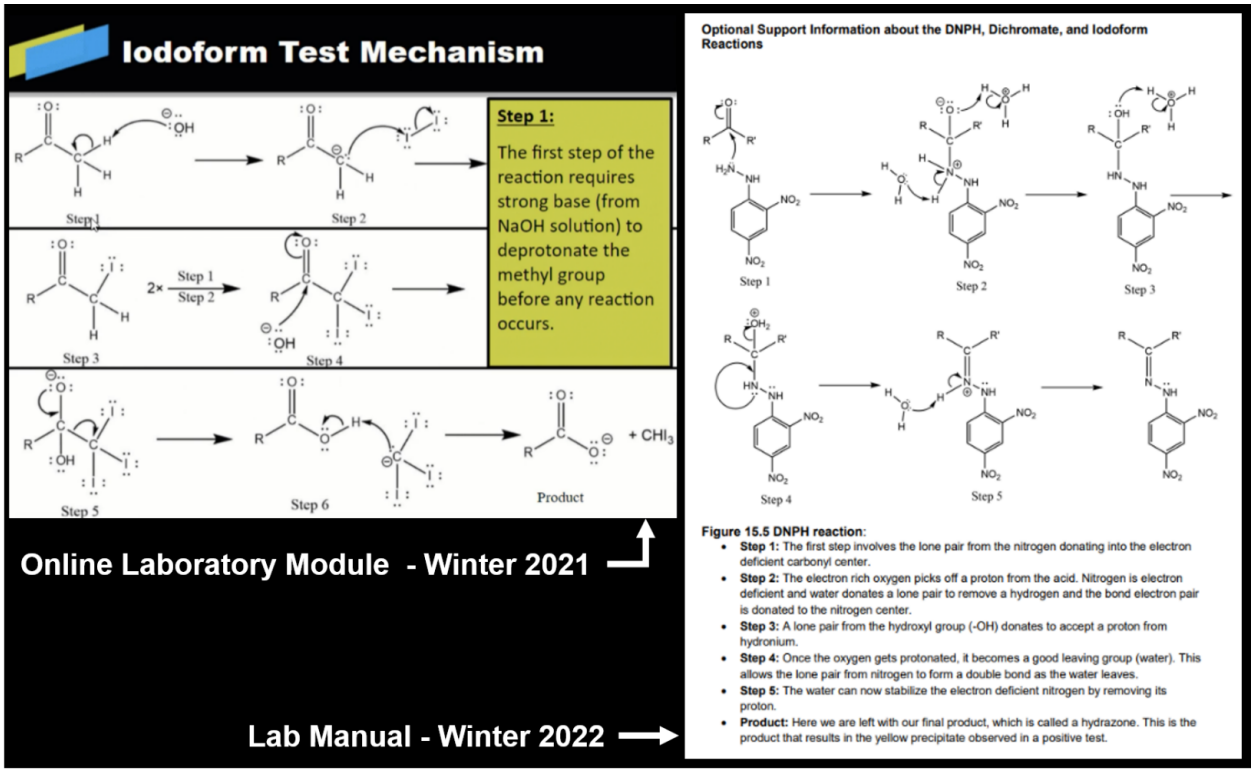
5.1 New Implementation of Material into Experiment 10 for Chem 1012

Included below are two screenshots of a newly introduced tutorial series for Chemistry 1012 Experiment 10 covering the theory and math behind the experimental topic of calorimetry. The thermodynamic relationships that are present in the lab are derived by hand for students to see to hopefully make the math portion of the experiment less daunting. This, along with 3 other videos covering the calculation portion of the experiment, garnered around 4000 views within a week, which was a record number for the course. If you would like to view these tutorials yourself, you can do so at the following link: Chem 1012/1022 Tutorial Series - Nick Roberts - Winter 2021



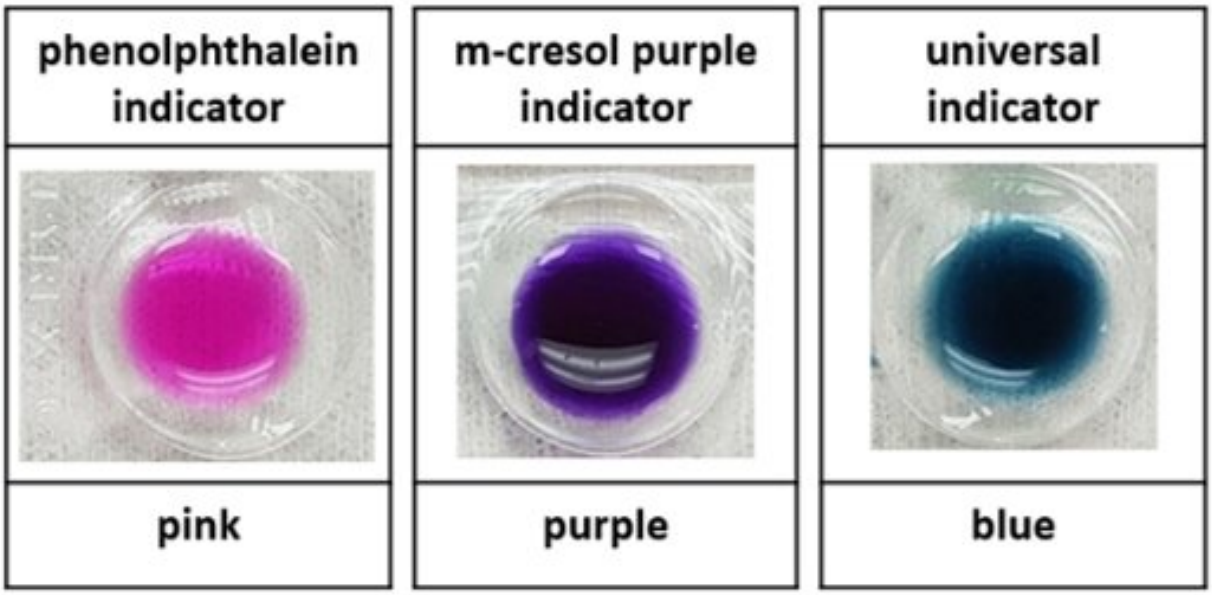
5.2 New Implementation of Material into Experiment 15 for Chem 1012

Pictured below are examples of the newly introduced optional mechanistic material for Experiment 15 (Chem 1012) in an online lab module and in the in-person lab manual. This content went over so well that it is now being kept in all editions of the Chem 1012 lab manual moving forward.



5.3 Implementation of Colour Vision Deficiency (CVD) Support for Chem 1011/1021 and Chem 1012/1022

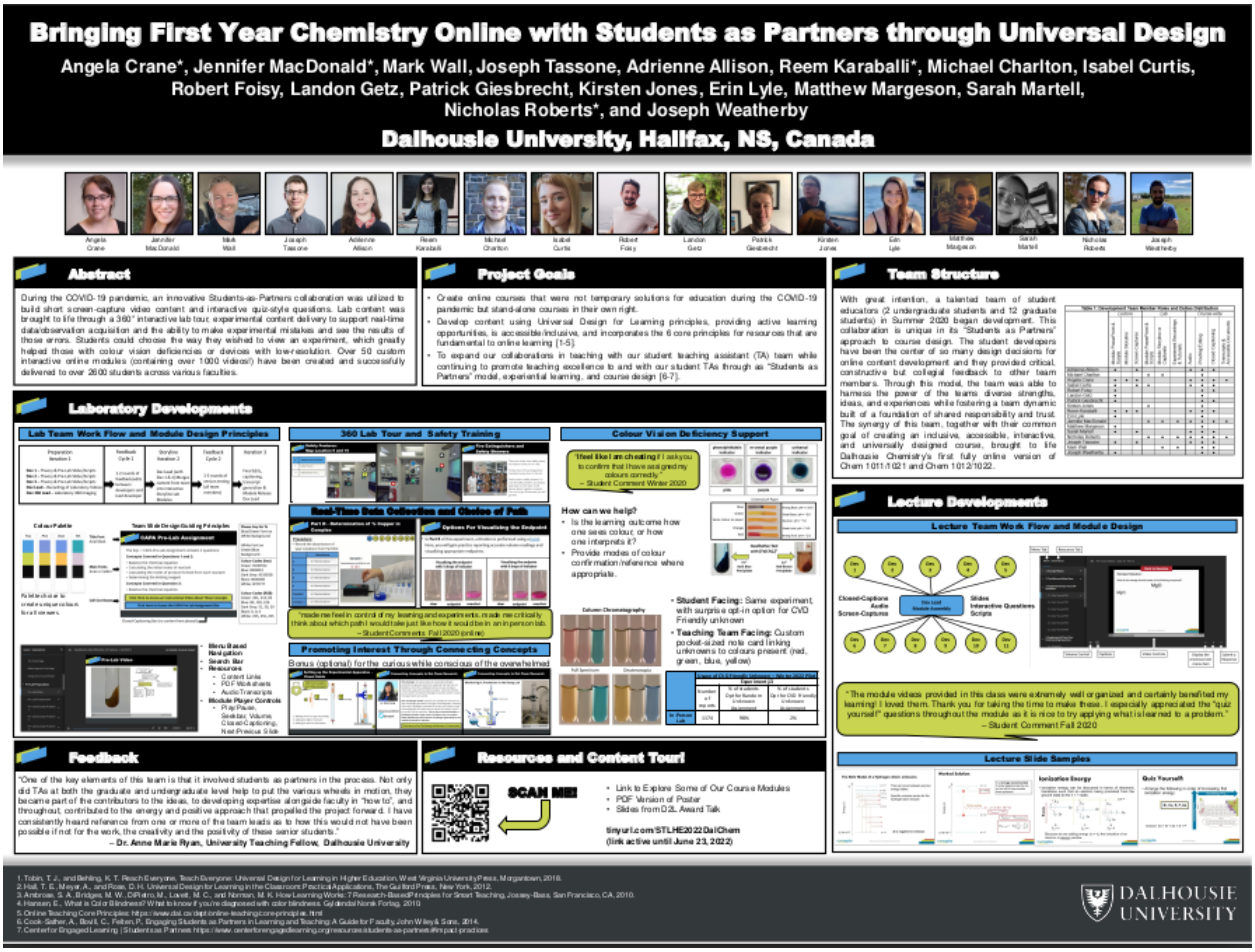
Below are examples of some of the many CVD implementations I had a hand in adding to the introductory Chemistry course at Dalhousie. These supports are now permanent implementations into the course.



	Drops of Indicator Used During Titrations: Fall 2020 and Fall 2021					
	Experiment 4			Experiment 6		
	Number of Reports	3 drops of indicator	6 drops of indicator	Number of Reports	3 drops of indicator	6 drops of indicator
Fall 2020 Online	1197	49.3%	50.7%	1138	55.1%	44.9%
Fall 2021 In-Person	1167	93.7%	6.3%	1228	94.3%	5.7%

5.4 Society for Teaching and Learning in Higher Education (STLHE) Poster from the Annual STLHE Conference

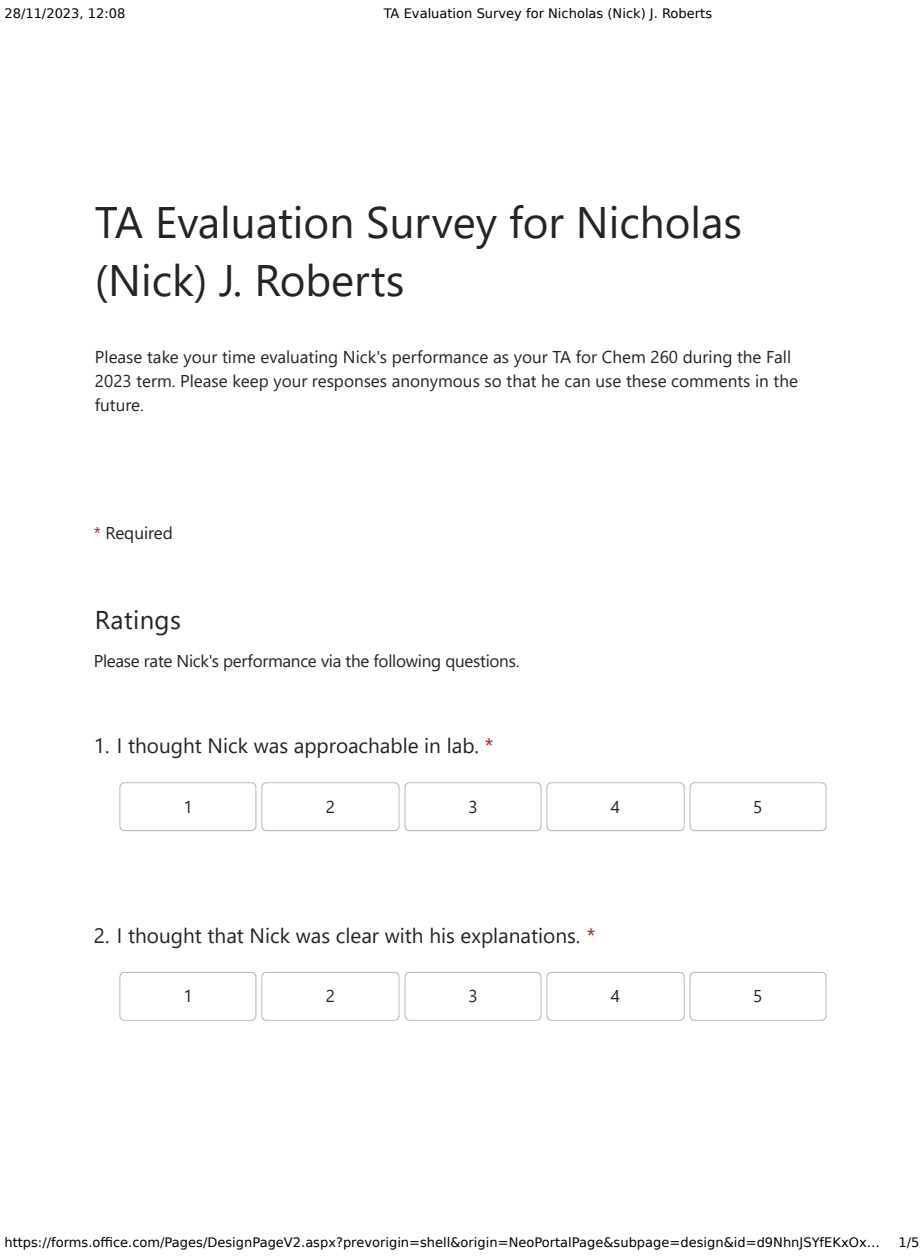
Below is the poster brought to the annual STLHE conference.



6 Professional Development

Design of a Custom Feedback Survey for Teaching Evaluations November 2023

Description: During the Fall of 2023, I was informed by the course coordinator that teaching assistant evaluations often take years to be given the relevant teaching assistants at the University of Victoria. Taking this into my own hands, and with approval from the course coordinators, I designed and sent to my chemistry 260 class a custom feedback survey (see below for a small snippet).



28/11/2023, 12:08 TA Evaluation Survey for Nicholas (Nick) J. Roberts

TA Evaluation Survey for Nicholas (Nick) J. Roberts

Please take your time evaluating Nick's performance as your TA for Chem 260 during the Fall 2023 term. Please keep your responses anonymous so that he can use these comments in the future.

* Required

Ratings

Please rate Nick's performance via the following questions.

1. I thought Nick was approachable in lab. *

1 2 3 4 5

2. I thought that Nick was clear with his explanations. *

1 2 3 4 5

https://forms.office.com/Pages/DesignPageV2.aspx?prevorigin=shell&origin=NeoPortalPage&subpage=design&id=d9NhnJSYfEKxOx... 1/5

Certificate in University Teaching and Learning, Dalhousie University 2023
Description: The certificate in university teaching and learning is a program designed for graduate and post- doctoral fellows to develop their teaching abilities in higher education. As an undergraduate, an exception was made such that I could pursue this.

CLT: Creating Open Educational Resources (OER) Textbooks to Enhance Students' Learning (Virtual) March 2023
Description: I attended a Center for Learning and Teaching (CLT) Webniar about OERs and how best to design/implement them into your course. This consisted of a ca. 60 minute talk by three speakers, with time allotted for questions at the end. Website: Past CLT Webinars

Meeting with Prof. Erika Merschrod July 2022
Description: Prof. Erika Merschrod came to Dalhousie as a visiting speaker to discuss Chemical Education. After her talk, a small group of students was asked to have an informal talk with her about Chemical education; I was among these students. The talk was a ca. 45 minute informal conversation about teaching strategies and how to increase interest in Chemistry for students.

CLT Summer Assessment Retreat July 2022
Desciption: The summer assessment retreat consisted of a week of fully online sessions that focused on the topic of assessments. I attended two of these sessions, one consisting on the assessment of large classes and the other on the assessment of your assessments. Both sessions were ca. 60 mins in length.

Teaching Strategies Meetings April 2022
Description: At the end of the winter term, I took the initiative to meet with Dr. Leanne Stevens to discuss how to design a course and to talk strategies with regards to science communication. This consisted of a ca. 60 minute interview discussing course evaluation, design, how to make proper assessments and how to get into the practice of science communication.

Synchronous In-Person Laboratory Teaching Observation December 2021
Description: Over the Fall semester of 2021, I took the initiative to ask that Dr. Jennifer MacDonald (Jenn) perform a teaching observation on me during 2 of my pre-lab talk sessions (one for section B09 and one for section B10). I wanted to have an evaluation performed to ensure that I was doing a good job with the material being presented as well as being consistent between both sections that I was teaching. Jenn then also monitored my performance during my lab sections, noting my interactions with students and TAs alike. This was done at Center for Learning and Teaching (CLT) standards, using their provided evaluation chart as well as Jenn's own personal way of note taking.

Teaching Strategies Meetings November 2021
Description: During the Fall semester of 2021, I took the initiative to arrange a meeting with Dr. Jennifer MacDonald (Jenn) to discuss my performance as a senior teaching assistant for the first year Chemistry labs. This consisted of a ca. 60 minute interview discussing what I could be doing better and addressing personal frustrations in taking on

more of an instructor type role.

Teaching Strategies Meetings April 2021
Description: During April of 2021, I met with Dr. Katherine Marczenko (now an instructor at the University of Guelph) to discuss improving teaching practices as well as how to improve course design. This consisted of a ca. 60 minute interview about her teaching philosophy and how she was planning on teaching her upcoming courses in inorganic Chemistry at the University of Guelph.

Asynchronous Video Tutorial Teaching Observation December 2020 – March 2021
Description: There was large interest in re-vamping an old tutorial series for the thermodynamics experiment for Chem 1012/1022. I took on this challenge and updated the pre-existing tutorial, as well as added in a new section for background theory. This tutorial consisted of the new background theory video, as well as calculations for the students post labs. An anonymous survey was also developed to evaluate the effectiveness/interest in this series. This was then observed and evaluated by Dr. Jennifer MacDonald, to provide further feedback on the series.

Dalhousie Conference on University Teaching and Learning, Halifax, NS (Virtual) 2021
Description: This was an event aimed at getting some noteworthy teachers in Atlantic Canada to discuss their teaching approaches in the new online format.

First Year TA Training (37 Sessions) 2019 – 2023
Description: These were meetings held before your regularly scheduled lab section that involved a walkthrough of the experiment and things to look out for. These were completed either individually or in a group setting.

Teaching Strategies Meetings Fall 2019
Description: Over the Fall semester of 2019, I took the initiative to arrange meetings with 3 faculty members (Dr. Jennifer L. MacDonald, Dr. Roderick Chisholm and Dr. Alison Thompson) on my own time to discuss teaching strategies/improvements. These were conducted in a 30 - 60 minute interview style where we sat down and talked about their teaching philosophies and what we can do as teachers to improve the student experience.

7 Activities Toward Scholarly Teaching and Scholarship of Teaching and Learning

7.1 Teaching and Learning Publications

1. "Navigating Colour Vision Deficiency in Science Education" J. L. MacDonald, **N. Roberts**, K. Near (Dalhousie University, 2025). Link: Navigating Colour Vision Deficiency in Science Education

2. (**Invited Piece**) "Chromatic inclusivity in chemistry." **N. J. Roberts**, J. L. MacDonald. (*Nat. Rev. Chem.*, **2024**, *8*, 487–488). DOI:

https://doi.org/10.1038/s41570-024-00619-w

3. "How Effective are Indicators for Individuals with Colour Vision Deficiency?" **Nicholas J. Roberts**, Toren Hynes, Devon Stacey, Jennifer L. MacDonald. (*J. Chem. Ed.*, **2023**, *100*, 4168-4173).
DOI: https://doi.org/10.1021/acs.jchemed.3c00413

7.2 Teaching and Learning Projects

Discussion Board Project May 2021 – April 2023

Description: This study aims to analyze the efficacy of discussion board usage in large gateway Chemistry classes for tutorial support and engagement when discussion board usage is optional, has a loose structure, and is supported by a teaching team comprised of undergraduate/graduate student teaching assistants and faculty. My responsibilities for this project have been tabulating and categorizing student response data for further analysis.

Colour Vision Deficiency Project Winter 2020 – April 2023

Description: Chemistry is a science that is heavily observation based, and a lot of these observations tend to involve colour. In the first year Chemistry program at Dalhousie, there are several experiments that rely heavily on having full colour vision to strive, for example: colour based titrations, colour based separations and unknown identification experiments. Along with Dr. Jennifer MacDonald, Dr. Roderick Chisholm and Dr. Mark Wall, we proposed a project that would aid in student accessibility for colour perception by attempting to synthesize affordable colour based filter cards for student use. Some of my personal responsibilities for this project have included: literature searching, grant proposal editing/writing and the experimental work to make these filters.

7.3 Teaching and Learning Conference/Workshop Contributions

1. "The RADBox: Teaching Students about Air Quality in Real Time" J. Scott McIndoe, **N. J. Roberts**, J. Dutnall, Canadian Chemistry Conference and Exhibition (Teaching Analytical Chemistry), June 18th, 2025.

2. **(Invited/Award Winning Presentation)** "Supporting Invisible Disabilities in Chemical Education" **N. J. Roberts**, WIDE Virtual Seminar Series, November 27th, 2024. Recording: Supporting Invisible Disabilities in Chemical Education

3. "Enhancing Accessibility by Integrating Support for Colour Vision Deficiency Into Your OER." Jennifer L. MacDonald, K. Near, **N. J. Roberts**, Open Education Conference, October 8th – 10th, 2024.

4. **(Invited)** "Colour Vision Deficiency in Chemistry: Challenges and Practical Solutions," **N. J. Roberts**, J. L. MacDonald, Canadian Chemistry Conference and Exhibition, June 8th, 2023.

5. **(Invited)** "Colour Vision Deficiency in the Undergraduate Chemistry Laboratory: A Student Perspective" **N. J. Roberts**, ChemCon Keynote Panel, May 26th, 2023.

6. "Colourful Collaborations: Student Partnership Driven Content Creation to Support Colour Vision Deficiency (CVD) in Chemistry" **N. J. Roberts**, K. G. Near, J. L. MacDonald, 2023 Chemistry Laboratory Education and Research (CLEAR) Symposium, International, May 4th, 2022.

7. **(Invited)** "Creating an Accessible Chemistry Learning Experience for Students with Vision and Hearing Impairments," J. L. MacDonald, **N. J. Roberts**, Todd Pagano, Annemarie Ross, Chemistry Education Division Virtual Seminar Series, February 22nd, 2023.

8. "Navigating Colour Vision Deficiency (CVD) in Science Education" J. L. MacDonald, **N. J. Roberts**, Atlantic Science Teacher's Conference, October 28th, 2022.

9. **(Invited)** "Teaching Assistant Award Winners Panel," L. Almeida, **N. J. Roberts**, T. Yousef, Dal TA Days, Halifax, NS, August 29th 2022.

10. "Bringing First Year Chemistry Online with Students as Partners through Universal Design" J. L. MacDonald, A. Crane, R. Karaballi, **N. Roberts**, STLHE Annual Conference, June 8th 2022.

11. "From Comment to Collaboration to Community: The Impact of Embedding Colour Vision Deficiency (CVD) Support Into In-Person, Online and Blended Laboratory Environments" J. L. MacDonald, **N. Roberts**, 48th College Chemistry Canada - La Chimie Collégiale au Canada (C3) Conference, May 27th, 2022.

12. "From Comment to Collaboration to Community: The Impact of Embedding Colour Vision Deficiency (CVD) Support Into In-Person, Online and Blended Laboratory Environments" J. L. MacDonald, **N. Roberts**, Dalhousie Conference on University Teaching and Learning (DCUTL), May 5th, 2022.

13. "Connecting Concepts: Using Asynchronous Course Content to Support and Engage Learning in the Online/Blended Laboratory" **N. J. Roberts**, J. L. MacDonald, Dalhousie Conference on University Teaching and Learning (DCUTL), May 4th, 2022.

14. **(Invited/Grant Winning Presentation)** "Navigating Colour Vision Deficiency in the First Year Chemistry Laboratory" J. L. MacDonald, R. Chisholm, M. Wall, **N. J. Roberts**, 2022 Chemistry Laboratory Education and Research (CLEAR) Symposium, International, April 21st, 2022.

15. **(Invited)** "Partnering with Students in our Teaching and SoTL Work" J. L. MacDonald, I. Curtis, **N. J. Roberts**. Dalhousie Centre for Learning and Teaching - SoTL Brownbag Lunch/Discussion Series, Halifax, NS, February 22nd, 2022.

16. **(Invited)** "Strategies and Stories: How to Make the Most of your Marking Responsibilities When Teaching Large Classes." J. L. MacDonald, E. Welsh, **N. J. Roberts**. Dal TA Days, Halifax, NS, September 3rd, 2021.

17. "Inspirations from Elmo: How "One Small Voice" Can Transform Your Course for Everyone!" J. L. MacDonald, M. Wall, A. Crane, **N. J. Roberts**. Dalhousie Conference on University Teaching and Learning, Halifax, NS, April 29th, 2021.

7.4 Teaching and Learning Grants

CIC Chemical Education Fund 2025
Description: "Inexpensive Dye Cast Filers to Help those with Colour Vision Deficiency." J. L. MacDonald, M. Wall, **N. J. Roberts** ($1000 Cnd - National: Chemical Institute of Canada)

Open Educational Resource (OER) Grant for the Design of Colour Accessible Curricula 2022
Description: The first-year Chemistry program is the highest enrolled science class at Dalhousie(1000-1500 students every year). The laboratory component for this course is crucial for students to gain hands-onskills required for future classes; however, the laboratory is designed such that the use of full colour vision is required. The global estimates for those who suffer from some form of colour vision deficiency (CVD) is 8.1%, which translates to around 81-105 students in our course. This is the equivalent of two full laboratory sections that are not experiencing the same experiment. To improve the accessibility and equity of our course, we have spent the past several years designing content and adding in supports for those with CVD. Herein we would like to create a book designed to share our expertise in this area of accessibility in the hopes that others will be able to accommodate this into their teaching practices. J. L. MacDonald, **N. J. Roberts**, K. Near ($7000 Cnd - Dalhousie).

CLEAR21 Grant 2021
Description: "Colour Chemistry: Development and implementation of colour filter cards to reduce barriers individuals with colour vision deficiency experience when interpreting colour based experimental results in the undergraduate Chemistry laboratory". J. L. MacDonald, R. Chisholm, M. Wall, **N. Roberts** (£500 - International Grant: The Learning Science/CLEAR21)

Scholarship of Teaching and Learning Grant 2021
Description: "Investigating the Efficacy of Discussion Boards in Student Engagement in Large Online Gateway Chemistry Classes". J. L. MacDonald, A. Crane, R. Foisy, **N. Roberts** ($2,578.42 Cnd - Dalhousie: Centre for Learning and Teaching)

Teaching and Learning Enhancement Grant 2021
Description: "Colour Chemistry: Development and implementation of colour filter cards to reduce barriers individuals with colour vision deficiency experience when interpreting colour based experimental results ". J. L. MacDonald, R. Chisholm, M. Wall, **N. Roberts** ($2948 Cnd. - Dalhousie: Centre for Learning and Teaching)

Accessibility and Accommodation Fund Grant 2020
Description: "Colour Chemistry: Development and implementation of colour filter cards to reduce barriers colour blind students and teaching staff experience when interpreting

colour based experimental results.". J. L. MacDonald, R. Chisholm, M. Wall, **N. Roberts** ($2500 Cnd. - Dalhousie Student Accessibility Centre)

7.5 Research Ethics Submissions/Approvals

Dalhousie Research Ethics Board (#REB 2021-5576) 2021
Description: "Investigating the Efficacy of Discussion Boards in Student Engagement in Large Online Gateway Chemistry Classes". J. L. MacDonald, A. Crane, R. Foisy, **N. Roberts** (REB# 2021-5576)

8 Service Towards Teaching and Learning

8.1 Committees

Gilead Early Career Award for Excellence in Equity, Diversity, and Inclusion Award Adjudicator 2025
Applicant Pool Size: 1
Reviewed: 1
Description: An award presented to: "... an early career chemist as a mark of distinction and recognition for excellence in their work in equity, diversity, and inclusion initiatives." As a previous award winner, I was invited to adjudicate the award submissions for 2023. This involved reviewing the application package and ranking it according to the CSC's guidelines.

Society for Teaching and Learning in Higher Education D2L Innovation Award Adjudicator, National 2023
Applicant Pool Size: 13
Reviewed: 3
Description:"Established in 2012, the D2L Innovation Award in Teaching and Learning, sponsored by D2L (Desire2Learn), celebrates and recognizes up to five post-secondary collaborative teams each year for their innovative approaches that promote student-centred teaching and learning." As a previous award winner, I was invited to review the award submissions for 2023. Responsibilities included reviewing three applicant packages, and rating them according to STLHE's guidelines. Website: D2L Innovation Award in Teaching and Learning – STLHE

Centre for Learning and Teaching President's Teaching Award Adjudicator, Dalhousie University 2023
Applicant Pool Size: 1
Reviewed: 1
Description: "Student instructors, including in the critical role of teaching assistants, make an indispensable contribution to university education: teaching in the classroom, leading seminars and tutorials, demonstrating in the laboratory, coaching, providing feedback on student work, and supporting students' success in numerous ways." As a previous award winner, I was invited to review the award submissions for 2023. Responsibilities included

reviewing a single applicant package, rating it according to the Center for Learning and Teaching's criteria, and having a meeting with the other adjudicators about the consensus of the package. Website: President's Graduate/Undergraduate Student Teaching Award

9 Future Teaching Aspirations

After a successful undergraduate and graduate work in pedagogy in a variety of roles, I'd love to contribute to a course on a more long-term basis. I continue to keep up with the literature in chemical education, and would love to have the opportunity to teach a well established course while adding in new ideas from the literature.

10 Appendix

10.1 Appendix A: Student Comments and Feedback for Chem 1011/1012 and Chem 1012/1022

The comments below were included in my evaluations as both a Teaching Assistant and a Senior Teaching Assistant for Chemistry 1011/1012.

"Was very sweet and relatable, helped me adequately with any problem I came across with great success"

"Always helpful, enjoyed his kindness."

"Absolute best TA ever. I had Nick for both fall and winter semester and he was always very helpful and enthusiastic!"

"He always helped me during lab when I had questions. He made me fully understand laboratory material and always reinforced safety rules in the lab."

"was my go to TA for when i had a question in the lab"

"good!"

"He was very good at helping me understand lab components without giving away the answer."

"I had a difficult question on one of the labs and Nick helped me with it in a timely manner."

"Nick is a great TA, he always helped me work through the problems and understand the concepts that I struggled with."

"They answered the lab questions in an informative manner for everyone in the class, not just the person asking it."

"Although I never posted on the [discussion boards], I often found questions I had had as well and usually it was Nick who had responded. His responses were very helpful and I appreciated his thoroughness."

"really patient and clear explanation."

"I really would like him to continue talking about his struggle with color blindness and give us resources to help if we are having difficulty with said issue."

"Nick was a very helpful and respectable TA. His interpersonal skills were very up to par and he was overall a very good TA. He was both very helpful and approachable."

"Nick was one of the best TA I have ever had!!!"

"Nick was a great senior TA!"

"Very friendly and helpful! They made the labs lots of fun. Thanks Nick!"

"I think Nick did an amazing job, I would love to be in another one of his lab sessions!"

"He has such a bubbly personality that it makes the labs fun, he's very approachable and knows his Chemistry"

"Nick does a wonderful job explaining the given lab's procedure, and makes it clear what students need to do to get the best results from their experiment."

"Nick was an excellent Senior TA; he was very approachable and kind, explained concepts clearly, and showed genuine interest in each student's learning."

"Overall great person, provided in-depth answers to any questions I had, gave helpful tips towards lab procedures, and contributed to making labs a more fun learning experience."

"He is really nice and kind. He don't leave without explaining. He stick to the end."

"Nick was my go to TA in lab section A for both the May and June courses. He always found a way to make something clear when I was not understanding and made the light bulb go off! While teaching and instructing me through experiment procedures, he always did it in an encouraging way which was very much appreciated! When your TA and or prof is encouraging and notes its okay to make mistakes, especially in a subject your new too, it makes learning much easier to do and you don't get discouraged."

"Always very helpful and knowledgeable, while being enthusiastic about all the material!"

"Nick is awesome- very knowledgeable and approachable in both the lab and the resource centre. I tend to look for Nick if I need a hand or have a question, as I find them to be the most concise while still fully explaining the material and I really appreciate that"

"Talk louder when giving I instructions or maybe move around a bit so everyone can hear"

"Always happy and positive! It was very nice"

10.2 Appendix B: Student Comments/Feedback for the Experiment 10 Online Asynchronous Tutorial Series, Chem 1012/1022

The following comments were taken from a survey put out about the newly implemented Experiment 10 tutorial.

"Without these videos I would not have been able to complete this lab, thank you so much! I feel as though the lecture part of the course didn't really get us ready for this lab so I really appreciate the lab side explaining out exactly what we need to do and being able to do the math along with the video, thank you so much."

"I loved it. Thanks you so much!"

"I really enjoyed this, also maybe in the future post them under content and not discussion so they are more accessible."

"IF YOU KEEP MAKING THESE TUTORIAL VIDEOS, I WILL NOT FAIL CHEMISTRY."

"It was great and very much appreciated! That was a tough lab but the videos were really helpful. I actually don't learn very well from video but once I was able to force myself to sit down and watch them, I'd wished I'd watched them sooner. I don't know if I could have done the lab without them. However, the total video time was long. While the length of the videos were appropriate for the content being taught and I wouldn't want them to be shorter, I think the amount of viewing time should be factored into the estimated amount of time a student is expected to put into Chem 1012. Doing the pre-lab, doing the actual data collection, watching the tutorial videos, doing the calculations, and taking the time to actually comprehend what the purpose of these abstract online labs are even for when it comes to writing the purpose/conclusion etc, on top of having to watch long lecture videos and read the text book and write weekly quizzes and monthly exams, Chem 1011/1012 are literally the most time demanding courses of my entire five year academic career and Chemistry is not even in my major. While I understand that these videos are supplemental, they really were almost necessary in order to do the lab. So, if perhaps instead of B-F for example, there was B-D or something like that that still demonstrates the purpose, this would be strongly preferable for student time management. Thank you!"

"Thanks for this extra help! I got pretty lost as I started working through the post lab, and the tutorial series completely cleared everything up. I was on the wrong track even for some parts I thought I understood - it saved me from a lot of searching through discussion posts, and really helped make the material stick."

"Would appreciate more videos of similar kind for future experiments :)"

"Thank you so much!!"

"Thank you both SO much! This was an excellent addition to the Chemistry lab and I would've been completely lost without it."

"Thank you to however came up with idea! A lot better then needing to continually post on the discussion posts / look for the specific question I have in the posts."

"Overall, very helpful"

"The videos were great, as questions that I had were answered and I did not have to waste people's time on the discussion board:). The discussion board is wonderful, but to have answers to my questions in a video format made me understand what was needed to be done a lot sooner than if I were to read it off of the discussion board."

"Overall, I really appreciated the addition of the tutorial videos! They made completing the lab much less stressful, and I feel a lot more confident that I did the calculations correctly."

"Thank you both for all your help this term!"

"I really liked the tutorials and would appreciate them for the upcoming labs!"

"I think the addition of these tutorials makes the labs a way more productive learning experience. it helped me to be engaged and really want to understand the work behind the solutions. I would love to see you guys continue these, they changed my experience with the lab portion this week completely."

"Thank you so much for including the Tutorial Series with this experiment! I found it very helpful :)"

"I would have watched the theory video if I had been more confused and needed more guidance on the concept itself, yet it helps me more to watch someone do a calculation and to see the process they follow."

"you guys are amazing! you really care about our learning and I really feel well supported! thank you to the whole team!"

"Please keep providing these tutorials because they were helpful in experiment 10."

"Thank you guys! It was extremely helpful for that experiment"

"Thank you for all your help!"

"As I tend to do my Labs at almost the last minute, I found this very helpful as it meant that I could get the help I needed, even though other resources would have taken too much time to receive a response (discussion, virtual resource centre, etc.)"

"it really helped thank you!"

"Thank you for preparing the extra content"

"I found the tutorial series EXTREMELY helpful and would love to see similar videos in the future!"

"Thank you very much for the tutorial videos! I really appreciated them!"

10.3 Appendix C: Student Comments/Feedback With Regards to Colour Vision Deficiency (CVD) Support

The following comments were taken from a survey put out about the CVD support implemented into the online Fall 2020 term.

"It was very useful to me to use more indicators as it was more obvious when an endpoint was reached. Also, it helps to see the colour better as it can be harder to see the faint pink colour through the screen someimes so I would always use 6 drops to eliminate this issue."

"The availability of choice of indicator helped me view the results more clearly that I would have if only the original choice was there without a second option. It helped me view the changes more clearly and my results where therefore, in my opinion sharper than it would have been if I chose the other option."

"It was extremely difficult to notice colour changes in a lot of the videos to prior to having the option to use 6 drops of indicator. Having the option to use more indicator made it easier to make observations."

"I'm colourblind, so seeing the clear difference in colour with 6 drops of indicator made it much easier to do the experiment."

"I have no major issue viewing colour, but the choice of drops for the indicator still benefited me. I do have glasses so occasionally on a screen it is a tad difficult to be sure of small colour changes. This option allowed for me to be sure exactly what colour I was supposed to be seeing, and when the experiment had been overshot. This option was very considerate of your Chemistry team. I'm sure everyone appreciated it, I know I did!"

"Since colour balance on computors can be different the ability to choose indicator levels allowed it to be clear and I was not worried that I was ever missing the change in color"

"I think it was great to have the option. I was nervous that I wouldn't be able to see the endpoint of the titration, but with the option of six drops, I felt more comfortable in the experiment as well as my answers."

"Being colorblind myself, I still needed help sometimes discerning colors in pre lab and lab module. However it was not as severe as I had expected."

"I personally used the higher number of drops in the experiments so that I can see when the endpoints occurred clearly and also if the endpoint was exceeded(color was too dark) better. If I had to only use three, I feel like I might've missed information because being online, I need it to be as clear as possible in the videos."

"Completing the assignments was much easier when I was given an alternative option to accommodate for my colour vision impairment. Prior to these accommodations I struggled with identifying colours of solutions and recording changes (which was half the value of the labs) but now I don't have that problem."

"In a live setting i could normally identify the endpoint with only 3 drops of indicator. However, online i found it more difficult to see and really appreciated the option to chose 6 drops."

"Especially over the computer, it can be very difficult to tell when there is a subtle colour change, so having the options of indicator drops helped me to be more sure about visualizing the endpoints"

"I found that the option in the number of drops of indicator showed a willingness to cooperate and accommodate individuals with different needs, which in turns creates a more

accepting learning atmosphere."

"since I chose the 3 drop option I was able to see the colour it was supposed to get if I was doing it in a lab myself. for people who have trouble seeing that difference, the choice is very helpful I would imagine."

"With different image resolution capacities of different computers it was easier to see the 3 drops of indicator on my laptop, however on another older tablet it was easier to visualize an endpoint with 6 drops of indicator. This made it easier to participate in the lab with different devices and still get relatively similar answers."

"I personally chose to go with the standard drops of indicator for my experiments. However, having the option available emphasized for me that it was more important for me, a student, to understand the process of the experiment than to adhere to traditional practice (i.e. using less indicator). I can imagine how difficult learning from those experiments would be for those who have difficulties with visual perception. It really made me feel like my experience and learning mattered."

"Often on the computer, I change the blue light settings to a warmer light for it to be less hard on the eyes all day, and I sometimes found it hard to distinguish some of the very light warm colours such as pink or red because of the settings I had to prevent headaches."

"Being able to choose the amount of indicator used was very beneficial especially with online learning. It made the endpoint very visible and i was able to grasp a better understanding of what was actually going on."

"I found that being able to choose my indicator was very helpful; it was often hard to see fine detail in the experiment videos, and I feel much more confident that I understood the reactions knowing that I could clearly visualize the endpoint."

"I having nothing elaborate on this however I do think it was very helpful and easier to put into perspective for me, I'd say keeping that going for future would be an awesome thing to have."

"A lot of experiments are designed for and by the person designing the experiment. It was nice to see that multiple options of indicator were given."

"Although I have normal colour vision it was definitely helpful to have more than one choice of colour due to not being 100 percent sure of the colour in the video."

"I chose the 3 drops of indicator because I felt that that is more accurate to what my experience would be like in the lab but I also can see where a lot of students might have difficulty seeing the colour change. I think it is an important decision for students based on what they prioritize, seeing the colour change or experiencing something more accurate to a real lab setting."

"The 6 drops option seemed to be the best possible way to visualize the endpoint of the titration. I am unsure why there was a 3 drop option and found that I only selected the 6 drop option. It may be beneficial to explain the difference between 3 and 6 drop indicator selections before a choice is made to ensure that students are aware of the efficacity of using more indicator .. though it was still unclear as to why the 3 drop option would ever be used."

"I am not color blind, but having more contrast with the endpoint would definitely help others who are."

"I personally did not use it as I could see fine from the "normal" version. However, I think it is important that everyone is given a fair shot to achieving their goals."

"i think it was nice to have the choice, and develop how you may want to perform that particular experiment yourself, but altogether without hands on experience the option overall was neither helpful nor detrimental to the experience"

"While we did do titrations in highschool, we did use more drops of indicator to visualize the endpoint. Having this option made it more familiar, and, in person, would have severely diminished the risk of overshooting the titration out of habitually seeking a differently visualized endpoint. It can be very difficult to discern if something is clear or light light pink, and can make for ambiguity in data reporting."

"it made my life a bunch easier because I could barely tell when it was only 3 drops"

10.4 Appendix D: Comments and Feedback from Teaching Presentations

The following comments were taken from the Dal TA days live session event, of which I was a speaker.

"great presenters with great experiences"

"Fantastic insights on how to engage students within a large class setting"

"The tips on encouraging interest in labs were particularly revealing"

"Very inspirational, made me very excited to get starting in my new TA position."

"I appreciate that an emphasis of teaching over grading is expressed"

10.5 Appendix E: Student Comments and Feedback for PSYO 1011/1012

The following comments were taken from my student evaluations for the PSYO 1011/1012 Courses.

"I think Nick does an excellent job leading our labs and making them a fun and interactive space. After I have gotten lab marks back and had any questions, he is always engaged in helping me understand how to improve for next time."

"Nick not only good to reach out to for academic help, but he is also very personable and I could easily approach him."

"One of the best TAs I've had so far. Very personable and always looking for you to succeed. Always felt comfortable going to office hours knowing I was going to get help and it wouldn't be a waste of time. Ran labs very effectively too."

"Very helpful and understanding TA. They created a very comfortable and calm atmosphere during the labs."

"Nick did a very good job at explaining the material and answering questions students had regarding the lab. Nick also provided very clear feedback and was quick to respond to emails."

"He doesn't over complicate the information during his instructions, and I am quickly able to follow along with the concepts that he is introducing. Good at walking around to the tables so we are more inclined to ask questions if we're having trouble with the experiment. The time in class is well spend and I appreciate that he sends emails to keep us up to date on what's happening with classes, especially during the strike."

"Nick was very clear and concise in his teaching style. I found him to be a very good teacher who always left time for questions and was able to answer questions very effectively and accurately."

"I did not receive much personal feedback from my labs unless I had gone to Nick's office hours, which I did not have much time for and the grades I had gotten on my labs I was okay with. I may have missed where to find the feedback given from the labs because I am new to Brightspace, but I did not see any. Nick was very responsive to my emails when I had questions about lab cancellations, and he was an enjoyable TA for the labs and I would be happy to have him again if there was ever another psychology lab I would be taking."

"All around a very good TA/Prefect"

"Nick has been great in-class, I have no complaints at all."

"I wish he talked a little bit more about his expectations and what he would like to see on Labs, because there's labs I thought I did good on but then I didn't."

"Nick was a great prefect, he made sure it was a comfortable environment for all and brought the best out in all the students participating."

"Nick was a great Lab Prefect!"

"Lab section B03 was a much quieter group of students compared to other lab/tutorial groups I have had. Nick definitely did not have the easiest go with class discussions, but he did great with communicating what was expected from discussion! His explanations and expectations of us were always very clear. He's pretty awesome!"

10.6 Appendix F: Student Comments and Feedback for CHEM 260

The following comments were taken from my student evaluations for the Chem 260 course.

"Nick was very approachable and knew a lot about the labs that we were conducting."

"Please keep your great sense of humor, it helped make the lab feel less stressful and more fun."

"When he answers a question of mine he has never made me feel judged. Also after he answers my question and I thank him, he goes "Yeah∼" which I think is part of his approachable demeanor"

"When he explained to me the theory behind ligands binding at metal centers. He made me realize how complex chemistry is."

"Nick was always ready to answer questions, no matter how dumb, and never made students feel bad for not understanding the material. He was ready to explain concepts for the report and help find ways to improve."

"Being able to answer questions about the material in a way that is understandable for people who are not super familiar with chemistry. Being personable made it easier to approach Nick with questions even if they were really small questions."

"Once we were working on an in lab assignment and I had a question about the reagents. Nick answered by asking us to recall from a previous experiment, where one of the reagents used in that experiment was similar to one of the reagents currently used and why. This was like active recall in a way so I liked how the material I learned from that previous experiment wasn't going to leave my memory because Nick had drawn upon it"

"Teach both sections, you were so good "

"I feel like some kind ther sections might have gotten more thorough explanations, but nothing super different! Could just elaborate better"

"Very good with providing feedback/clarification on the report marking"

"gave me space but also always available to check my procedure and experiment set up which allowed me to learn independently while not being unsure if i was doing it correctly or safely"

"He is very approachable, which made it easy to ask him questions, and not feel bad doing so. His explanations were also very understandable even for someone who has not taken a ton of chemistry courses. Nick's overall demeanour is calm which contributed to a calm and easy lab environment to focus in."

"Nick did a phenomenal job, he always showed up well prepared, and was extremely helpful when things got confusing. He has amazing communication skill and always made the lab fun"

10.7 Appendix G: Student Comments and Feedback for CHEM 231

The following comments were taken from a mix of my student evaluations for the Chem 231 course, as well as the departmental ones.

"It is helpful when you spend one-on-one time with people. It is also helpful when you explain things without completely saying the answer, but staying with us until we get it."

"All the material was broken down into simple terms and material was well explained. "

"Nick explained everything very clearly which was good, it was a nice breath of fresh air to hear things from a different perspective than the professor, and I feel that that alone made me more comfortable with the material"

"I like how he takes a moment to think before responding to questions. It ensures that he knows exactly how he is going to answer and responses are very clear as a result."

"I like how Nick actively walked around the class to check on our progress rather than just waiting for questions to come up."

"Very much enjoyed the clear explanations he gave in tutorial, they helped with understanding the material greatly"

"Being very approachable and kind as well never talking down to us or making us feel bad for asking questions"

"He was super helpful at answering specific questions, and also did so in a way that made you think about it instead of just giving you the entire answer."

"You explained something in one of the practice exams that I was confused about. This helped me feel more prepared for the exam."

"Checked my answers when I was working on the tutorial worksheet (not for marks). This was great because he confirmed what was correct, pointed out where I was wrong or needed to expand. He gave hints and discussed it with me which encouraged me to think about it and get a better understanding."

"Running through areas he would look at first when starting questions. This helped as it outlined an effective and proven method that he new worked to start solving a question applicable to other questions as well."

"When I asked a question he helped me work through it by guiding questions and helping when I struggled to answer them."

"I kind of already mentioned this, Nick seemed more "real" about the material, and that was nice to see coming from someone who learnt the material for the first time more recently than the professors"

"He helped a lot during the optional tutorials before midterms. I was struggling with a concept and he really took the time to explain it. The one-on-one support helped to ensure I undrstood the concept well."

"The last "engaging scientific practices" made a lot more sense after Nick walked me through the Nu and electrophile reactions. He walked through it step by step and in a more clear way than we did in class."

"His explanations of EDG and EWG and the effects of induction in tutorial was a prime example. This was helpful as it helped with understanding the material of the activity in a way that made me remember it."

"Lecture instructors did not teach us what we needed for tutorial. Nick did in about 3 minutes. Heroic"

"Nick helped me better understand parts of the acids and bases unit. Instead of directly giving me information he would often ask questions to encourage individual thinking and lead me in the right direction during explanations so that I was not just listening to him explain"

"Nick was very helpful whenever I asked him questions directly while working on tutorial questions."

"Thank you for being such a helpful TA Nick! Your help during the open tutorial before our second midterm saved me."

"Overall I found Nick to be a very helpful TA. I can tell he really knows what he is talking about and is very clear in his explanations."

"Nick was great! He put in lots of work and helped us learn a lot."

"Nick was amazing and able to help me with all of my questions."

"He was very nice, and anything that I asked him he would make sure to explain it in different ways until I understood it."

"He was extremely helpful at answering any questions, and he helped you figure out a question by prompting you to think about certain things instead of just telling you the answer."

"So great"

"nothing :) maybe just have some office hours so he can help us even more than he already does"