



Fond du Lac Tribal and Community College  
Elementary Education Program



Course Number: EDUC 3121-20

Course Title: Science Methods

Faculty Name: Heidi Ojibway

MTC Goal Area: \_\_\_\_\_

Credits: 3 Pre-requisites: SCI 1280, SCI 1285 Co-requisites: \_\_\_\_\_

Successful admittance into the Elementary Education Teacher program required? Yes: X No:   

Field Experience/Student Teaching? Yes: \_\_\_\_\_ Number of hours/weeks: \_\_\_\_\_ No: \_\_\_\_\_

**Course Description:**

This course will implement best practices in science literacy for elementary education classrooms. Students will study and apply current methods for science and environmental education. Theoretical background and practical skills necessary for teaching both process and content curriculum are developed through individual and group work. Eight (8) hours of field experience are required.

**Recommend Text and/or other Resources (journals, articles, and/or any other additional materials):**

- Teaching Children Science: A Discovery Approach, with Enhanced Pearson eText -- Access Card Package, Derosa and Abruscato, 9th Edition, 2019, Pearson, 10-0134691792 or 13-9780134691794

**Course Content:**

Unit 1: Reading and interpreting the MN science standards for K-6

- Writing lessons and labs surrounding the K-6 MN science standards
- Learning to evaluate and reinforce students' work surrounding K-6 science standards best practices for writing lesson plans
- 5E lesson practice and writing Inquiry method of teaching science
- Using discrepant events to teach inquiry and tackle misconceptions
- Teaching the scientific method
- Evaluating the scientific method
- Website and supplemental material searches
- Understanding the scientific tools needed to teach young children
- Laboratory safety, proper PPE, finding ways to use non-hazardous chemicals in activities  
Practicing Lab and Unit write ups for: Laboratory Equipment and Laboratory Safety



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### Unit 2: Lessons in Earth Science

- Reviewing key concepts of Earth Science
- Practicing Lab and Unit write ups for Earth and Space Sciences Lessons method students would like to address
- Incorporating Native American Scientists who have contributed to the field
- Incorporating the Native American culture and how the people help to maintain balance

### Unit 3: Lessons in Life Science

- Reviewing key concepts of Life Science • Practicing Lab and Unit write ups for Life Science Topics

### Unit 4: Lessons in Physical Science

- Reviewing key concepts of Physical Science
- Practicing Lab and Unit write ups for Physical Science Topics

### **Learning Outcomes:**

#### **Outcomes and Assessments Competencies Across the Curriculum**

**Information Literacy:** Students will be able to use print and/or non-print tools effectively for the discovery, acquisition, and evaluation of information.

**Objective 1:** students will have to demonstrate their ability to communicate through written expression weekly in the on-line discussions associated with topics in classroom discussion, current events, lesson plans and cultural assignments. Students will be required to respond to the discussion prompt and then respond to a minimum of two classmates.

**Objective 2:** students will have to demonstrate their ability to create a unit of their choice from materials they have gathered on topics and the material they have received from class. Students will be graded on completeness, flow and correlation to standards.

**Ability to Communicate:** Students will be able to listen, read, comprehend, and/or deliver information in a variety of formats to successfully communicate.

**Objective 1:** students will be given reading assignments out of the text outside of class time and then be expected to discuss the information therein. Students will be evaluated on their knowledge of reading material by classroom discussion and assessments.

**Objective 2:** students will be expected to ask questions when they are not understanding or sure of the reading material, they are required to read outside of class time. Students will be evaluated on their knowledge of reading material by classroom discussion and assessments.



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**Problem Solve:** Students will be able to conceptualize, apply, analyze, synthesize, and/or evaluate information to formulate and solve problems.

**Objective 1:** Students will be able to demonstrate their ability to write and evaluate a laboratory experiment, evaluate primary source articles, and work scientific problems using problem solving skills. Students will be evaluated by their written lesson plans, classroom discussions, and assessments.

**Objective 2:** Students will demonstrate their ability to identify common scientific misconceptions and how to teach children to let go of said misconceptions through discrepant events and other tools.

**Culture:** Students will learn to appreciate and consider knowledge of Anishinaabe traditions and culture, knowledge of one's own traditions and cultures, knowledge of others' traditions and cultures, culture of work, culture of academic disciplines and/or respect for global diversity.

**Objective 1:** Students will be able to analyze how Native and Indigenous cultures interpret scientific phenomena and explain how these interpretations are embedded in stories, traditions, and cultural landmarks. Students will demonstrate their understanding through online discussions, research activities, and the creation of a *Diversity in Science* project.

**Objective 2:** Students will be expected to incorporate Native American culture into at least one of their lesson plans addressing past, present and future scientific worldviews and phenomenon.

### Learning Outcomes:

- Access, interpret and disseminate into their curriculum, the Minnesota state science standards and the Next Generation Science Standards (NGSS) for grades K-6 through classroom curriculum.
- Demonstrate the ability to write effective lesson plans using Minnesota science standards for grades K-6 that will include but not limited to various inquiry-methods (learning methods) which encompass indigenous peoples and peoples of color and other ethnic backgrounds.
- Demonstrate, through coursework and assessments, the ability to apply appropriate measurements and follow the required safety protections when teaching and conducting scientific investigations.
- Demonstrate the ability to evaluate and reinforce students' work to give a better understanding of the scientific world and worldview around them by classroom work, projects, and assessments.
- Demonstrate understanding of and evaluate work concerning the scientific method approach to science learning and understanding by working in small groups, classroom assignments and assessments.
- Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.
- Demonstrate the understanding of natural cycles which protect the Earth and how Indigenous peoples have interacted and continue to interact with nature to protect their homes of the past, present and future.



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### **Cultural Standards:**

*Each course within the BS in Elementary Education program must meet a minimum of two measurable learning outcomes for three different **Cultural Standards**. If your course does not meet the Cultural Standards, please justify your rationale.*

Cultural Standard (must meet 3 of 7)	Learning Outcomes that Align to Cultural Standards (two for each standard) The student will:	Cultural Assessment Description
<p><b>2. GWAYAKWAADIZIWIN – Living a balanced way</b></p> <p>To provide students the opportunity to recognize the importance of living in harmony with the community and are prepared to use a collective approach to understanding and deciding on a course of action.</p> <p><u>Disposition:</u> <b>Communication and Collaboration</b> Teacher candidates demonstrate professional, interpersonal, and communication skills. These skills are used to promote positive collaborative partnerships with students, families, colleagues, other school professionals, and the global community to support achievement of student learning outcomes.</p> <ul style="list-style-type: none"> <li>• <b>Reflective Collaboration:</b> Uses insights and inspiration of others to improve practice and can occur in: <ul style="list-style-type: none"> <li>○ Professional Learning Communities</li> <li>○ Mentoring Programs</li> <li>○ Peer Observations</li> <li>○ Critical Friends Groups</li> </ul> </li> <li>• <b>Community Involvement:</b> Demonstrates positive collaborative skills in interactions with instructors, advisors, students, colleagues, parents/guardians/caregivers, school teams, and those in the wider community.</li> <li>• <b>Communication:</b> Effectively and accurately communicates ideas, thoughts or visions (oral and written) and engages in active listening based on audience and community cultural norms.</li> </ul> <p><u>Professional Outcome:</u> <b>Community and Collaboration</b></p> <ul style="list-style-type: none"> <li>• To develop teachers who are reflective, connected educators who understand the interrelatedness of educating the whole child by including the community.</li> </ul>	<p>Demonstrate the ability to write effective lesson plans using Minnesota science standards for grades K-6 that will include but not limited to various inquiry-methods (learning methods) which encompass indigenous peoples and peoples of color and other ethnic backgrounds.</p> <p>Demonstrate the understanding of natural cycles which protect the Earth and how Indigenous peoples have interacted and continue to interact with nature to protect their homes of the past, present and future.</p>	<p>Students will be writing a full lesson plan on the water cycle and integrating how keeping the water cycle balanced is key to Mother Earth. In this lesson plan students will address how a balanced water cycle affects all humans and living things on Earth.</p> <p>Students will demonstrate this outcome by developing an investigative lab at the upper elementary grades including grading rubrics that show how a balanced water cycle affects people and Mother Earth.</p> <p>Students will include how an unbalanced water cycle has consequences for all humans and living things on the planet.</p>
<p><b>4. AANGWAAMIZIWIN – Diligence and caution</b></p> <p>To develop a student’s capacity to proceed carefully, after identifying, discussing and reflecting on ethical dimensions of political, social, and personal life.</p> <p><u>Disposition:</u> <b>Ethical Behavior</b> Teacher candidates demonstrate professional integrity through behaviors and actions that reflect state and FDLTCC ethical and cultural standards.</p>	<p>Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.</p> <p>Access, interpret and disseminate into their curriculum, the Minnesota state science standards and the Next</p>	<p>Students will be assessed on their ability to create a laboratory exercise on laboratory equipment and use including a student assessment in an elementary classroom and how protecting oneself protects the people. Students will write an age and developmentally appropriate lesson plan on how to work in a science setting that is safe and respectful to the environment and the culture.</p>



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<ul style="list-style-type: none"> <li>• Demonstrate professional and ethical conduct with faculty, faculty supervisors, cooperating teachers, students, parents, colleagues, and community.</li> <li>• Practices, complies, and understands the school site and the college and unit policies (e.g., academic honesty), as well as Minnesota Code of Ethics for Teachers.</li> <li>• Adheres to all professional standards, including the use of technologies (e.g., accesses authorized websites, social media and other applications, and uses personal electronic devices as appropriate).</li> </ul> <p><b>Professional Outcome: Ethical Practitioner</b></p> <ul style="list-style-type: none"> <li>• To develop teachers' capacity to be ethically responsive in respecting their role as an educator and to the community.</li> </ul>	<p>Generation Science Standards (NGSS) for grades K-6 through classroom curriculum.</p>	<p>Students will be assessed on their ability to create an activity for an elementary classroom which includes how to work safely in a science classroom including safety symbols, equipment and protocols. This activity will include a way for teacher candidates to assess their students' knowledge of the science classroom safety.</p> <p>Students will also be required to include information on how people and companies use safety equipment and protocol to protect the environment and the people as part of the lesson component.</p>
<p><b>6. ZAAGI' IDIWIN – Loving and Caring</b></p> <p>To encourage the teacher candidates' development of healthy, caring relationships built on respect for all.</p> <p><b>Disposition: Equity, Social Justice, and Inclusion</b></p> <p>Teacher candidates demonstrate fairness, empathy and compassion based on their belief that everyone can learn. Candidates actively seek out multiple perspectives and diverse experiences to address the academic, interpersonal, and emotional needs of all students.</p> <ul style="list-style-type: none"> <li>• Demonstrates and appreciation of the languages, communities, and experiences students bring to the classroom.</li> <li>• Advocates for and supports Indigenous and other diverse communities and individuals.</li> <li>• Respects the dignity and essential worth of all individuals.</li> <li>• Interacts with sensitivity to community and cultural norms.</li> <li>• Values and responds to all aspects of a child's developmental well-being (cognitive, emotional, psychological, social, and physical).</li> <li>• Promotes the diversity of opinions, ideas, and backgrounds.</li> </ul> <p><b>Professional Outcome: Diversity and Disposition</b></p> <ul style="list-style-type: none"> <li>• Promote teachers' acceptance and respect of the diversity within their school, community and environment.</li> </ul>	<p>Demonstrate the ability to evaluate and reinforce students' work to give a better understanding of the scientific world and worldview around them by classroom work, projects and assessments.</p> <p>Demonstrate understanding of and evaluate work concerning the scientific method approach to science learning and understanding by working in small groups, classroom assignments and assessments.</p>	<p>Students will be assessed on their ability to design a project- based bulletin board that addresses the contribution of black, brown and Native American scientists.</p> <p>Students will be assessed on their ability to create an activity, with a grading rubric, where students create an essay or paper on a Native American scientist and their contribution to science and their people.</p>



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Minnesota Professional Education License and Standards Board Standards (MN PELSB)\*\* listed at the end of the syllabus. (Insert more rows as needed.)

**8710.2000 Standards of Effective Practice**

MN PELSB SEP Standard Code	8710.2000 Standards of Effective Practice	Learning Opportunities & Assessment *Include the Field Experience hours as applicable for clarity.	Based on the learning opportunities and assessments, the K-6 learner will demonstrate meeting this standard by:	FDLTCC Learning Outcomes	Cultural Standard
4.R	Identify and apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.	Website Search One:  Develop a lesson that includes one technology resource.  Week 7: Diversity Bulletin Board	Complete an internet search and identify 2-3 technology resources that can be used in the classroom to engage and motivate students in science. Students will also connect the technology resources on how they empower all students, including those from diverse backgrounds, characteristics, and abilities. In the classroom, students will discuss their findings and explore how technology resources can empower students from diverse backgrounds, characteristics and abilities. Students will learn about free online educational technology sources for surveys, data, vocabulary, etc.  The lesson plan will be on the water cycle and integrating how keeping the water cycle balanced is key to Mother Earth. Students will incorporate a form of technology they learned from their website search into their lesson plan. Students will implement the lesson in the classroom as part of a field experience.  Students will develop a bulletin board that engages students to do the works other cultures have contributed to science and scientific research. Students will be given a choice on how they want to engage students (Ex.) Perhaps they will give them a treasure hunt assignment from people on the bulletin, have them add a person they have researched to	Demonstrate the understanding of natural cycles which protect the Earth and how Indigenous peoples have interacted and continue to interact with nature to protect their homes of the past, present, and future.  Demonstrate the ability to write effective lesson plans using Minnesota science standards for grades K-6 that will include but not limited to various inquiry-methods (learning methods) which encompass indigenous peoples and peoples of color and other ethnic backgrounds.	GWAYAKWAADIZIWIN <i>Living a balanced way</i>



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			add to the bulletin board, etc. These are options for students to consider as they are evaluating this activity for use in their own classroom one day		
7.J.	Know how to ask questions and stimulate discussion in different ways, including probing for learner understanding, helping students articulate their ideas and thinking processes, promoting productive risk-taking and problem-solving, facilitating factual recall, encouraging convergent and divergent thinking, stimulating curiosity, and helping students to question;	<p>Weekly discussions week 2- 15</p> <p>Week 3: Chapter 4, page 76-80</p> <p>Field experience – introducing inquiry learning</p>	<p>During this semester, students are going to be exploring convergent and divergent thinking as ways to stimulate their elementary students' thinking. Classroom discussions will include ideas, tips, and examples on how to engage students through inquiry such as demonstrations that cause conflict and questions, discrepant event demonstrations that also cause conflict, and creating web quests where students must start research on their own.</p> <p>In small group work students will practice using these techniques to explore how discussions can be framed to probe student understanding to help in understanding concepts. In these groups, students will also practice using techniques that promote risk-taking.</p> <p>Students will be using the textbook as a guide to learn the techniques available for inquiry learning. Some of the text examples include wait-time, fostering listening skills and question strategies.</p> <p>Students will be required to keep a journal about their field experience and will be recording what inquiry techniques they are using and how they think they went and what could be done better.</p> <p>Questions to stimulate reflection include: What methods of inquiry did you use to engage students in problem-solving and facilitating factual recall? How did you promote risk-taking? How did you promote convergent and</p>	Demonstrate the ability to evaluate and reinforce students' work to give a better understanding of the scientific world and worldview around them by classroom work, projects, and assessments.	AANGWAAMIZIWIN Diligence and caution



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			divergent thinking? How did you promote student curiosity and help		
9.N.	Use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning	<p>Chapter 1, page 15: connecting technology to teaching</p> <p>Week 2: chapter 3, pages 41-68</p> <p>Week 3: Current event assignments</p> <p>Week 10: Chapter 6 (all)</p>	<p>The book assignments are designed to give students a starting point for learning about technology and how to use technology responsibly in class.</p> <p>Chapter 2 is about lesson planning and how to use standards, sequence and scope.</p> <p>Science is always changing and teachers who teach science need to know how to stay current and using current events is one excellent way to do this. Knowing what publications are good to review and learning to review primary source articles are keys to being able to effectively keep current.</p> <p>Some of the current event articles will allow students to use various technology resources, such as but not limited to, laboratory equipment, graphing through word and excel and scientific calculators (upper elementary) to understand the collection and analyzing of data, to helping understand the interpreting of results and communicating findings to empower instructional practice and maximize student learning.</p> <p>Using a technology resource, students will analyze the data and communicate findings in class and discuss how instructional practice could be improved to maximize student learning through new or supporting material they find in current event articles. In the classroom students will discuss technology resources that can be used to collect data. Students will be required to understand the type of data that needs to be collected for each activity.</p>	<p>Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.</p> <p>Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.</p>	AANGWAAMIZIWIN Diligence and caution



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			<p>When students are working with scientific data collecting equipment, they will need to learn length is measured in the base unit meter, liquid volume will be measured in L, volume of angular objects will be measured in m<sup>3</sup>, mass will be measured in grams, force will be measured in Newtons, etc.</p> <p>For instance: in the speed lab, students will establish distance in meter and time in a second because speed is measured in m/s (or some unit of distance/some unit of time).</p> <p>To analyze data, students need to go back to their hypothesis and determine what they predicted for an outcome and compare their collected data to that hypothesis to be able to conclude, with facts, if their hypothesis was correct or not. The other aspect of analyzing data is to evaluate where errors may have occurred when taking data measurements or performing calculations.</p> <p>Students will use a technology resource on a lesson and assessment that was implemented in a classroom field experience. Prior to field experience, students will use laboratory equipment and technology used to collect and analyze data. Students will be learning how to use this equipment by performing activities the instructor will set up. These activities will involve what equipment to use when, how to calibrate it, if necessary, what units are associated with the equipment and then finally students will be required to use this equipment any time we conduct a lab in this class that requires data collection tools. Students will finally be evaluated on a quiz/test demonstrating their knowledge of the tools mentioned above.</p>		
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			<p>Book assignments are meant to guide students using technology, scientific tools, data collection, etc. so students can fully appreciate the importance of current events and staying current.</p> <p>Chapter 6 is also about how to integrate science into other subjects in school. This is important to help future teachers learn how to show their future students how science is everywhere, even in other subjects at school.</p>		
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### **8710.3200 Elementary Education: Subject Matter:**

Subpart 3. **Standard 2, student learning.** A teacher must understand how students learn and develop and must provide learning opportunities that support a student's intellectual, social, and personal development. The teacher must:

MN PELSB Content Standard code	<i>8710.3200 Elementary Education: Subject Matter</i>	Learning opportunities and Assessment *Include the Field Experience hours as applicable for clarity.	Based on the learning opportunities and assessments, the TC and/or the K-6 learner will demonstrate meeting this standard by:	FDLTCC Learning Outcomes	Cultural Standard
3.A.1.	Understand and apply the research base for and the best practices of kindergarten and elementary level education.	<p>All of chapter 3 from week 2</p> <p>Discovery learning activity on pg. 67</p> <p>Week 4: Chapter 6, pages 111-113 on NGSS</p> <p>Week 7: Appendix A, pg. 238-270</p> <p>Week 7: Lesson plan writing for upper and lower elementary for Earth and space science</p> <p>Week 10: Appendix B, pg. 271-303</p> <p>Week 10: Lesson plan writing for upper and lower elementary in the life sciences</p> <p>Week 13: appendix C, pgs. 303-335</p>	<p>Chapter 3 is a guide to writing lesson plans and using science standards, sequence, and scope to write effective plans.</p> <p>This activity has students work with the researched based NGSS standards and have several choices to choose from to complete this activity, such as writing a lesson plan which incorporates some NGSS standards.</p> <p>This is more information about the NGSS.</p> <p>Appendix A is all about writing plans within the Earth and Space Science Scope. This is set up nicely for a person writing a lesson plan on any subject within this science subject. Students will incorporate Appendix A information and adapt and use the unit lesson plan template to design their lesson.</p>		



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		<p>Week 13: writing for upper and lower elementary lesson plans in the physical sciences</p>	<p>Once students look through Appendix A they can choose a topic to create a small lesson plan on Earth and Space Science. Students will use the MN state science standards and create a plan based upon at least one concept covered in an upper and lower elementary grade they choose. Students will use the unit lesson plan template.</p> <p>Appendix B is the life sciences and is set up like appendix A, so it will be used similar to Appendix A, except for Life Sciences. Students will then use the MN state science standards for an upper and lower elementary grade and write a plan using the unit lesson plan template.</p> <p>Appendix C is Physical Science. Again, the protocol for appendix A and B will be followed here using the unit lesson plan template.</p> <p>Students will take MN science standards for an upper and lower elementary grade and write a plan for physical science using the unit lesson plan template.</p>		
<p>3.A.5.</p>	<p>Understand how to integrate curriculum across subject areas in developmentally appropriate ways.</p>	<p>Classroom discussions</p> <p>Week 4, Chapter 6, pages 114-123</p> <p>Reality check, page 124</p> <p>Going Further, page 126</p> <p>Week 3 Current event assignment, looking for a scientific issue in social studies, politics, economics, etc.</p>	<p>Classroom discussions will include developmentally appropriate ways to integrate science curriculum across subject areas.</p> <p>This chapter of the book demonstrates to students how to integrate science with other subjects in the elementary classroom in developmentally appropriate ways</p> <p>The reality check and going further give students the opportunity to practice integrating based upon given parameters.</p> <p>The current event assignment will give students the opportunity to look for current</p>	<p>Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.</p>	<p>ZAAGIIDWIN Loving and Caring</p>



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			literature that demonstrates how science is integrated into many of the other disciplines.		
3.J.1.	Understand science as a human endeavor the nature of scientific knowledge, and the historical perspective of science	<p>Week 6: Page 130-133 in text, history of earth and space science</p> <p>Week 9: Page 165-168 in text, history of life science</p> <p>Week 13: Page 203-207 in text, history of physical sciences</p> <p>Week 7: Diversity bulletin board and paper</p>	<p>Each of the disciplines in this text have a section that relates careers, key events in the discipline and finally women and men who have made contributions in science. These sections of the chapters will give another resource when making the diversity bulletin board. Students will develop a bulletin board that engages students to do the works other cultures have contributed to science and scientific research.</p> <p>The key historical events are listed by date, so students have a starting point for research they may want to research later or research for the diversity bulletin board.</p>	<p>Demonstrate understanding of and evaluate work concerning the scientific method approach to science learning and understanding by working in small groups, classroom assignments and assessments.</p> <p>Demonstrate the understanding of natural cycles which protect the Earth and how Indigenous Peoples have interacted and continue to interact with nature to protect their homes of the past, present and future</p>	<p>ZAAGIIDWIN Loving and Caring</p>
3.J.2.a	Identify questions and concepts that can be explored through scientific inquiry	<p>Week 4: Creating a discrepant event</p> <p>Week 4: PPT misconceptions and discrepant events</p> <p>Classroom discussions on how discrepant events can be used to identify and develop questions and concepts using scientific inquiry that can then be applied in the classroom.</p>	<p>Discrepant events are excellent tools to use to help tackle misconceptions students may have picked up during their education program.</p> <p>Students will be taught how to identify several discrepant events and how they can be utilized in the classroom to engage in the classroom to engage students and get them to start asking questions.</p> <p>These events are excellent for scientific inquiry and exploration of new topics.</p> <p>Students will be discussing in class how the discrepant events work and how they might use them in an upper or a lower classroom of their own in the future.</p>	<p>Demonstrate understanding of and evaluate work concerning the scientific method approach to science learning and understanding by working in small groups, classroom assignments and assessments.</p>	<p>GWAYAKWAADIZIWIN Living a balanced way</p>



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			Students will be asked to create their own discrepant event in an elementary grade of their choice based upon standards that are covered.		
3.J.2.b	Design and conduct scientific investigations	<p>Week 1: pg. 29, graphing; pg. 39, scientific inquiry process</p> <p>Week 7: making a cloud scientific investigation</p> <p>Week 11: Making a model of the water cycle</p> <p>Week 13: Speed Lab Note: students will be doing a series of lab experiments throughout the semester to see how a lab can be designed, such as the speed lab, and then they are going to be required to design a lab they will conduct during their time in the classroom.</p>	<p>Page 29 has a data table from a scientific experiment and asks students to practice their graphing skills as a part of the scientific inquiry process.</p> <p>Part of the scientific process is trying to understand the world around us, and scientific models help us accomplish this. There are several different types of models that are used in science and physical models are the most used in the elementary classroom.</p> <p>Students will get the experience of creating a physical model so they can not only better understand the importance of physical models when they teach these concepts but also have prior experience at designing them in the event they ask their own students to do something similar.</p> <p>The speed lab is an easy lab that collects distance and time data which is analyzed into speed.</p> <p>Students will be shown how to make a distance vs time graph where the slope is speed. This lab goes through the entire scientific method. Hands-on experience of conducting experiments such as these help future teachers teach the scientific method process, data collection and analysis process and help them to design their own experiments and activities in their own classroom.</p> <p>Students will be creating a lab-based lesson plan where they are required to design a lab, conduct it in the classroom and then evaluate their own design when the lesson is concluded.</p>	Demonstrate understanding of and evaluate work concerning the scientific method approach to science learning and understanding by working in small groups, classroom assignments and assessments.	AANGWAAMIZIWIN Diligence and caution



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<p>3.J.2.c</p>	<p>Use appropriate scientific instrumentation and equipment and mathematics as tools to improve scientific investigations and communications</p>	<p>Week 1: reviewing lab equipment</p> <p>Week 1: pg. 29, graphing; pg. 39, scientific inquiry process</p> <p>Week 13: Speed Lab: collecting and analyzing data</p> <p>Classroom discussion on how to scientific instrumentation and equipment and mathematics as tools to improve scientific investigations and communications throughout semester.</p>	<p>To collect proper data that can be used to explain phenomena, students need a refresher on the lab equipment structure, function and calibration so they can not only maintain equipment in their own classroom but teach students how to use this data collecting equipment.</p> <p>Being able to complete a graphing exercise on paper, students will be shown how to use google sheets or excel to make a graph that can be interpreted.</p> <p>Students will have to use meter sticks and stop watches to collect data for this lab and then use graphing tools to graph the data for analysis and interpretation.</p> <p>Throughout the semester, classroom discussions will be used to give students a format for discussing what works and doesn't work in scientific study. This will also give students the opportunity to brainstorm on how investigations could be done better in future tries.</p>	<p>Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.</p>	<p>AANGWAAMIZIWIN Diligence and caution</p> <p>GWAYAKWAADIZIWIN Living a balanced way:</p>
<p>3.J.2.d.</p>	<p>Compare the use of multiple types of inquiry for answering questions;</p>	<p>Week 3: Chapter 4, page 76-80</p> <p>Week 3: 5E PPT and examples</p> <p>Week 1: chapter 1 – inquiry method section</p> <p>Watch: Scientific Inquiry: A Teacher's Guide (13) Scientific Inquiry: A Teacher's Guide - YouTube</p> <p>Weekly discussions week 2- 15</p>	<p>Again, this section gives students the opportunity to learn various techniques to inquiry and asking questions.</p> <p>The 5E lesson planning is an inquiry approach method that starts students investigating a new topic with a group to pull prior knowledge. The 5E model: Engagement, Exploration, Explanation, Extension, and Evaluation. In the 5E Instructional Model, science instruction is primarily student-led and inquiry-based. The teacher is a facilitator, guiding the student through questions, investigations, experiences, and research.</p> <p>Chapter one is an introduction to learning science. This not</p>	<p>Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.</p> <p>Demonstrate the ability to write effective lesson plans using Minnesota science standards</p>	<p>AANGWAAMIZIWIN Diligence and caution</p> <p>GWAYAKWAADIZIWIN Living a balanced way:</p>



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			<p>only discusses some topics for inquiry method, it also goes into how children learn and real-life obstacles that keep students from learning or being engaged.</p> <p>This will reinforce the material covered for scientific inquiry and learning.</p> <p>Discussion throughout the quarter is a crucial avenue for students to think pair and share ideas they have learned and ideas they may want to pursue and get reinforcement from fellow students and the instructor</p>	<p>for grades K-6 that will include but not limited to various inquiry methods (learning methods) which encompass Indigenous Peoples and peoples of color and other ethnic backgrounds.</p>	
3.J.2.e.	Evaluate alternative explanations and models based on evidence, current scientific understanding, and logic;	<p>Week 10: Current Event Assignment on primary source and secondary source</p> <p>Weekly discussions week 2-15</p> <p>Week 7: making a cloud scientific investigation observing and evaluating a scientific model</p> <p>Week 11: Making a model of the water cycle: observing and evaluating a scientific model</p> <p>Week 13: Speed Lab: making conclusions based upon hypothesis and data</p>	<p>Current event articles are excellent ways for students to find out what is new in the scientific world. This is a vital skill for teachers to acquire who teach science. Current events allow students a chance to see new techniques that are being tried in science and a way to increase their ability to read and analyze scientific data.</p> <p>Models in science are valuable to understanding concepts that are not necessarily tangible. There are several different types of scientific models, but at the elementary level, physical models are very important tools for students to learn how to use and even how to show their understanding of scientific concepts. Both the making of a cloud and the water cycle model are physical models.</p> <p>The speed lab is an actual lab using the entire scientific method that allows students to follow the method, collect data, use data to support a hypothesis or idea and then analyze the data to be able to clearly visualize the outcome of the experiment.</p>	<p>Demonstrate the ability to evaluate and reinforce students' work to give a better understanding of the scientific world and worldview around them by classroom work, projects and assessments.</p>	<p>ZAAGIIDWIN Loving and Caring</p>



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			<p>Scientific investigations allow students the ability to see the logic behind the scientific process.</p> <p>Students will be required to keep current with science news. Students will be asked to evaluate the current event articles and evaluate alternative explanations for the science being discussed.</p> <p>Scientific investigations and keeping current with science news allow students to investigate how science encourages alternative explanation through testing, data collecting and peer review.</p>		
3.J.2.f.	Communicate and defend a scientific argument.	<p>Week4 Current event, current event in politics</p> <p>Classroom Discussion: Students will be asked to work in small groups and defend a scientific argument.</p>	<p>Students will be investigating a current event article that is highly politicized, for example, climate change. This gives students the understanding of how important it is for teachers to teach future voters the importance of how to evaluate scientific research and what is junk science and what is real science.</p> <p>Students will be asked to defend their current event topic in the class and to present data for or against the topic they selected.</p> <p>Then students will be given the opportunity to discuss the importance of scientific arguments and how it can be used to keep science in check and allow students to learn to use facts that are supported when arguing a scientific point.</p>	<p>Demonstrate the ability to evaluate and reinforce students' work to give a better understanding of the scientific world and worldview around them by classroom work, projects and assessments.</p> <p>Demonstrate understanding of and evaluate work concerning the scientific method approach to science learning and understanding by working in small groups, classroom assignments and assessments.</p>	<p>ZAAGIIDIWIN Loving and Caring</p>
3.J.3.	Know and make connections across the domains of science and technology, and between science and other school subjects.	<p>Week 9, Chapter 6, pages 114-123</p> <p>Reality check, page 124 Going Further, page 126</p> <p>Week 4 Current event assignment, looking for</p>	<p>Chapter six teaches and gives students examples of how to integrate science and technology into the other disciplines of the elementary classroom.</p> <p>The reality check and going further give specific tasks</p>	<p>Demonstrate the ability to evaluate and reinforce students' work to give a better understanding of the scientific world and worldview</p>	<p>GWAYAKWAADIZIWIN Living a balanced way</p> <p>AANGWAAMIZIWIN Diligence and caution</p>



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		<p>a scientific issue in social studies, politics, economics, etc.</p> <p>Week 9 Website search on websites available to teachers to stay current with new technologies and best practices, especially across subject lines.</p>	<p>students can do to practice integrating science into other disciplines.</p> <p>Searching for current literature or scientific investigation that demonstrates the connections between science and other disciplines is a good tool to practice helping students become well rounded teachers.</p> <p>The website search will give students the opportunity to find free resources that incorporate science and technology into other disciplines.</p>	<p>around them by classroom work, projects and assessments.</p> <p>Demonstrate the ability to write effective lesson plans using Minnesota science standards for grades K-6 that will include but not limited to various inquiry methods (learning methods) which encompass Indigenous Peoples and peoples of color and other ethnic backgrounds.</p>	
3.J.4.	Use scientific understanding and abilities when making decisions about personal and society issues.	<p>Week 10: Personal and societal issues in the earth and space sciences; pg. 134</p> <p>Week 12: Personal and societal issues in life sciences; pg. 170-171</p> <p>Week 14: Personal and societal issues in the physical sciences; pg. 208</p> <p>Weekly discussions weeks 2- 15</p> <p>Week 11: water cycle project and Mother Earth and environmental implications</p>	<p>The beginning of each part two through four gives students a look at some of the societal and personal issues that each of the disciplines face or provide. Part two is issues in earth/space science, part three is the life sciences and part four the physical sciences.</p> <p>Each has a unique set of issues.</p> <p>Class discussion surrounding these topics can be helpful in showing perspective teachers there are good things to science and consequences brought on by technology. Making students aware of these issues will help them to guide their own students in ways that science/technology make life easier, but it comes with a price and the responsibility of being a good steward.</p> <p>A water cycle shows the different pathways of where water is supposed to go and how it is supposed to keep circulating throughout the cycle.</p>	<p>Demonstrate the ability to write effective lesson plans using Minnesota science standards for grades K-6 that will include but not limited to various inquiry methods (learning methods) which encompass Indigenous Peoples and peoples of color and other ethnic backgrounds.</p> <p>Demonstrate the understanding of natural cycles which protect the /earth and how Indigenous peoples have interacted and continue to interact with nature to protect their homes of the past, present and future.</p>	GWAYAKWAADIZIWIN Living a balanced way:



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			Humans have interrupted this cycle in many ways that makes valuable water unavailable. Students will have to extend this project into ways humans can remedy water issues or avoid them altogether by good stewardship.		
3.J.8.a	Content standards under chapter 3501 for recommendations regarding curriculum, assessment, professional development, and program development:	<p>Week 7: Appendix A, pg. 238-270</p> <p>Week 10: Lesson plan writing for upper and lower elementary for Earth and space science and aligning with state standards</p> <p>Week 10: Appendix B, pg. 271-303</p> <p>Week 10: Lesson plan writing for upper and lower elementary in the life sciences and aligning with state standards</p> <p>Week 13: appendix C, pgs. 303-335</p> <p>Weekly discussion through weeks 2-15 on how to stay current in your license with professional development opportunities.</p>	<p>The appendices for earth/space, life and physical sciences help to put content into action. In these appendices are ideas of lessons that can be created in each of the disciplines. Students will be tasked with merging content from these appendixes with MN state standards at the grade level they wish to write a lesson for and design a lesson.</p> <p>Students will be asked to write a plan for one subject at lower elementary and one at an upper elementary grade level.</p> <p>In addition to writing lesson plans, students will be shown how to inter- connect the standards and content throughout a time frame such as a quarter or semester so they can get the practice of developing a program for a portion of a school year. Students will use the unit lesson plan template that includes what state standards will be taught in each lesson.</p> <p>Students will be assessed on their lesson plan and assessment and how it relates to MN graduation standards. Discussion will be a vital portion of these topics, so students know where to go to find reliable sources to help them keep current and keep up their professional development surrounding science instruction.</p> <p>Discussions will also include curriculum development, assessments and how staying current in the field leads to</p>	Access, interpret and disseminate into their curriculum, the Minnesota state science standards, and the Next Generation Science Standards (NGSS) for grades K-6 through classroom curriculum.	AANGWAAMIZIWIN Diligence and caution



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			<p>innovative program development.</p> <p>Students will be made aware of science and professional organizations that also provide these types of services.</p>		
3.J.8.b.	<p>how to teach scientific inquiry in a developmentally appropriate manner.</p>	<p>Week 7: Appendix A, pgs. 238-270</p> <p>Week 10: Lesson plan writing for upper and lower elementary for Earth and space science and aligning with state standards</p> <p>Week 10: Appendix B, pgs. 271-303</p> <p>Week 12: Lesson plan writing for upper and lower elementary in the life sciences and aligning with state standards.</p> <p>Week 13: appendix C, pgs 303-335</p> <p>Week 14: writing for upper and lower elementary lesson plans in the physical sciences and aligning with state standards</p> <p>Week 6: creating discrepant events that are age appropriate and tackle misconception</p>	<p>Elementary grade levels not only have different content standards but also are at different developmental stages. The appendices in the book offer ideas from lesson plan writing that can be modified to meet certain grade levels. Students will be given the opportunity to write a lesson for a younger elementary classroom and then modify the plan to fit an upper classroom level.</p> <p>As part of creating lessons, teachers want to have engaging activities including discrepant events.</p> <p>Students will be given the opportunity to design demonstrations or events that fit the appropriate age and developmental level of the students in a particular elementary classroom.</p>	<p>Access, interpret and disseminate into their curriculum, the Minnesota state science standards and the Next Generation Science Standards (NGSS) for grades K- 6 through classroom curriculum.</p> <p>Demonstrate the ability to write effective lesson plans using Minnesota science standards for grades K-6 that will include but not limited to various inquiry methods (learning methods) which encompass Indigenous Peoples and peoples of color and other ethnic backgrounds.</p>	<p>AANGWAAMIZIWIN Diligence and caution</p>
3.J.8.c.	<p>common student misconceptions in science and developmentally appropriate strategies to elicit students' misconceptions and help them move to accepted scientific understandings</p>	<p>Weeks 4 and 6: Misconceptions and discrepant events PPT</p> <p>Weeks 4 and 6: Creating age-appropriate discrepant events</p> <p>Students will identify common misconceptions in science and apply developmentally appropriate strategies to elicit these</p>	<p>As a part of an inquiry method of teaching, students need to become aware of tools that can be used to tackle common misconceptions students may have about certain scientific phenomena. For example: Stars and constellations appear in the same place in the sky every night. The sun rises exactly in the east and sets exactly in the west every day. The moon can only be seen during the night. Dinosaurs and cavemen lived at the same time etc. Identifying</p>	<p>Demonstrate understanding of and evaluate work concerning the scientific method approach to science learning and understanding by working in small groups, classroom assignments and assessments.</p>	<p>AANGWAA MIZIWIN Diligence and caution</p>



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		<p>misconceptions in learners, guiding them toward scientifically accepted understandings.</p>	<p>misconceptions and then creating or using a demonstration or discrepant event allows students to question their own beliefs and understandings and help to shape their knowledge in logical thinking about scientific understanding.</p> <p>The web article provides strategies on how to explore and address misconceptions in science.</p>		
3.J.8. d.i	<p>State and national legal responsibilities and safety guidelines for teaching science.</p>	<p>Week 6: lab equipment and safety videos</p> <p>Week 6: lab safety PPT</p> <p>Week 6: Laboratory safety assignment</p> <p>Week 7: Laboratory safety lesson plan, age and culturally appropriate, environmental appropriate</p>	<p>Students need to be given the opportunity to research specific standards and guidelines for the state of Minnesota regarding lab safety. This will just be one component of the four activities list here.</p> <p>Students will have to research the specific guidelines for handling chemicals and disposal for their area.</p> <p>Students will write an age and developmentally appropriate lesson plan on how to work in a science setting that is safe and respectful to the environment and the culture.</p>	<p>Access, interpret and disseminate into their curriculum, the Minnesota state science standards and the Next Generation Science Standards (NGSS) for grades K- 6 through classroom curriculum.</p> <p>Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.</p>	<p>AANGWAAIZIWIN Diligence and caution</p>
3.J.8.d.ii.	<p>How to establish and enforce recognized safety procedures during science learning experiences</p>	<p>Week 6: lab equipment and safety videos</p> <p>Classroom discussion on how to establish and enforce safety procedures at various grade levels in K-6.</p>	<p>Another component of these activities is to give students the opportunity to learn how to set up a safety plan for their future classroom that involves student training and enforcement and being able to recognize safety hazards based upon the activity they will be doing. This will involve classroom discussion and practice</p>	<p>Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when</p>	<p>AANGWAAMIZIWIN Diligence and caution</p>



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				teaching and conducting scientific investigations.	
3.J.8.d.iii.		<p>Week 6: lab equipment and safety videos</p> <p>Week 6: lab safety PPT</p> <p>Week 6: Laboratory safety assignment</p> <p>Week 7: Laboratory safety lesson plan, age and culturally appropriate, environmental appropriate</p>	<p>Students need to have the opportunity to learn about safety equipment and appropriate PPE (personal protective equipment) needed during activities. Every science activity that is about to be carried out needs to be evaluated for safety hazards and the tools that might be needed to keep students safe.</p> <p>The lesson plan will demonstrate how students have learned how to use the equipment and teach how to use equipment, when necessary, for scientific activities.</p> <p>Students will be able to get the ability to use this material in one of their plans used while they are in their field experience.</p>	<p>Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.</p>	<p>AANGWAAMIZIWIN Diligence and caution</p>
3.J.8.d.iv.	<p>how to manage, maintain, and utilize science supplies and equipment.</p>	<p>Week 6: lab safety PPT</p> <p>Week 6: Laboratory safety assignment</p> <p>Week 7: Laboratory safety lesson plan aligned to state and local standards, age and culturally appropriate, environmental appropriate</p>	<p>Students will be given the opportunity to learn about science and safety supply companies for the acquisition of supplies.</p> <p>These supply companies also provide much guidance and assistance in the maintenance, use, and disposal of science supplies and equipment.</p>	<p>Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.</p>	<p>AANGWAA MIZIWIN Diligence and caution</p>
3.J.8.d.v.	<p>state and national guidelines and plans for the care, storage, use and disposal of chemicals and equipment used to teach science.</p>	<p>Week 6: lab equipment and safety videos</p> <p>Week 6: lab safety PPT</p> <p>Week 6: Laboratory safety assignment</p> <p>Week 7: Laboratory safety lesson plan aligned to state and local standards, age and culturally appropriate,</p>	<p>Another portion of these two weeks of safety training students will be given the opportunity to learn about the municipality's requirements for storage and safety for the handling of chemicals. Students will be taught about contacting the school's chemical hygiene officer for help in determining safety, storage and disposal hazards of</p>	<p>Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and</p>	<p>AANGWAA MIZIWIN Diligence and caution</p>



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		environmental appropriate	<p>materials that might be needed for a scientific activity.</p> <p>Students will be taught how to look for alternative, safe substitutions for hazardous chemicals to avoid possible harm and avoid all the regulations</p> <p>Students' understanding of these guidelines and resources will be reflected in their laboratory safety assignment and lesson plan writing.</p> <p>Students will be required to incorporate safety into field teaching experience when they conduct a science activity.</p>	conducting scientific investigations.	
3.J.8.d.vi.	The ethics of and restrictions on making and maintain collections of scientific specimens and data;	<p>Collection of Scientific Specimens: Benefits for Biodiversity Sciences and Limited Impacts on Communities of Small Mammals</p> <p>Week 6: lab equipment and safety videos</p> <p>Week 6: lab safety PPT</p> <p>Week 6: Laboratory safety assignment</p> <p>Week 7: Laboratory safety lesson plan aligned to state and local standards, age and culturally appropriate, environmental appropriate</p>	<p>Another portion of this segment will be to give students the opportunity to learn about finding resources for the appropriate collection of specimens and of data, especially any personal data that may be collected as part of a scientific activity, such as but not limited to a science fair project.</p> <p>Students will be given the opportunity to show their understanding of this requirement through their lab safety assignment.</p> <p>If students will address this in their lesson plan</p> <p>It will be important for students to understand that Chemical hygiene standards and programs involve not only chemical and physical hazards for students but also live and preserved specimens that may be used in scientific investigations and activities. Sometimes a science teacher will collect organisms from the wild, like minnows, worms, rollie pollies, etc. It is important how these get treated and released back.</p>	Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.	AANGWAAMIZIWIN Diligence and caution



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			These are common themes in science textbooks of how to handle live and preserved specimens so you can teach students to be respectful.		
3.J.8.d.vii.	The ethics of and restrictions on the use of live organisms, and how to acquire, care, handle and dispose of organisms.	<p>Week 6: lab equipment and safety videos</p> <p>Week 6: lab safety PPT</p> <p>Students will be able to analyze the benefits of collecting scientific specimens for biodiversity research and evaluate the potential impacts of specimen collection on small mammal populations and local communities.</p> <p>Week 6: Laboratory safety assignment</p> <p>Week 7: Laboratory safety lesson plan aligned to state and local standards, age and culturally appropriate, environmental appropriate</p>	<p>If scientific activity involves the use of live specimens, students will be given the opportunity to learn where to find information and resources as to how specimens can be acquired, should be handled, and then properly disposed of once the activity is completed.</p> <p>Students will be given the opportunity to show their knowledge of the above information through their lab safety assignment and may incorporate this information into their lesson if so desired.</p> <p>Students will be expected to discuss appropriate handling of live and preserved specimens in class. This will also apply to any animals that are pets in the classroom.</p>	Demonstrate through classroom work and assessment the ability to understand the various pieces of scientific equipment and safety measures and protections required when teaching and conducting scientific investigations.	AANGWAAMIZIWIN Diligence and caution



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### **Course Requirements & Assessment descriptions:**

Students will be able to:

- Demonstrate understanding of scientific principles, research protocols, theories and laws
- Demonstrate the ability to complete laboratory equipment and safety lesson plan with an assessment
- Demonstrate the ability to write a lesson plan in various formats especially for the FDLTCC department of elementary ed format.
- Demonstrate the ability to identify common scientific misconceptions and how to help correct them.
- Demonstrate the ability to understand and interpret the different types of scientific standards for grades K-6 and NGSS.
- Demonstrate the ability to complete a thorough current event assignment with an appropriate citation.
- Demonstrate the ability to find reference material to supplement and support their scientific knowledge

### **Learning Outcomes – Field Experience and Lesson Planning**

By the end of the course, students will be able to:

1. Engage in authentic classroom teaching experiences by completing a minimum of 8 hours in elementary education settings.
2. Design and implement a laboratory safety lesson plan that is age-appropriate, culturally responsive, and environmentally conscious.
3. Develop and deliver an Indigenous-focused science lesson plan that integrates Indigenous knowledge, is developmentally appropriate, and respects cultural perspectives.
4. Adapt instructional strategies to meet the diverse needs of elementary learners, including differentiation for cultural, developmental, and environmental considerations.
5. Reflect on teaching practices by evaluating the effectiveness of lesson plans and their impact on student learning, including engagement, comprehension, and safety awareness.

Assessment Scale (4–1):

- 4 – Exemplary: Fully meets all expectations with high-quality engagement, planning, implementation, and reflection.
- 3 – Proficient: Meets expectations with minor areas for improvement.
- 2 – Developing: Partially meets expectations; improvement needed in one or more areas.
- 1 – Beginning: Does not meet expectations; significant improvement required.



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### Course Assignments:

Each week you will be given a new reading assignment and perhaps some lesson plan. Students are expected to ask questions when they do not understand the material they are being requested to read. Reading material will be assessed in online quizzes, midterms and final exams.

“Lesson Plan” and “methods” assignments (10 points each) will be given to students to be conducted in and outside of the classroom.

In the first half of the semester, as well as the second half, students will be required to complete one current event assignment and one website review. These assignments will be assigned at the beginning of the semester and after the midterm. Students will be able to complete the assignments any time during the half-semester.

### Quizzes, Midterm and Final:

25-point quizzes will be posted on D2L and will be due on or before the due date. Students will be given one hour to complete the quiz.

A 100-point (each) midterm and final exam will be assigned on D2L. Students will be given two hours of class time to complete each exam.

### Weekly Participation:

Students will be given a weekly discussion topic on the Monday of the week pertaining to the weekly classroom topic. Students will be expected to post one original discussion post each week by 11:59 pm the Wednesday of the week and reply to a minimum of one other classmate’s original posts on or before Sunday at 11:59 pm. Students who do not post by the original Wednesday post will lose half credit for your weekly discussion.

**Due Dates and handing in work:** Students are expected to hand in their work on or before due dates either by submitting them to D2L or via email (enter email).

Assignments handed in one day late will accrue a 10% deduction from the total score, two days late a 20% deduction, three days late a 50% deduction. Any work four or more days late will receive a “0”.

Criteria	Points	Due
1. Quizzes (25 pts each) x3	75	
2. Unit Tests (25 points each) x4	100	
3. Children’s Book	100	
4. Assignments (20 pts each) x14	280	
5. Weekly Discussions-participation (10 pts each) x11	110	
6. Lesson Plan Writing (40 pts each) x6	240	
7. Midterm	100	
8. Final Exam	100	
Total Points:	1105	



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### Course Schedule:

Week	Class Topic / <u>Learning Opportunities</u>	Assignments and Assessments	SEP Standard (SEP) Subject Matter (SM) Cultural Standard (CS)
<p>Week 1</p> <p>What is science? Inquiry vs. discovery in classrooms.</p> <p>By the end of this lesson, students will be able to:</p> <p>Understand the role of inquiry in science education.</p> <p>Identify and apply the NGSS science and engineering practices.</p> <p>Design a simple inquiry-based activity for elementary students.</p>	<p>Introduce Unit 1: Teaching through inquiry</p> <p>Ch 1: Inquiry: The Path Discovery: The Destination</p> <p>1.1 Develop a working definition of science</p> <p>1.2 Describe how research about learning science informs science teaching</p> <p>1.3 Describe the purpose and three dimensions of the Next Generation Science Standards</p>	<p>Read Chapter 1</p> <p>Discussion: Introductions &amp; “A childhood memory of discovery.” Connect to NGSS practices.</p> <p>Design an Inquiry Based Lesson</p> <p>Classroom technology introduction: Infinite campus, canvas, google classroom.</p>	<p>9.N., 3.A.1., 3.J.1., 3.J.2.c, 3.J.2.d</p> <p>ZAAGIIDIWIN Loving and Caring</p> <p>GWAYAKWAADIZIWIN Living a balanced way</p> <p>AANGWAAMIZIWIN Diligence and caution</p> <p>Mino-bimaadiziwin (the good life) as a way of continuously learning and observing nature.</p>
<p>Week 2</p> <p>Science Practices and Inquiry Process Skills</p> <p>NGSS practices &amp; process skills</p>	<p>Ch 2: Science Practices &amp; Inquiry Process Skills</p> <p>2.1 Create a vision for discovery learning in your classroom</p> <p>2.2 Describe science practices and inquiry skills as they relate to learning science and engineering.</p>	<p>Read Chapter 2</p> <p>Pg 29: Scientific graphing exercise</p> <p>Elder &amp; Child Interviews Pg 38 Activity 2</p> <p>Discrepant Event</p> <p>Website Search</p> <p>Quick Check Quiz</p>	<p>4.R, 7.J., 9.N., 3.J.1., 3.J.2.a, 3.J.2.d, 3.J.2.e, 3.J.3</p> <p>Circle teaching &amp; learning from Elders—emphasis on questioning, storytelling, and oral tradition as inquiry methods.</p>
<p>Week 3</p> <p>By the end of this lesson, students will:</p> <p>Apply backward design to outline a short NGSS-aligned unit.</p> <p>Draft a 5E lesson plan with clear, measurable objectives.</p> <p>Align assessments (diagnostic, formative,</p>	<p>Ch 3: Planning Units and Lessons</p> <p>3.1 Distinguish between curriculum, unit, and lesson planning.</p> <p>3.2 Use NGSS bundles and Understanding by Design – to guide unit planning.</p> <p>3.3 Design inquiry-based science lessons based on the 5E Learning Cycle and Sheltered Instruction Observation Protocol.</p>	<p>Read Chapter 3</p> <p>Discussion: teaching indigenous children through their culture</p> <p>Quick Check Quiz</p> <p>Website Search</p> <p>Build a Mini-Unit</p> <p>Draft a 5E Lesson</p>	<p>7.J., 9.N., 3.J.1., 3.J.2.d, 3.J.2.e, 3.J.3, 3.J.8.a</p> <p>Include a local phenomenon (e.g., maple sugar season, migration of geese, wild rice harvesting) as anchor phenomena.</p>



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<p>summative) to objectives and activities.</p> <p>Give and receive peer feedback asynchronously.</p>			
<p>Week 4</p> <p>Assessing Children’s Science Learning</p> <p>Diagnostic, formative, and summative assessment</p> <p>Aligning objectives, instruction, and assessment</p> <p>Begin Field Experience</p>	<p>Ch 4: Creating Environments for Discovery</p> <p>4.1 Explain how an effective classroom layout piques curiosity, invites inquiry, and inspires students to discover.</p> <p>4.2 Describe how to lead discussions using effective science talk.</p> <p>4.3 Explain how to plan for a cooperative learning group in which all members are interdependent.</p> <p>Misconceptions and discrepant events Science Standards</p> <p>Field Experience</p>	<p>Read Chapter 4</p> <p>Assignment: Create a virtual “science corner” using photos or sketches—consider layout, materials, safety, and inclusive access.</p> <p>Discussion: Post two ideas for creating a culturally responsive environment (e.g., natural materials, storytelling spaces).</p> <p>Current Event: science in social studies</p> <p>Watch: Scientific Inquiry: A Teacher's Guide - Students will be able to identify common misconceptions in scientific concepts and apply developmentally appropriate strategies to elicit these misconceptions in learners, facilitating their progression toward scientifically accepted understandings. Students design a mini lesson that includes strategies for uncovering and correcting misconceptions.</p>	<p>7.J., 3.A.1., 3.A.5., 3.J.1., 3.J.2.a, 3.J.2.d, 3.J.2.e, 3.J.2.f, 3.J.3, 3.J.8.c</p> <p>Integrate respect for Land and Sacred Spaces—use natural objects, teaching circles, and land-based learning indoors or outdoors.</p>
<p>Week 5</p> <p>Focus: Linking teaching, inquiry, and assessment strategies</p>	<p>Ch 5: Assessment of Understanding and Inquiry</p> <p>5.1 Describe scenarios in which assessment strategies could be used for formative assessment.</p> <p>5.2 Describe and identify three-dimensional assessments.</p> <p>5.3 Explain how rubrics and scoring guides are used and describe their effectiveness as assessment tools.</p>	<p>Read Chapter 5</p> <p>Draft a diagnostic prompt (e.g., prediction or concept sketch) related to your previous mini-unit topic from week 3.</p> <p>Design a formative check (exit ticket, quick lab write-up, or peer discussion protocol).</p> <p>Discussion: What have you learned about Science Notebooks? What is your take on them? Would you use them in your class? Why or why not? Would you use Science Portfolios in place of</p>	<p>7.J., 3.J.2.e</p> <p>Consider assessment as story-sharing—students demonstrate knowledge through narratives, drawings, or performance, respecting multiple entry points for understanding.</p>



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		<p>traditional assessment techniques? Why or why not?</p> <p>Quick Check Quiz</p>	
<p>Week 6</p> <p>Safety 1: Foundations of Lab &amp; Environmental Safety</p>	<p>Why safety is central in teaching science; how to establish routines.</p> <p>Laboratory Safety &amp; Equipment Laboratory Safety Lesson Plan: Lesson plan on lab safety that is aligned to state and local standards, age and culturally appropriate, environmental appropriate</p>	<p>Read/View: Safety guidelines (state/local standards + textbook safety practices).</p> <p>Laboratory Safety Assignment Draft a K–5 classroom safety contract (rules + student pledge).</p> <p>Post a short video/sketch showing a safety scenario (e.g., handling glassware, outdoor sampling).</p> <p>Discussion: How do we model Aangwaamiziwin (diligence, caution) for children?</p> <p>Discrepant Event</p>	<p>7.J., 3.A.1., 3.J.2.e, 3.J.8.b, 3.J.8.c, 3.J.8. d.i, 3.J.8.d.ii., 3.J.8.d.iii., 3.J.8.d.iv., 3.J.8.d.v., 3.J.8.d.vi., 3.J.8.d.vii.</p> <p>Science Content 3.J.8.d.v AANGWAAMIZIWIN Diligence and caution</p> <p>“Respect all living things” as the first safety rule; reciprocity when gathering natural materials.</p>
<p>Week 7</p> <p>Safety II: Laboratory Safety Lesson Plan (Key Assessment)</p>	<p>Why safety is central in teaching science; how to establish routines.</p> <p>Laboratory Safety &amp; Equipment Laboratory Safety Lesson Plan: Lesson plan on lab safety that is aligned to state and local standards, age and culturally appropriate, environmental appropriate</p>	<p>Assignment (Major): Develop a Laboratory Safety Lesson Plan that is:</p> <ul style="list-style-type: none"> <li>*5E Lesson Plan with Assessment for lab equipment and safety</li> <li>*Aligned to NGSS + state/local safety standards.</li> <li>* Age-appropriate (elementary level).</li> <li>* Culturally appropriate (integrate Indigenous perspectives).</li> <li>*Environmentally appropriate (safe outdoor inquiry).</li> <li>*Embodies Aangwaamiziwin — diligence and caution.</li> </ul> <p>Discussion: As a self-reflection: “How will I model Aangwaamiziwin in my classroom?”</p>	<p>7.J., 3.A.1., 3.J.2.b, 3.J.2.e, 3.J.8.d.i., 3.J.8.d.iii., 3.J.8.d.iv., 3.J.8.d.v., 3.J.8.d.vi., 3.J.8.d.vii.</p> <p>AANGWAAMIZIWIN Diligence and caution</p>
<p>Week 8</p>	<p>Indigenous Peoples’ Day Short Week for Mid-Quarter</p>	<p>Mid-Quarter Exam</p>	



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<p>Week 9</p> <p>Focus: Blending engineering design with science inquiry in elementary classrooms.</p>	<p>Ch 6: Integrating Science and Engineering</p> <p>6.1-6.6 Describe strategies for integrating science/engineering and: Language arts, mathematics, social studies, art, music, health/physical education.</p>	<p>Read Chapter 6</p> <p>Develop a mini-STEAM challenge (design brief, constraints, brainstorming, testing plan) with a strong safety component.</p> <p>Discussion: Describe how you will integrate inquiry-based science and engineering with other subjects in your classroom.</p> <p>Record yourself teaching one of your lessons either inquiry based, STEAM, or discrepant events and submit.</p> <p>Unit 1 Test</p>	<p>7.J., 9.N., 3.A.1., 3.A.5, 3.J.2.b, 3.J.2.c, 3.J.2.e, 3.J.3</p> <p>Explore traditional Anishinaabe resource use—designing birchbark baskets, snowshoes, or canoes—and the engineering principles behind these items.</p>
<p>Week 10</p> <p>Focus: Understanding Earth systems and place-based phenomena.</p>	<p>Introduction to Unit 2 Earth and Space Science – important scientist, impact on society, careers</p> <p>7.1 Describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact to affect the Earth’s materials and processes.</p> <p>7.2 Describe how plate tectonics explain the development and ongoing changes of the Earth’s surface.</p> <p>7.3 Explain how solar energy, convection currents, and density influence ocean currents.</p> <p>7.4 Explain how the effects of weathering or the rate of erosion by water, ice, wind, or vegetation contribute to the recycling of Earth materials.</p>	<p>Read Chapter 7</p> <p>Create a phenomenon-based lesson hook (e.g., local weather event, seasonal change).</p> <p>Build and teach a simple 5E mini-lesson plan around that phenomenon. Include how it effects the Anishinaabe.</p> <p>Create a school calendar, Sept-May, listing seasonal changes and cultural science lessons to teach in that month. Please list 2 topics for each month. This will also be shared in the discussion post for this week. That way when everyone has shared you can add their ideas to your template and have a wonderful outline to start your science classrooms in the future.</p>	<p>7.J., 3.A.1., 3.J.2.b, 3.J.2.e, 3.J.4, 3.J.8.a, 3.J.8.b</p> <p>Incorporate teachings on land, water, and place (e.g., the significance of local landforms or seasonal signals in Anishinaabe calendar).</p>
<p>Week 11</p> <p>Focus: Space, sun/moon, planetary systems.</p> <p>Assigning Projects and using rubrics Personal and Societal issues</p>	<p>The Cosmos</p> <p>8.1 Reflect on the origins of the universe.</p> <p>8.2 Describe the relationships among the Earth, Moon, and Sun that explain observable patterns such as day/night, tides, and seasons.</p>	<p>Read Chapter 8</p> <p>Bulletin Board Create a Bulletin Board to teach the different cloud types -OR- make a model of a water cycle. Refer: Real Teaching: Clouds pg. 144-145. AND Appendix A: pg. 238-270</p>	<p>4.R., 7.J., 3.A.1., 3.J.1., 3.J.2.b, 3.J.2.e, 3.J.4</p> <p>Introduce Anishinaabe star knowledge—like Ojii (Fisher) constellation or seasonal star patterns guiding planting or harvesting.</p>



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	<p>8.3 Explain why the Sun appears bigger and brighter than other stars.</p> <p>8.4 Describe the mechanisms for natural climate change.</p> <p>8.5 Describe a brief history and the anticipated future of modern space exploration.</p>	<p>Craft a children’s story or poem explaining a cosmic cycle (moon phases, seasons, star patterns). Incorporate Anishinaabe star knowledge.</p> <p>Unit 2 Test</p>	
<p>Week 12</p> <p>Living Things</p> <p>Focus: Biodiversity, ecosystems, living organisms.</p>	<p>Introduction to Unit 3 Life Sciences – important scientists, impacts on society, and careers.</p> <p>9.1 Distinguish living from nonliving systems.</p> <p>9.2 Describe relationships between structure and function.</p> <p>9.3 Understand the flow of energy as a unifying theme of life systems.</p> <p>9.4 Describe the interdependence of organisms in an ecosystem.</p> <p>9.5 Explain how inheritance, variation of traits, and natural selection impact evolution.</p> <p>9.6 Discuss how connecting children with the planet and Earth systems precedes and supports education about climate change.</p>	<p>Read Chapter 9</p> <p>Discussion: Discuss interconnectedness in creation stories, clan animals (doodem), and respect for all living beings as relatives.</p> <p>Choose one:</p> <ol style="list-style-type: none"> <li>1. Design an outdoor observation activity.</li> <li>2. Design a sorting/classification activity.</li> <li>3. Design a Stewardship activity.</li> <li>4. Create a jeopardy game for classifying living things into the 6 Kingdoms, food webs, and/or food chains.</li> </ol> <p>Record yourself reading your story from last week to your students in your host teacher’s classroom.</p>	<p>7.J., 3.A.1., 3.J.1., 3.J.2.b, 3.J.2.e, 3.J.4, 3.J.8.b</p> <p>Interconnectedness in creation stories, clan animals (doodem), and respect for all living beings as relatives.</p>
<p>Week 13</p> <p>The Human Body</p> <p>Focus: Structure, function, and health.</p>	<p>The Human Body</p> <p>10.1 Describe and identify the primary structures and functions of major human body systems.</p>	<p>Read Chapter 10</p> <p>Develop a visual model or interactive activity for one body system (e.g., respiratory, digestive).</p> <p>Choose one:</p> <ol style="list-style-type: none"> <li>1. Create a Kahoot or Quizizz on the human body. Minimum of 15 questions.</li> <li>2. Create a poster of the human body with body parts labeled in Ojibwemomin. Must label a</li> </ol>	<p>7.J., 9.N., 3.J.2.e</p> <p>The view of the human body as part of balance—sharing traditional foods, herbal medicine, and the importance of spiritual, emotional, and physical health.</p>



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		minimum of 25 parts.	
		Unit 3 Test	
<p>Week 14</p> <p>Matter &amp; Motion Focus: States of matter, properties, and motion.</p>	<p>Introduction to Unit 4 Physical Science Topics and Teaching Tactics</p> <p>11.1 Explain how the kinetic molecular theory of matter can be used to explain fundamental properties of matter.</p> <p>11.2 Describe distinctive attributes of chemical reactions.</p> <p>11.3 Provide examples for Newton’s Laws of Motion.</p> <p>11.4 Explain how mass and distance relate to gravitational force.</p> <p>Writing Lower elementary plans Writing Upper elementary plans</p>	<p>Read Chapter 11</p> <p>Design a Lesson Plan that incorporates a hands-on learning activity to address one of Newton’s Laws of Motion.</p> <p>Record yourself teaching the lesson in your host teacher’s classroom or in your own setting with a small group of students. (3-5 students) (To be turned in by week 16.)</p> <p>Discussion: Discuss how material transformations in nature—water freezing, snow melting, how motion is observed in animal migration or water flow in local rivers, effects cultural practices.</p>	<p>7.J., 3.A.1., 3.J.2.b, 3.J.2.e, 3.J.4, 3.J.8.b</p> <p>Explore material transformations in nature—water freezing, snow melting, how motion is observed in animal migration or water flow in local rivers.</p>
<p>Week 15</p> <p>Energy, Technology/Engineering Focus: Energy sources, engineering design, technology.</p>	<p>12.1 Develop a working definition of energy.</p> <p>12.2 Explain relationships between energy and forces.</p> <p>12.3 Explain how energy transfer is related to potential energy, kinetic energy, and work.</p> <p>12.4 Describe the meaning of the law of conservation of mass and energy.</p> <p>12.5 Describe how waves relate to energy.</p> <p>12.6 Identify properties of electrical, sound, light, and heat energy.</p>	<p>Read Chapter 12</p> <p>Create and carry out a simple renewable energy demonstration (e.g., solar oven, wind catcher) or design solution for a real problem (e.g., shelter, food preservation).</p> <p>Unit 4 Test</p>	<p>7.J., 9. N., 3.J.2.b, 3.J.2.e</p> <p>Highlights respect for energy sources—sun, water, and earth—and traditional technologies (e.g., tobacco ties, birchbark techniques) that reflect sustainable engineering.</p>
<p>Week 16</p>	<p>Personal and Societal Issues Enhancing scientific knowledge through professional development and scientific resources</p>	<p>Recording of Week 14 is due.</p> <p>Discussion: Read and reflect on “Personal and Social Implications of the Physical Sciences” pg. 208-209.</p> <p>Investigate NSTA and other sites that offer science professional development so students can pursue classes.</p>	<p>3.A.1., 3.J.2.e</p>



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		Websites, podcasts, etc. that help to keep the science teacher current.	
Finals Week	Cumulative Exam	Final Exam	

**NOTE:** during this semester long course, students will be completing classroom and field experience. During this field experience students will be practicing and self-evaluating:

Technology that can be used in the classroom for grades and LMS, such as but not limited to google classroom, canvas, Schoology and the grading system Infinite campus. Students will also get a chance to use computer technology to graph, scientific calculators to help analyze data and laboratory equipment to conduct scientific investigations.

### Requirements and Points:

To meet the program requirements, students must pass the course with 70% or above.

Grade	%	Points
A	100-90	1105-994
B	89-80	986-884
C	79-70	872-773
D	69-60	762-663

Students will be able to create and deliver two of the lesson plans they have created. Depending upon where they are placed and at what grade level, they will determine the age-related science content that will be expected in their plans.

Students will be able to utilize inquiry science that promotes student discussion, encouraging student questioning, higher order thinking and student engagement. Further students will be practicing ways to help students articulate their ideas and thinking processes, promoting productive risk-taking and problem-solving, facilitating factual recall, encouraging convergent and divergent thinking, stimulating curiosity, and helping students to question.

### Instructor Responsibilities - You can expect your instructor to:

- Attend every class period and arrive at class on time. If I am not there, please WAIT. If I cannot make class due to illness or unexpected events, I will contact you through D2L and will try to give you as much notice as possible.
- Come to class with a good attitude
- Be respectful of your ideas and value the diversity you bring to the classroom
- Be open to dialogue that challenges me
- Answer any appropriate questions you may have
- Use a variety of teaching techniques and modalities to accommodate different learning styles



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- Return written assignments in class and online in a timely fashion and provide helpful feedback
- Be present during my stated office hours, by phone, email or text
- Minimize disruptions and distractions in the classroom so that everyone has the best possible opportunity to learn

Office Hours and contact information:

My office hours will be Fridays from 8:00-10:00 a.m. I prefer you use my FDLTCC email to reach me and can do so anytime; [heidi.ojibway@fdltcc.edu](mailto:heidi.ojibway@fdltcc.edu) or you can reach me by text at 218-310-7969, this is my cell phone.

### **FDLTCC Competencies Across the Curriculum (CAC)**

**Information Literacy** – the ability to use print and/or non-print tools effectively for the discovery, acquisition, and evaluation of information.

**Ability to Communicate** – the ability to listen, read, comprehend, and/or deliver information in a variety of formats.

**Problem Solving** – The ability to conceptualize, apply, analyze, synthesize, and/or evaluate information to formulate and solve problems.

**Culture** – knowledge of Anishinaabe traditions and culture, knowledge of one's own traditions and culture, knowledge of others' traditions and cultures, culture of work, culture of academic disciplines and/or respect for global diversity.



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## Conceptual Framework

### Vision

The vision of the FDLTCC Education Unit is to be transformational leaders in culturally responsive pedagogy and Indigenous knowledge by embracing Niindaa'iwedaa o' o gikendaasowin, which means sending knowledge into the future by embedding Anishinaabe knowledge, culture, and traditions into the curriculum and instilling these teaching practices in our future educators.

### Mission

The mission of the FDLTCC Education Unit is to work within our communities to prepare caring, competent educators by promoting equitable, inclusive, and transformative educational practices that are based on Anishinaabe knowledge, traditions, and culture.

### Cultural Standards Woven Together with Professional Outcomes

The unit has adopted the cultural standards of the WINHEC accredited American Indian Programs and adapted them to meet the specific needs of the education unit. Professional outcomes were developed from the cultural standards. Both the cultural standards and the professional outcomes flow from the unit's vision and mission to provide a unique perspective on teaching and learning. The cultural standards and professional outcomes direct the unit's thinking, planning, actions, and initiatives (see figure 1).

### GIKENDAASOWIN – Knowing Knowledge

To prepare our teacher candidates to be problem solvers who strive for continuous learning and growth.

#### Disposition: Integrates Content and Pedagogical Knowledge

Teacher candidates demonstrate their ability to integrate content and pedagogical knowledge by weaving the following into their teaching:

- Technology: Use technology effectively to improve student learning.
- Theory to Practice: Applies current theory, research, and best practices to improve one's professional practice as a teacher.
- Critical and Connected Thinking: Engages in critical thinking that reflects analysis, problem solving, and incorporates world views and community knowledge to create culturally relevant instruction.
- Reflective Practice: Demonstrates self-reflection and incorporates professional feedback to adjust for continuous improvement in professional practices and effective instruction.



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### Professional Outcome: Content and Pedagogical Knowledge

- To develop teachers who value and utilize knowledge, learning, and critical thinking that is central to Indigenous and other ways of knowing.

### **GWAYAKWAADIZIWIN – Living a Balanced Way**

To provide teacher candidates the opportunity to recognize the importance of living in harmony with the community and are prepared to use a collective approach to understanding and deciding on a course of action.

### Disposition: Communication and Collaboration

Teacher candidates demonstrate professional interpersonal and communication skills. These skills are used to promote positive collaborative partnerships with students, families, colleagues, other school professionals, and the global community to support achievement of student learning outcomes.

- *Reflective Collaboration:* Uses insights and inspiration of others to improve practice and can occur in:
  - Professional Learning Communities
  - Mentoring Programs
  - Peer Observations
  - Critical Friends Groups
- *Community Involvement:* Demonstrates positive collaborative skills in interactions with instructors, advisors, students, colleagues, parents/guardians/caregivers, school teams, and those in the wider community.
- *Communication:* Effectively and accurately communicates ideas, thoughts or visions (oral and written) and engages in active listening based on audience and community cultural norms.

### Professional Outcome: Community and Collaboration

- To develop teachers who are reflective, connected educators who understand the interrelatedness of educating the whole child by including the community.

### **ZOONGIDE'EWIN – Strong Hearted**

To provide a foundation on which we build and strengthen each teacher candidate's resilience, innovation, and passion.

### Disposition: Vision and Leadership

Teacher candidates demonstrate the vision and skills necessary to lead and manage classrooms and schools as complex, adaptive systems in a changing world.

- Demonstrates skills and qualities that lead to meaningful change.



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- Models and fosters respect for all cultures, identities, and perspectives in words and actions and considers historical pasts to prepare for the future.
- Listens and responds to community needs and understands cultural norms as opportunities for growth and development.

### Professional Outcome: [Transformational Leadership](#)

- To increase the teachers' leadership capacity to live and walk with a strong heart, respectful and open to new ideas and courageous enough to confront the accepted truths of history and society.

### **AANGWAAMIZIWIN – Diligence and Caution**

To develop teacher candidates' capacity to proceed carefully, after identifying, discussing and reflecting on logical and ethical dimensions of political, cultural, social, and personal life.

### Disposition: [Ethical Behavior](#)

Teacher candidates demonstrate professional integrity through behaviors and actions that reflect state and FDLTCC ethical and cultural standards.

- Demonstrate professional and ethical conduct with faculty, faculty supervisors, cooperating teachers, students, parents, colleagues, and community.
- Practices, complies, and understands the school site and the college and unit policies (e.g., academic honesty), as well as Minnesota Code of Ethics for Teachers.
- Adheres to all professional standards, including the use of technologies (e.g., accesses authorized websites, social media and other applications, and uses personal electronic devices as appropriate).

### Professional Outcome: [Ethical Practitioner](#)

- To develop teachers' capacity to be ethically responsive in respecting their role as an educator and understanding community needs.

### **DEBWEWIN – Honesty and Integrity**

Encourage teacher candidates to develop a deeper appreciation of their own worldview and the worldview of others.

### Disposition: [Data-Informed Practice](#)

Teacher candidates demonstrate ability to make data-driven decisions as they plan, implement, and evaluate instruction.

- Uses student data to plan and implement instructional strategies and activities.
- Uses assessment data to identify student strengths and deficiencies and adjusts practice based on results.



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- Uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual and social development of the student.

### Professional Outcome: Assessment and Use of Data

- To expand teachers' potential to think and act with honesty and integrity as they use multiple types of assessment strategies to evaluate student progress and guide student learning and development.

### **ZAAGI' IDIWIN – Loving and Caring**

To encourage the teacher candidates' development of healthy, caring relationships built on respect for all.

### Disposition: Equity, Social Justice, and Inclusion

Teacher candidates demonstrate fairness, empathy and compassion based on their belief that everyone can learn. Candidates actively seek out multiple perspectives and diverse experiences to address the academic, interpersonal, and emotional needs of all students.

- Demonstrates and appreciation of the languages, communities, and experiences students bring to the classroom.
- Advocates for and supports Indigenous and other diverse communities and individuals.
- Respects the dignity and essential worth of all individuals.
- Interacts with sensitivity to community and cultural norms.
- Values and responds to all aspects of a child's developmental well-being (cognitive, emotional, psychological, social, and physical).
- Promotes the diversity of opinions, ideas, and backgrounds.

### Professional Outcome: Diversity

Promote teachers' acceptance and respect of the diversity within their school, community and environment.

### **ZHAWENINDIWIN – Compassion**

To encourage teacher candidates to develop an empathetic appreciation of the arts and humanities as a way to understand the human experience.

### Disposition: Life-Long Learner

Teacher candidates engage in professional growth and encourage curiosity and inquiry as reflective agents of change by sharing knowledge responsibly and participating as a community resource.

- Demonstrates commitment to professional development and intellectual curiosity.
- Practices current skills while demonstrating ability to adapt and develop new skills.
- Actively participates or fosters the positive professional learning environment within the school community as well as the school- home relationships.



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- Analyzes various professional contexts, resulting in more informed decision-making about professional practice.

### Professional Outcome: Generation of New Knowledge

To expand teachers' knowledge of the human condition and cultures, and the importance of compassion especially in relation to behavior, ideas, and values.

### **MN PELSB Standards of Effective Practice (SEP) and/or Content Standards**

#### **SEP: 8710.2000 Standards of Effective Practice**

Subp. 4. Standard 3, diverse learners. A teacher must understand how students differ in their approaches to learning and create instructional opportunities that are adapted to students with diverse backgrounds and exceptionalities. The teacher must:

R. identify and apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.

Subp. 7. Standard 6, communication. A teacher must be able to use knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom. The teacher must:

J. know how to ask questions and stimulate discussion in different ways for particular purposes, including probing for learner understanding, helping students articulate their ideas and thinking processes, promoting productive risk-taking and problem-solving, facilitating factual recall, encouraging convergent and divergent thinking, stimulating curiosity, and helping students to question

Subp. 9. Standard 8, assessment. A teacher must understand and be able to use formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the student. The teacher must:

N. use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student



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### **MN PELSB Standards: Subject matter standards.**

#### **SM: 8710.3200 Subject Matter Elementary Education**

Subp. 3. Subject matter standards, elementary education. A candidate must complete a preparation program for licensure under subpart 2, item C, that must include the candidate's demonstration of the knowledge and skills in items A to L.

A. teacher of children in kindergarten through grade 6 must:

(1) understand and apply the research base for and the best practices of kindergarten and elementary level education;

(5) understand how to integrate curriculum across subject areas in developmentally appropriate ways.

J. A teacher of children in kindergarten through grade 6 must demonstrate a fundamental knowledge of scientific perspectives, scientific connections, science in personal and social perspectives, the domains of science, and the methods and materials for teaching science and scientific inquiry. The teacher must:

(1) understand science as a human endeavor, the nature of scientific knowledge, and the historical perspective of science;

(2) know and apply the understandings and abilities of scientific inquiry including the ability to:

(a) identify questions and concepts that can be explored through scientific inquiry;

(b) design and conduct scientific investigations;

(c) use appropriate scientific instrumentation and equipment and mathematics as tools to improve scientific investigations and communications;

(d) compare the use of multiple types of inquiry for answering questions;

(e) evaluate alternative explanations and models based on evidence, current scientific understanding, and logic; and

(f) communicate and defend a scientific argument;

(3) know how to make connections across the domains of science, between science and technology, and between science and other school subjects;

(4) use scientific understandings and abilities when making decisions about personal and societal issues;

(5) know and apply the fundamental concepts and principles of physical science concerning properties of and changes in matter; position, motion, and force; light, heat, electricity, and magnetism; and kinds of and ways to transfer energy;



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(6) know and apply the fundamental concepts and principles of life science concerning the characteristics of organisms, the life cycle of organisms, the interrelationships of organisms and environments, structure and function in living systems, reproduction and heredity, regulation and behavior, populations and ecosystems and their interrelationships, and diversity and adaptations of organisms;

(7) know and apply the fundamental concepts and principles of earth and space science concerning properties of earth materials; objects in the sky; changes in earth and sky; structure of the earth system, including hydrosphere, biosphere, atmosphere, and lithosphere; history of the earth; and earth in the solar system; and

(8) know and apply pedagogy and classroom management in science and scientific inquiry including understanding:

- a. content standards under chapter 3501 for recommendations regarding curriculum, instruction, assessment, professional development, and program development
- b. how to teach scientific inquiry in a developmentally appropriate manner;
- c. common student misconceptions in science and developmentally appropriate strategies to elicit students' misconceptions and help them move to accepted scientific understandings; and
- d. how to implement safe environments for learning science through knowing:
  - i. state and national legal responsibilities and safety guidelines for teaching science;
  - ii. how to establish and enforce recognized safety procedures during the science learning experience;
  - iii. how to use required safety equipment for classroom, field, and laboratory settings including goggles, fire extinguisher, fire blanket, eye wash, and chemical shower;
  - iv. how to manage, maintain, and utilize science supplies and equipment;
  - v. state and national guidelines and plan for the care, storage, use, and disposal of chemicals and equipment used to teach science;
  - vi. the ethics of and restrictions on making and maintaining collections of scientific specimens and data; and
  - vii. the ethics of and restrictions on the use of live organisms, and how to acquire, care, handle, and dispose of organisms

(J) A teacher of children in kindergarten through grade 6 must demonstrate a fundamental knowledge of scientific perspectives, scientific connections, science in personal and social perspectives, the domains of science, and the methods and materials for teaching science and scientific inquiry. The teacher must:

(1) understand science as a human endeavor, the nature of scientific knowledge, and the historical perspective of science;

(2) know and apply the understandings and abilities of scientific inquiry including the ability to:

- a. identify questions and concepts that can be explored through scientific inquiry;
- b. design and conduct scientific investigations;



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- c. use appropriate scientific instrumentation and equipment and mathematics as tools to improve scientific investigations and communications;
- d. compare the use of multiple types of inquiry for answering questions;
- e. evaluate alternative explanations and models based on evidence, current scientific understanding, and logic; and
- f. communicate and defend a scientific argument;

(3) know how to make connections across the domains of science, between science and technology, and between science and other school subjects;

(4) use scientific understandings and abilities when making decisions about personal and societal issues;

(5) know and apply the fundamental concepts and principles of physical science concerning properties of and changes in matter; position, motion, and force; light, heat, electricity, and magnetism; and kinds of and ways to transfer energy;

(6) know and apply the fundamental concepts and principles of life science concerning the characteristics of organisms, the life cycle of organisms, the interrelationships of organisms and environments, structure and function in living systems, reproduction and heredity, regulation and behavior, populations and ecosystems and their interrelationships, and diversity and adaptations of organisms;

(7) know and apply the fundamental concepts and principles of earth and space science concerning properties of earth materials; objects in the sky; changes in earth and sky; structure of the earth system, including hydrosphere, biosphere, atmosphere, and lithosphere; history of the earth; and earth in the solar system; and

(8) know and apply pedagogy and classroom management in science and scientific inquiry including understanding:

- a. content standards under chapter 3501 for recommendations regarding program development;
- b. how to teach scientific inquiry in a developmentally appropriate manner;
- c. common student misconceptions in science and developmentally appropriate strategies to elicit students' misconceptions and help them move to accepted scientific understandings; and
- d. how to implement safe environments for learning science through knowing:
  - i. state and national legal responsibilities and safety guidelines for teaching science;
  - ii. how to establish and enforce recognized safety procedures during the science learning experience;
  - iii. how to use required safety equipment for classroom, field, and laboratory settings including goggles, fire extinguisher, fire blanket, eye wash, and chemical shower;
  - iv. how to manage, maintain, and utilize science supplies and equipment;
  - v. state and national guidelines and plan for the care, storage, use, and disposal of chemicals and equipment used to teach science;



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- vi. the ethics of and restrictions on making and maintaining collections of scientific specimens and data; and
- vii. the ethics of and restrictions on the use of live organisms, and how to acquire, care, handle, and dispose of organisms.



## Required Syllabus Statements

*Updated 7-18-25*

### Academic Honesty and Integrity

The primary academic mission of Fond du Lac Tribal and Community College is the exploration and dissemination of knowledge. Academic honesty and integrity are integral to the academic process. Academic dishonesty, cheating, plagiarism, and collusion are serious offenses which undermine the educational process and the learning experience for the entire college community.

Fond du Lac Tribal and Community College students are expected to understand and adhere to the concept of academic integrity and to the standards of conduct prescribed by the college's policy on Academic Honesty. Students are expected to assume responsibility for their work, and student materials submitted in fulfillment, of course, program, and college academic requirements must represent students' own efforts. Any act of academic dishonesty attempted by a student at Fond du Lac Tribal and Community College is unacceptable and will not be tolerated.

Violations of academic integrity or other forms of misconduct may result in serious consequences. These can include receiving a failing grade ("F") for the course and may also lead to additional disciplinary actions as outlined by Fond du Lac Tribal and Community College and the Minnesota State system. For full details, please refer to the [Student Code of Conduct Policy](#).

### Accessibility Services Notice

Fond du Lac Tribal and Community College is committed to providing equitable access to learning opportunities for all students. The Minnesota Respond, Innovate, Succeed, and Empower (RISE) Act requires our college to clearly write the process and rights of each student in plain language making self-disclosure by a student with a sufficient disability to start the interactive process. The RISE Act still honors and follows the Federal Disabilities laws- ADA and Section 504 of the Rehabilitation Act. FDLTCC provides students with disabilities (e.g., mental health, attentional, learning, chronic health, sensory or physical) reasonable accommodation to participate in educational programs, activities, or services. Students must contact Trish Berger, our Accessibility Coordinator, to create an accommodation plan with reasonable accommodations. The student will decide which courses the accommodations will be used for and give permission for the instructors to receive the accommodations. The student will then have a discussion with the instructor to activate these accommodations. Students requiring



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accommodations must first complete an intake form and meet with Trish Berger, Accessibility Coordinator, to establish an accommodation plan. She can be reached at [trish.berger@fdltcc.edu](mailto:trish.berger@fdltcc.edu) or 218-879-0864. For more information, please visit <https://fdltcc.edu/student-support/accessibility-services/>

### Sexual Violence

Fond du Lac Tribal & Community College (FDLTCC) is committed to providing an environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic and dating violence, gender or sex-based bullying and stalking. If you or someone you know has experienced gender or sex-based violence (intimate partner violence, attempted or completed sexual assault, harassment, coercion, stalking, etc.), know that you are not alone. FDLTCC has staff members trained to support survivors in navigating campus life, accessing resources, providing accommodations, assistance completing with protective orders and advocacy. For more information regarding the Campus Security Report, the following link will give you a report on the Clery Compliance and Security Report at FDLTCC: <https://fdltcc.edu/admissions/about-us/policies-reports/campus-security-policies-reports/>. Please be aware that all FDLTCC employees are required to report any incidents of sexual violence and, therefore, cannot guarantee the confidentiality of a report, but it will consider a request for confidentiality and respect it to the fullest extent possible. If you wish to report sexual misconduct or have questions about school policies and procedures regarding sexual misconduct, please contact Lori Driscoll, Executive Human Resources Officer at 218-878-0879/[lori@fdltcc.edu](mailto:lori@fdltcc.edu) or Jesse Stirewalt, Director of Housing and Student Activities at 218-590-3345/[jstirewalt@fdltcc.edu](mailto:jstirewalt@fdltcc.edu).

### ***Student Success—North Star Communication Platform***

Student success is at the heart of what Fond du Lac Tribal and Community College staff, faculty and administration strive to achieve. To help support our students in their educational journeys, FDLTCC uses a communication platform called North Star. Students can raise their hands for support, set up appointments with staff and faculty and communicate seamlessly with instructors. The college encourages ALL FDLTCC students to use the North Star webpage link to watch video tutorials and to log into the platform to start using its features.

## FDLTCC Generative AI Syllabus Statements

(Updated Spring 2025)

**Generative artificial intelligence (AI)** refers to artificial intelligence systems that can create original content—such as text, images, audio, or code—by learning patterns from existing data. These models are distinct from traditional AI in that they generate new outputs rather than simply analyzing or classifying information. Increasingly, generative AI is being integrated into everyday programs (Microsoft



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365, Google searches, Adobe Creative Suite, etc.) making it harder to identify when you are engaging with these tools.

While generative AI can support learning and creativity, its use raises important ethical, academic, and environmental concerns—including issues of accuracy, bias, authorship, and the significant environmental impact.

Some Use of Generative A.I. Allowed

Generative AI policies may differ from one course to another. In this course, the use of generative AI tools (ChatGPT, Copilot, Gemini, DALL-E, etc.) may be permitted in certain situations. Your instructor will specify when and under what conditions their use is allowed. If you use these tools, you may be required to explain how they informed your work, and all use must include proper attribution/citations.

### Reference/Resource List:

- *Teaching Children Science: A Discovery Approach, with Enhanced Pearson eText -- Access Card Package*, Derosa and Abruscato, 9th Edition, 2019, Pearson, 10-0134691792 or 13-9780134691794
- *Integrated Science*; Sixth Edition Bill Tillery, Eldon D. Enger and Frederick C Ross; McGraw Hill; 2011
- *Earth, Portrait of a Planet, 4th Edition*, Stephen Marshak, W. W. Norton & Company, 2011
- *Chemistry-Structure and Properties*, Nivaldo J. Tro, Pearson, 2015
- *Environmental Chemistry-a global perspective, 3rd edition*, Gary W VanLoon and Stephen J Duffy, Oxford University Press, 1999.
- *Physics, 4th edition*, James S. Walker, 4th edition, Addison-Wesley, 2019
- *Principles of Biochemistry, 5th edition*, Moran, Horton, Scrimgeor, and Perry, Person, 2010
- *Chemistry in Context Applying Chemistry to Society, 8th Edition*, McGraw Hill, 2015
- *Introduction to Organic Chemistry, 4th Edition*, William Brown and Thomas Poon, John Wiley & Sons, 2011
- *Prescott's Microbiology, 9th edition*, Wiley, Sherwood, Wolverson, McGraw Hill, 2013
- *Fundamentals of Anatomy and Physiology, Fredric Martini, Prentice Hall, 1998 Study Guide", F Martini, Prentice Hall, 1998*
- *Lab Manual", F Martini, Prentice Hall, 1998*
- *Fundamentals of Anatomy and Physiology-Applications Manual, Fredric Martini, Prentice Hall, 1998*
- *The Anatomy Coloring Book, W. Kapit and L. Elson, Addison-Wesley, 1993*
- *Musculoskeletal Anatomy Coloring Book, Muscolino, Joseph, Mosby, Inc., 2010*
- *Coloring Guide to Regional Human Anatomy", Twietmeyer and McCracken, Lea & Febiger, 1988*
- *Biology Principles and Explorations, Annotated Teacher Edition, Holt, Rinehart and Winston, Harcourt Classroom Education Company, 2001*
- *Conceptual Physics, Paul G. Hewitt, Prentice Hall, 2002*



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- *Physics: A Conceptual World View*, 7th Edition, Kirkpatrick and Francis, Brooks/Cole, 2010
- *Inquire Within: Implementing Inquiry-and Argument Based Science Standards in Grades 3-8*, 3rd edition (Llewellyn - Sage), Corwin, 2013

### Websites:

NSTA, National Science Teachers Association; [www.nsta.org](http://www.nsta.org)

Department of Interdisciplinary Studies, [www.montana.edu](http://www.montana.edu)

AAAS, The American Association of the Advancement of Science; [www.aaas.org](http://www.aaas.org)

NASA, National Aeronautics and Space Administration; [www.nasa.gov](http://www.nasa.gov)

NOAA, National Oceanic and Atmospheric Administration, [www.noaa.gov](http://www.noaa.gov)

USGS, U.S. Geological Survey; [www.usgs.gov](http://www.usgs.gov)

ACS, American Chemical Society; [www.acs.org](http://www.acs.org)

AIP, American Institute of Physics; [www.aip.org](http://www.aip.org)

AAPT, American Association of Physics Teachers; [www.aapt.org](http://www.aapt.org)

YouTube, [www.YouTube.com](http://www.YouTube.com)

Next Generation Science Standards; [www.nextgenscience.org](http://www.nextgenscience.org)

MnDOE, Minnesota Department of Education, Minnesota Science standards and benchmarks;  
<https://education.mn.gov/MDE/dse/stds/sci/>

### Podcasts:

Gimlet media, "Science vs."

AAAS-TWIS: "This week in science"

### Videos:

Watch: Scientific Inquiry: A Teacher's Guide <https://youtu.be/16Q6NMCsLq8>