

Faculty of Education

EDUC-4715-153 Elementary (K-8) Curriculum, Instruction and Assessment: Science – Advanced January 5 - March 14, 2023

Professor: Michael Link, PhD Office: 2G21 Graham Hall Email: m.link@uwinnipeg.ca Course Time: 8:30 – 10:20 am

Course Type: Condensed (18 classes, 36 contact hours)

Course Location: 0AN81
Office Hours: By appointment
VW Date: February 28, 2023

Reading Week: February 20-25, 2023

ACKNOWLEDGEMENT OF TERRITORY¹

We begin by acknowledging that we are gathered on the original lands of Anishinaabeg, Cree, Oji-Cree, Dakota, and Dene peoples, on Treaty One Territory. These lands are the heartland of the Métis people.

We acknowledge that our water is sourced from Shoal Lake 40 First Nation.

COURSE DESCRIPTION

This course builds on the instructional, assessment, and differentiation approaches and techniques introduced in the Elementary Science - Foundational course, fostering of the development of advanced skills in elementary-years science within the context of the Manitoba Curriculum for Kindergarten to Grade 8 Science.

COURSE OBJECTIVES

The objectives of the Elementary Science course are for students:

- To become familiar with the Manitoba Science Curriculum;
- To study the teaching of the process of science inquiry;
- To examine approaches for teaching concepts in science;
- To select instructional strategies to suit the developmental stages of children
- To identify effective approaches for curriculum design and instructional methods for science and cross-curricular teaching
- To practice developing and implementing cross-curricular teaching
- To understand how to connect teaching and learning to student's lives and communities
- To provide opportunities for positive social and environmental change
- To examine the teaching of science, technology, society, and the environmental issues in the science classroom.

¹University of Winnipeg Land Acknowledgement. https://www.uwinnipeg.ca/indigenous/land-acknowledgement.html

TENTATIVE TOPICS

- The Manitoba Science Curriculum
- Inquiry and Design Process Cycles in the Science Classroom
- Teaching Inquiry through an Indigenous Lens
- Strategies that develop science concepts, real-world connections and learning skills that build engaged citizenship within the realm of sustainability
- Cross-Curricular Pedagogy and Design
- Place-Based Education
- Education for Sustainability

Topics listed may not be covered or may be covered differently due to time.

COURSE RESOURCES

Required Course Texts:

Anderson, D., Chiarotto, L., Comay, J., & Dr. Eric Jackman Institute of Child Study. (2017). Natural curiosity: A resource for educators: The importance of Indigenous perspectives in children's environmental inquiry (2nd ed.). The Laboratory School, Dr. Eric Jackman Institute of Child Study, Ontario Institute for Studies in Education, University of Toronto.

Available Online

- Charrière, J. (Host). (2021, May). Place-Based Education: Interview with David Sobel (No. 12) [Audio podcast episode]. In *Disconnect: The outdoor education podcast*. Pinecast. https://podcasts.apple.com/ca/podcast/place-based-education-interview-with-david-sobel/id1502348525?i=1000517196587
- Kindergarten to Grade 4 Science: A Foundation for Implementation (1999). Manitoba Education and Training. https://www.edu.gov.mb.ca/k12/cur/science/found/kto4/full_doc.pdf
- Grades 5 to 8 Science: A Foundation for Implementation (2000). Manitoba Education and Training. https://www.edu.gov.mb.ca/k12/cur/science/found/5to8/full_doc.pdf
- Green Teacher. (2021, September 7). Teaching about a circular economy (No. 22) [Audio podcast episode]. In *Talking with Green Teachers*. Podbean.
 https://greenteachingpodcast.podbean.com/e/episode-22-teaching-about-a-circular-economy/
- Green Teacher. (2021, August 28). Indigenous perspectives in inquiry-based learning (No. 21)
 [Audio podcast episode]. In *Talking with Green Teachers*. Podbean.
 https://greenteachingpodcast.podbean.com/e/episode-21-indigenous-perspectives-in-inquiry-based-learning/
- Kozak, S. & Elliot, S. (2014). Connecting the Dots: Key Strategies That Transform Learning for Environmental Education, Citizenship and Sustainability. Learning for a Sustainable Future. http://www.lsf-lst.ca/dots



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- Lynch, L. (Host). (2021, September 19). Climate in the Classroom [Audio podcast episode]. In What on Earth. CBC Radio. https://www.cbc.ca/listen/live-radio/1-429-what-on-earth/clip/15867035-climate-classroom
- Watson, A. (Host). (n.d.). Using inquiry to help kids develop critical consciousness. (No. 185) [Audio podcast episode]. In *Truth for Teachers*. https://thecornerstoneforteachers.com/truth-for-teachers-podcast/using-inquiry-to-teach-critical-consciousness/

Optional Resources:

- Connecting youth with nature: Resources for teachers, parents, and caregivers. David Suzuki Foundation. https://davidsuzuki.org/take-action/act-locally/connecting-youth-with-nature/
- Connecting with nature: An educational guide for grades four to six. David Suzuki Foundation. https://davidsuzuki.org/wp-content/uploads/2018/09/Suzuki-superheroes-educational-guide-for-grades-four-to-six.pdf
- Connecting with nature: An educational guide for grades seven and eight. David Suzuki Foundation. https://davidsuzuki.org/wp-content/uploads/2018/09/Suzuki-superheroes-educational-guide-for-grades-seven-and-eight.pdf
- DK. (2018). Science!: Science as you've never seen it before. DK Publishing.
- Environment and climate change: Climate change and environmental degradation undermine the rights of every child. UNICEF. https://www.unicef.org/environment-and-climate-change
- Leslie, C. (2010). *The Nature Connection: An Outdoor Workbook for Kids, Families, and Classrooms.* Storey Publishing.
- Nature as a Classroom. David Suzuki Foundation. https://davidsuzuki.org/wp-content/uploads/2018/09/Suzuki-superheroes-nature-as-a-classroom.pdf
- McConnell, C. (2020). Lesson Planning with Purpose: Five Approaches to Curriculum Design. Teachers College Press.
- Rodenburg, J. & Monkman, D. (2016). *The Big Book of Nature Activities: A Year-Round Guide to Outdoor Learning*. New Society Publishers.
- Suzuki, D., Ellis, S., & Lott, S. (2003). Salmon forest. Greystone Books
- Suzuki, D., & Fernandes, E. (2008). There's a barnyard in my bedroom. Greystone Books.
- Suzuki, D. Vanderlinden, K. & Edwards, W. (2010). *You Are the Earth: Know Your World So You Can Help Make It Better*. Greystone Books.



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READING SCHEDULE

Session	Readings/Podcasts		
1 (January 5) -Greetings and Introductions	n/a		
2 (January 10) - Inquiry and Engagement: Nurturing a Sense of Wonder	(Anderson et al., 2017, pp. 5-25) [Natural Curiosity] Watch: Natural Curiosity: Branch I & Indigenous Lens 1 https://www.youtube.com/watch?v=iz5vqopbrn8		
3 (January 12) - Inquiry and Engagement: Putting it into Practice	(Anderson et al., 2017, pp. 26-56) [Natural Curiosity] Watch: Natural Curiosity: Branch II & Indigenous Lens 2 https://www.youtube.com/watch?v=5GgRI5JBu6E		
4 (January 17) - Experiential Learning: Building a Sense of Place	(Anderson et al., 2017, pp. 57-80) [Natural Curiosity]		
5 (January 19) - Place-Based Education	Charrière, J. (Host). (2021, May) [Interview with David Sobel] https://player.fm/series/disconnect-the-outdoor-education-podcast/ep-12-place-based-education-interview-with-david-sobel		
6 (January 24)- Integrated Learning: Making Connections and Broadening Perspectives	(Anderson et al., 2017, pp. 81-102) [Natural Curiosity] Watch: Natural Curiosity: Branch III & Indigenous Lens 3 https://www.youtube.com/watch?v=U5P_CDlcnrk		
7 (January 26) - Moving Toward Sustainability: Living & Acting in the World	(Anderson et al., 2017, pp. 103-114) [Natural Curiosity] Watch: Natural Curiosity: Branch IV & Indigenous Lens 4 https://www.youtube.com/watch?v=meMbqRmwqbM And select one of the following sections from the Anderson text: • Early Years – pp. 142-186 • Grades 1 & 2 – pp. 187-210 • Grades 3 & 4 – pp. 211-250 • Grades 5 & 6 – pp. 251-274		
8 (January 31) - Environmental Inquiry in Action – The Educators' Stories	(Anderson et al., 2017, pp. 114 - 141) [Natural Curiosity]		



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9 (February 2) - Planning for Science:	(Koch, 2017, pp. 301-325) [Science Stories]
Instructional Strategies	Please bring a lesson plan to class.
10 (February 7) – Local and Integrated	(Kozak & Elliot, 2014, pp. 5-31) [Connecting the Dots]
Learning	
11 (February 9) - Acting on Learning and	(Kozak & Elliot, 2014, pp. 32-51) [Connecting the Dots]
Real-World Connections	
12 (February 14) - Considering Alternative	(Kozak & Elliot, 2014, pp. 52-75) [Connecting the Dots]
Perspectives and Inquiry	
13 (February 16) - Sharing Responsibility	(Kozak & Elliot, 2014, pp. 76-97) [Connecting the Dots]
for Learning with Students & Visions of	
Learning	
14 (February 28) - Group Presentation	Podcast - <u>Indigenous perspectives in inquiry-based</u>
	learning
15 (March 2) - Group Presentation	Podcast – <u>Teaching about the Circular Economy</u>
16 (March 7) - Group Presentation	Podcast – <u>Climate in the Classroom</u>
17 (March 9) - Group Presentation	Video – <u>Sustainable community development: From</u>
	what's wrong to what's strong with Cormac Russell
18 (March 14) - Field Trip Buffer	

- Anderson, D., Chiarotto, L., Comay, J., & Dr. Eric Jackman Institute of Child Study. (2017). Natural curiosity: A resource for educators: The importance of Indigenous perspectives in children's environmental inquiry (2nd ed.). The Laboratory School, Dr. Eric Jackman Institute of Child Study, Ontario Institute for Studies in Education, University of Toronto.
- Charrière, J. (Host). (2021, May). Place-Based Education: Interview with David Sobel (No. 12) [Audio podcast episode]. In *Disconnect: The outdoor education podcast*. Pinecast. https://podcasts.apple.com/ca/podcast/place-based-education-interview-with-david-sobel/id1502348525?i=1000517196587
- Green Teacher. (2021, September 7). Teaching about a circular economy (No. 22) [Audio podcast episode]. In *Talking with Green Teachers*. Podbean.
 https://greenteachingpodcast.podbean.com/e/episode-22-teaching-about-a-circular-economy/
- Green Teacher. (2021, August 28). Indigenous perspectives in inquiry-based learning (No. 21)
 [Audio podcast episode]. In *Talking with Green Teachers*. Podbean.

 https://greenteachingpodcast.podbean.com/e/episode-21-indigenous-perspectives-in-inquiry-based-learning/
- Kozak, S. & Elliot, S. (2014). Connecting the Dots: Key Strategies That Transform Learning for Environmental Education, Citizenship and Sustainability. Learning for a Sustainable Future. http://www.lsf-lst.ca/dots
- Lynch, L. (Host). (2021, September 19). Climate in the Classroom [Audio podcast episode]. In What on Earth. CBC Radio. https://www.cbc.ca/listen/live-radio/1-429-what-on-earth/clip/15867035-climate-classroom
- Russell, C. (2016, May). Sustainable community development: From what's wrong to what's strong [Video]. TEDxExeterConferences. https://www.youtube.com/watch?v=a5xR4QB1ADw



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- The course will be delivered face-to-face
- Students will be contacted by their University of Winnipeg email when it is necessary to cancel a class.
- Students have the responsibility to regularly check their University of Winnipeg email to ensure timely receipt of correspondence from the University and their course instructors.
- As a sign of respect to everyone in class, please turn off all mobile phones before entering class unless there are extenuating reasons not to do so and you have discussed those reasons with me.

COURSE ASSESSMENT AND EVALUATION

- Final grades are tentative until approved by the Departmental Review Committee (DRC) and may be subject to change.
- 20% of term work will be returned before the VW date
- Assignments are to be submitted via Nexus on the respective due date before 10 pm.
- In the case of submitting a late assignment without prior arrangements, a penalty of 10% per day will be assigned. Assignments more than ten days late will receive a grade of zero.
- All assignments must be typed, include references, and be submitted with a cover page that includes the following information: name, student number, section number, title of assignment, date, instructor's name.
- Assignments should use APA 7th Edition writing and formatting style, be double-spaced with a 12-point font, and a 1" border on all sides. Students may consult the 2020 Publication Manual of the American Psychological Association 7th Edition or the Purdue Owl APA 7th Edition style guide. https://owl.english.purdue.edu/owl/.
- It is the student's responsibility to retain a copy of all assignments submitted for grading.
- Students may not submit one assignment for credit in two different courses without the consent of each instructor.
- A marking assistant may be used to grade coursework.
- Some of the assignments involve group work and you will be required to collaborate with other students. It is your responsibility to ensure that each member of the group contributes equally to these assignments.
- There will be no exam for this course.

GRADING

Letter Grade	%
A+	98-100
Α	94-97
A-	90-93
B+	86-89
В	80-85
C+	70-79
С	60-69
D	50-59
F	<49



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ASSIGNMENTS

Assignment	%	Due Date
Reflective Response to the Readings	40	Throughout the term (first scheduled
		response/facilitation will be scheduled and
		marked before the VW date)
Integrated Science Unit	20	March 14, 2023
Interactive Group Workshop	20	February 28, 2023
Participation and Professionalism	20	Throughout the term

ASSIGNMENT DESCRIPTIONS

Reflective Response to the Readings

40% (2 X 20%)

Due Date: Throughout the term (first scheduled response/facilitation will be scheduled and marked before the VW date)

Select two articles or chapters from the reading schedule (see the course website) and write a reflective response with accompanying discussion points and questions. You will use your facilitation skills, along with your discussion points and questions to lead a dialogue with a small group of your peers. During the first week of the term, a reading schedule will be sent around for you to indicate your reading selection. There will be approximately four students per session leading small group discussions. Once you have read your selection and generated some discussion points and questions, you are encouraged to collaborate with your peers who will be leading a small group discussion during the same session. I will post our final schedule on the course website to help facilitate this collaboration.

Reflective Response: This is an opportunity for you to write about yourself as a learner and a science educator. Reflect upon how the readings connect to your own school experiences (as a preservice teacher and a student), what discrepancies you see, what similarities, what questions you have, etc. These reflections should be completed thoroughly and thoughtfully. Your reflections should demonstrate your understanding of the assigned reading material and should include original thoughts and synthesis. These responses are not to be the final word on any of the issues we address or simply a summary, rather, they should be moments of focused analysis which you collect over the course and which will reflect back to you your evolved thinking. Reflective writing pieces should be succinct — approximately 500 words should suffice in most cases. Please refer to the reading schedule on the course website for more information regarding dates. Please see the corresponding rubric on the course website for full details on assessment for this assignment.

Discussion Points and Questions: You will also develop discussion questions/points for your group. The questions or points should extend your group's inquiry into the readings. Please include these at the bottom of your reflective writing piece. Post your reflection and discussion questions/points on the Nexus site before the class they are to be discussed.



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Integrated Science Unit

20%

Due Date: March 13, 2023

This unit will be composed of 10 lessons. Typical units are 3-4 weeks in length. You are required to integrate the unit with other subjects (i.e., language arts, social studies, mathematics, or visual arts). You have the option of submitting this assignment individually or in a group (with peers teaching the same grade).

Refer to the unit template on the course website for guidance. Once you complete the unit, individually write a reflective paper that addresses the following questions:

- What did you learn about yourself as a teacher during the development of this unit plan?
- Why is it important for your students to participate in this unit?
- How does this unit fit within your idea of yourself as a science teacher and your beliefs about teaching and learning?
- Do you see a difference, an advantage, or incentive to the use of inquiry learning? Explain.
- Any other thoughts or reflections on the process of lesson and unit planning.

Please refer to the corresponding rubric on the course website for more details concerning the assessment of this assignment.

Interactive Group Workshop

20%

Due Date: March 1, 2023 (to be presented during Weeks 8 & 9)

Each group member will design a learning centre appropriate for the science cluster that has been assigned to them. The centres are to be designed so that each one provides an opportunity to practice a different skill in science. Each member of the group is to be involved in presenting its learning centre. After the presentation, students will reflect on the centre and possibilities for improvement on the design. Each person will submit a report that includes a picture of the centre (to be photographed by the instructor, if necessary), an explanation of the center in a lesson-plan format, and a reflection on the value of creating the centre. Please see the corresponding rubric on the course website for more details concerning the assessment of this assignment.

Title of Assignment: Participation and Professionalism

20%

Due Date: Throughout the term

As future teachers, you are expected to be prepared and willing to participate actively in class and to act in a professional and respectful manner towards your peers and your instructor. In the event of extenuating circumstances that will prevent you from attending class, I will expect you to contact me by e-mail prior to class. As a sign of respect to everyone in class, please turn off all mobile phones before entering class (whether in person or via video call) unless there are extenuating reasons not to do so and you have discussed those reasons with me. Your participation in our class activities and discussions is

important not only for your own learning but also the learning of others. I expect you to attend every class, to arrive on time for a prompt start, and to participate in and contribute to class discussions. You are encouraged and expected to share your thinking with your classmates. Please encourage your peers by giving each other "think" time. You are responsible for posing questions and taking responsibility for your own learning. You cannot readily "make up" the class if you are absent because so much rests on what we do together, and this learning cannot be duplicated. Excessive absences (more than one) or tardiness will affect your final grade, but more importantly, it will affect your preparation as a teacher. Please see the corresponding rubric on the course website for more details concerning the assessment of your participation.

III. UNIVERSITY OF WINNIPEG POLICIES

DUE TO COVID-19, a permitted or necessary change in mode of delivery may require adjustments to important aspects of course outlines, like class schedule and the number, nature, and weighting of assignments and/or exams.

Please note that withdrawing before the VW date does not necessarily result in a fee refund. Students are encouraged to contact their instructor before withdrawing in case the instructor can help in any way. The withdrawal date for individual courses and information on refunds is found here: https://www.uwinnipeg.ca/registration/docs/withdrawal-schedule-spring.pdf.

Regulations, Policies, and Academic Integrity. Students are encouraged to familiarize themselves with the "Regulations and Policies" found in the University *Academic Calendar* at: https://uwinnipeg.ca/academics/calendar/docs/regulationsandpolicies.pdf. Particular attention should be given to subsections 8 ("Student Discipline"), 9 ("Senate Appeals"), and 10 ("Grade Appeals"). Please emphasize the importance of maintaining academic integrity, and to the potential consequences of engaging in plagiarism, cheating, and other forms of academic misconduct. Even "unintentional" plagiarism, as described in the UW Library video tutorial "Avoiding Plagiarism" (https://www.youtube.com/watch?v=UvFdxRU9a8g) is a form of academic misconduct. Similarly, uploading essays and other assignments to essay vendor or trader sites (filesharing sites that are known providers of essays for use by others who submit them to instructors as their own work) is a form of misconduct, as it involves "aiding and abetting" plagiarism. More detailed information can be found here:

Academic Misconduct Policy and Procedures: https://www.uwinnipeg.ca/institutional-analysis/docs/policies/academic-misconduct-procedures.pdf.

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Respectful Learning Environment. Students are expected to conduct themselves in a respectful manner on campus and in the learning environment irrespective of platform being used. Behaviour, communication, or acts that are inconsistent with a number of UW policies (e.g. Respectful Working and Learning Environment Policy https://www.uwinnipeg.ca/respect/respect-policy.html, Acceptable Use of Information Technology Policy https://www.uwinnipeg.ca/institutional-analysis/docs/policies/acceptable-use-of-information-technology-policy.pdf) could be considered "non-academic" misconduct. More detailed information can be found here:

Non-Academic Misconduct Policy and Procedures: https://www.uwinnipeg.ca/institutional-analysis/docs/student-non-academic-misconduct-procedures.pdf.

All students, faculty and staff have the right to participate, learn, and work in an environment that is free of harassment and discrimination. The UW Respectful Working and Learning Environment Policy may be found at https://www.uwinnipeg.ca/respect/.

Copyright and Intellectual Property. Course materials are the property of the instructor who developed them. Examples of such materials are course outlines, assignment descriptions, lecture notes, test questions, and presentation slides—irrespective of format. Students who upload these materials to filesharing sites, or in any other way share these materials with others outside the class without prior permission of the instructor/presenter, are in violation of copyright law and University policy. Students must also seek prior permission of the instructor/presenter before, for example, photographing, recording, or taking screenshots of slides, presentations, lectures, and notes on the board. Students found to be in violation of an instructor's intellectual property rights could face serious consequences pursuant to the *Academic Misconduct* or *Non-Academic Misconduct Policy*; such consequences could possibly involve legal sanction under the *Copyright Policy* (https://copyright.uwinnipeg.ca/docs/copyright_policy_2017.pdf).

Research Ethics. Students conducting research interviews, focus groups, surveys, or any other method of collecting data from any person, including a family member, must obtain research ethics approval before commencing data collection. Exceptions are research activities done in class as a learning exercise. For submission requirements and deadlines, see http://www.uwinnipeg.ca/research/human-ethics.html

Privacy. Students should be reminded of their rights in relation to the collecting of personal data by the University (https://www.uwinnipeg.ca/privacy/admissions-privacy-notice.html), especially if Zoom is being used for remote teaching (https://www.uwinnipeg.ca/privacy/zoom-privacy-notice.html) and testing/proctoring (https://www.uwinnipeg.ca/privacy/zoom-test-and-exam-proctoring.html).

Students may choose not to attend classes or write examinations on holy days of their religion, but they must notify their instructors at least two weeks in advance. Instructors will then provide opportunity for students to make up work or examinations without penalty. A list of religious holidays can be found in the 2020-21 Undergraduate Academic Calendar.

Students with documented disabilities, temporary or chronic medical conditions, requiring academic accommodations for tests/exams or during lectures/laboratories are encouraged to contact Accessibility Services (AS) at 204.786.9771 or https://www.uwinnipeg.ca/accessibility-services/ to discuss appropriate options. All information about a student's disability or medical condition remains confidential http://www.uwinnipeg.ca/accessibility.



The dates the University is closed for holidays, irrespective of campus closure related to COVID-19: Monday, September 5, 2022 – Labour Day
Friday, September 30, 2022 – Truth and Reconciliation Day
Monday, October 10, 2022 – Thanksgiving
Friday, November 11, 2022 – Remembrance Day
Sunday, December 25, 2022 – Christmas Day
Monday, December 26, 2022 – Boxing Day
Sunday, January 1, 2023 – New Year's Day

University Closure – Friday, December 23, 2022 – Monday, January 2, 2023 (University Re-opens Tuesday, January 3, 2023)

Monday February 20, 2023 – Louis Riel Day
Friday, April 7, 2023 – Good Friday
Sunday, April 9, 2023 – Easter Monday
May 22, 2023 – Victoria Day
Saturday July 1, 2023 – Canada Day
Monday, August 7, 2023 – Terry Fox Day
See https://www.uwinnipeg.ca/academics/calendar/docs/dates-2021-22.pdf for all UW dates.

Students can find answers to frequently ask questions related to remote learning here: https://www.uwinnipeg.ca/covid-19/remote-learning-faq.html