



MEET THE COURSE TEAM

COL Lead: **Dr Evode Mukama**

Lead Instructor: **Dr Nathaniel Ostashewski**

Technical Assistant: **Daniel Wilton**

Teaching Assistants:

Prisca Byukusenge and Jenine Hawryluk

Lead Instructor bio:

Dr Nathaniel OSTASHEWSKI is Associate Professor of Open, Digital, and Distance Education at Athabasca University in Alberta, Canada. He taught chemistry for 18 years in grades

7-12 and utilized active learning and technology in all his science teaching. Currently Dr Ostashewski teaches graduate courses in distance education, research design, educational technology, and online and blended learning. He has been incorporating digital

technology in teaching since 1990, both at the K12 and graduate education level. Since 1995 Nathaniel has been training educators how to incorporate technology-enabled learning into "worth-it" classroom, blended, and online activities. His extensive experience with digital media for education, OERs, online and blended instructional design/teaching strategies, and learner engagement tactics are evidenced in MOOCs he designs and teaches.



CERTIFICATION

Two levels of certification are available based on your level of participation and completion of tasks/activities:

- **Certificate of Participation:** requires 70 per cent or more on each quiz and participation in at least three discussion forums.
- **Certificate of Completion:** requires 70 per cent or more on each quiz, participation in at least three discussion forums, and successful completion of a TEL Chemistry Lesson Plan.

Certificates are made available at no charge as verifiable PDF documents.



REGISTRATION

For further information and registration, go to:

<https://www.mooc4dev.org/TCT>

TCT inquiries: tct@colfinder.org

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COMMONWEALTH OF LEARNING

MOOC

Teaching Chemistry with Technology

08 January to 12 February 2023





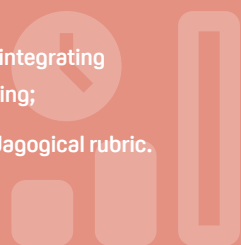
COURSE OVERVIEW

In this course we will explore the use of the Open Access PhET Interactive Simulation software in chemistry teaching. Used by educators around the world, PhET simulations bring worthwhile technology-enabled teaching tools to the classroom. Founded in 2002 by Nobel Laureate Carl Wieman, the PhET Interactive Simulations project at the University of Colorado Boulder creates free interactive math and science simulations. PhET simulations are based on extensive education research and engage students through an intuitive, game-like environment where students learn through exploration and discovery.

In this course, the participants will explore examples (and how to develop them) of how to incorporate active learning and simulations (online or offline) that can engage their learners in chemistry education. The participants will have the opportunity to meet and discuss challenges presented in chemistry education. Chemistry and pedagogy experts will guide participants through the development of PhET simulations.

During this MOOC, you will:

- Identify foundational elements of chemistry teaching;
- Explore chemistry simulations and OER tools that support them;
- Identify blended learning approaches for chemistry education;
- Discuss strategies and tools for chemistry teaching with other teachers;
- Develop a Chemistry Lesson Plan integrating technology for teaching and learning;
- Evaluate a lesson plan using a pedagogical rubric.



WHO SHOULD TAKE THIS COURSE

This course is open to anyone, anywhere, and is mobile-friendly. This TCT MOOC has been designed to assist teachers, student teachers, teacher educators and instructional designers to plan and develop a chemistry lesson and related assessments with technology. Chemistry teachers will benefit from the exploration tools, tactics and strategies that expand their repertoire of chemistry teaching practice.



AT A GLANCE

Schedule	08 January to 12 February 2023
Intended audience	K-12 and university chemistry teachers, student teachers, teacher educators and instructional designers
Language	English
Duration	5 weeks
Expected workload	3 to 5 hours per week (25 hours in total)
Challenge level	Introductory
Prerequisites	None
Certification	Certificates of Participation or Certificate of Completion at no charge



COURSE OUTLINE



Week 1

- 1.1 How online learning works for this course (COL) and MOOC participant expectations.
- 1.2 Science teaching philosophy (Scientific Method), What is TPACK and why you should care.
- 1.3 OERs, Creative Commons licensing and why they are important for teaching.

Acid-Base Solutions

The screenshot displays the PhET Acid-Base Solutions simulation. The main view shows a beaker containing a solution with a light bulb above it. A magnifying glass is positioned over the beaker, showing a detailed view of the solution's particles. The interface includes several control panels:

- Solution Panel:** Allows switching between Acid and Base, setting Initial Concentration (mol/L) on a logarithmic scale (0.001 to 1), and adjusting Strength from weak to strong/weaker to stronger.
- Views Panel:** Includes options for Molecules, Solvent, Graph, and Hide Views.
- Tools Panel:** Contains icons for a pipette, a beaker, a light bulb, and a refresh button.

 At the bottom, the chemical equation $HA + H_2O \rightleftharpoons A^- + H_3O^+$ is displayed. The PhET logo and navigation icons are visible in the bottom right corner.



Week 2

- 2.1 Active learning and simulations in Science Education.
- 2.2 What is PhET and how does it work.
- 2.3 How do teachers use PhET in Chemistry.



Week 3

- 3.1 Blended learning for chemistry teaching.
- 3.2 Guidelines for evaluating PhET simulations in chemistry teaching.



Week 4

- 4.1 Planning your own simulation lesson using PhET.
- 4.2 Creating your chemistry simulation lesson plan and supporting student activities.
- 4.3 Assessment for chemistry simulations.



Week 5

- 5.1 Evaluating chemistry lesson plans.
- 5.2 Reflections on teaching chemistry with TEL