

Revised 8/24/2017

Turtle Mountain Community College
Fall 2017

Instructor: Kathy Jo Henry
Email: khenry@tm.edu
Course: EDUC 406 Science Methods and Materials
Credit: 2 semester hour
Class Hours: Tuesday 1:00 - 2:50
Office Hours: Appointments Monday through Thursday

Text: Peters, Joseph, M., Stout, David, L., Science in Elementary Education: Methods Concepts and Inquires, 11 edition, 2011 Pearson Education, Inc., Publishing. National Research Council, National Science Education Standards, 1996, National Academy Press,

SUPPLEMENTAL Readings will be handed out in class by the instructor.

Purpose of the Course: This course prepares the pre-teacher candidate the practice to strengthen skills that are essential to quality teaching. To understand and become familiar with current methodologies to teach science. To better, understand children's thinking related to scientific knowledge, skills, and dispositions. To recognize the importance of ongoing and appropriate assessment.

Course Description: This course addresses the philosophy, content and pedagogy of **science (Life, Earth, Space, and Physical Science)**; covering the scientific methodologies of the Indigenous and western sciences. Emphasis is also on the implementation is also on implementation of developmentally appropriate methodologies that include applications of national and state standards.

Course Objectives:

The student will:

1. design and teach inquiry-oriented activities that support diverse students' learning effectively;
2. develop knowledge, understanding, and use of the role of fundamental concepts in the subject matter of science;
3. develop knowledge, understanding, and use of the unifying concepts of science and the inquiry processes that scientists use;
4. exhibit dispositions of an effective, caring professional educator, as outlined in the College of Education's Conceptual Framework;
5. identify naïve theories and misconceptions that most young adolescent learners have about scientific and technological phenomena;
6. identify relevant connections between science content and diverse students' lives and backgrounds;
7. create a safe environment in which diverse learners have opportunities to engage in inquiry-based learning; and
8. **plan Life, Earth, Space, and Physical Science lessons that are developmentally appropriate and responsive to the needs of diverse groups of students.**

Method of Instruction: Includes direct instruction (lecture and power point presentations), discussion, collaborate group work, peer teaching, workshops (when available), student presentations, hands-on demonstrations, required readings, and field-based application.

Disability / Access Statement: If you have special learning or physical disabilities (formally diagnosed), you have legal rights to course modifications. Please identify yourself to the professor so that he/she may assist you with your course progress.

Attendance, Class Participation: Many of the activities require your active participation; attendance and active participation are very important. If you are ill or have a family emergency, please notify me by email or call at ext. 2200. It is the responsibility of the student to meet the Teacher Education Department's and Turtle Mountain Community College's attendance policies.

Performance Assessments: Students are expected to complete all class readings prior to each class session so as to engage in active dialogue, sharing of ideas and reflection to engage in Productive learning. Students are expected to integrate course readings and class information into their written assignments to demonstrate knowledge of content matter. An evaluation of your papers, assignments, projects, in-class discussions, small and large group presentations, and participation will determine whether or not you've met the instructional objectives for the course. Scholarship, initiative, cooperation, attitude and improvement will also be taken into consideration. Bring you syllabi to each class meeting. A course disposition rubric is used for independent student evaluations. The disposition rubric will be introduced at your First Co-Hort Orientation.

Service Learning: Our mission is to promote reciprocal connections among students, faculty, and community members through integrated academic coursework and service in the community, and to encourage the development of socially and environmentally responsible citizens. When community or school activities are available and will meet our class objectives, students will be required to participate. Short notice more than likely will occur.

Statement of Academic Honesty: Scholastic honest is expected. Dishonesty includes cheating, plagiarism, and collusion. Student is expected to do individual work unless directed by a project and or permission is given. If dishonesty is found, the student will be reported to the Academic Dean.

Cultural Component: This respectful cultural ways and an important part of this course as we role model culturally responsive teaching.

COURSE	ND STANDARDS	INTASC STANDARDS	ARTIFACTS
EDUC 406 Science Methods and Materials for Elementary Education 2 credit hours	Composite Science 13047.1 Physic 13050.1 Inquiry The study of processes common to all sciences utilizing data- based activities, open- ended investigation, and student generated decision making and problem-solving. 13010.3 13020.3	#1 #7	Quizzes Lesson Plans (Field Application/ Midterm) Science Fair Project Judging Science Fair Projects (Final) In class experiments/activities Simple Machines Rock cycle

	13035.3 13045.3 13047.3 13050.3		Field Trip Mystical Horizons Journaling
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COURSE REQUIREMENTS

- ✓ **10 chapter quizzes-----20 ea.----200pts.**
- ✓ **4 lesson plans-----25 ea.----100 pts.**
- ✓ **1 field application lesson-----50 pts.**
- ✓ **Lesson Reflection-----25 pts.**
- ✓ **Science fair project-----100 pts.**
- ✓ **Science Fair judging-----25 pts.**
- ✓ **Science Fair project and judging reflection----- 50 pts.**

TOTAL-----550 pts.

Quizzes – Chapter quizzes (10) will be multiply choice and essay.

Lesson Plans – The pre-teacher candidate will complete **4 science lesson plans** in the following areas **life science, space science, earth science, and physical science**. One of the lesson plans created will be used in the classroom.

Field Application – The pre-teacher candidate will meet with a school building manager, **(Principal) and receive permission to introduce a science lesson to whole group classroom**. Upon approval a grade level will be chosen. The pre-teacher candidate will be responsible to meet with classroom teacher and decide on a lesson depending on the school’s curriculum.

Science Fair Project- This activity requires the pre-teacher candidate to study the steps to set-up a science fair, understanding the elements a project needs for being judged, judging a project, and cost. Each pre-teacher candidate will build a science project using the **Basic 5 Steps** of a Science Project:

1. **Question:** Ask a question which can be answered by observation and/or experimentation.
2. **Hypothesis:** State your hypothesis. Students will predict what the outcome will be based on their experiences and/or information collected from available resources.
3. **Procedure:** A. Material: List every item which is needed to do the experiment. Include equipment as well as materials. B. Method: List a step-by-step sequence of exactly what is done.
4. **Results:** Display a complete record of your observations and/or results. Note any accidents, mistakes, unusual or unexpected observations and additional information which surfaces. Use graphs and/or charts to present your data.
5. **Conclusion:** Using the data from your results, answer the question asked in Part 1. Then, note any additional comments, explanations of why the results did or did not match your hypothesis. Also note any information, which you learned from your research which would be relevant (include a Bibliography). ⇐ Submit a Notebook with your project, which will present the Basic 5 Steps in more detail and the Bibliography. Although some or all of the information may be displayed on your exhibit, it is strongly recommended that you have a Notebook as part of your project.

Students are responsible for completion of all readings assigned. Supplemental readings need careful review.

Course Units

WEEK ONE

Syllabus review, course intention, pretest,
Bean seed preparation

Readings: SEE “Discovery Science through Inquiry” pgs. 20-39 discussion

WEEK TWO

Readings: SEE “Planning for Inquiry” pgs 40 to 57, NE, First Insights pgs 13-14

WEEK THREE

NO CLASS

Chapter 1 & 2 QUIZ

WEEK FOUR

Butterfly Project

QUIZ

Readings: SEE “Inquiry and Assessment” pgs. 58-85, NE, Sense, Perception, and Creative Participation pgs. 20-31

WEEK FIVE

Readings: SEE, “Inquiry and Science as Practice” pgs. 86 – 113, NE, Native Stories of Creation and Emergence, 31-46.

WEEK SIX

QUIZ

Readings: SEE, “Inquiry Experiences for All Children” 114 – 130, NE, 58-63

WEEK SEVEN

QUIZ—Backward Design Lesson

WEEK EIGHT

NO CLASS

QUIZ **Field application must be approved and submitted by today**

Readings: SEE, “Inquiry Learning Opportunities” 131-163, NE, pgs 64-71

WEEK NINE

SEE, Life Science pgs. 328 -429, NE, Chapter 5 pgs.,150-175

WEEK TEN

QUIZ

WEEK ELEVEN

QUIZ

Physical Science pgs. 180 – 385 NE, Chapter 6

WEEK TWELVE

See, Earth and Space Science pgs. 430 – 515, NE Chapter 7

WEEK THIRTEEN

QUIZ

NE, Chapter 8

WEEK FOURTEEN

QUIZ

WEEK FIFTEEN

Science Fair Project Presentation/ Setting UP

Science Fair Project Presentation/judging

WEEK SIXTEEN

Science Fair Project Presentation judging

Science Fair Project Presentation/judging

WEEK SEVENTEEN

FINAL EXAM