Cultivating Scientific Literacy in the K-12 Classroom
Course Syllabus

Instructor: Molly L. Sultany, Northwest Academy, Portland, Or.

Number of Credits: 4 or 5  Department: CI  Course Number: xx

The PSU Graduate School of Education’s Goals and Purposes:

Our program will prepare leaders in:

**Diversity & Inclusiveness**
- to work effectively with diverse populations
- to promote inclusive and therapeutic environments

**Research-Based Practices & Professional Standards**
- to critically analyze and implement research-based practices
- to demonstrate appropriate professional knowledge, skills, and dispositions

**Impact on Learning and Development**
- to ensure all learners and clients succeed
- to use technology to enhance learning
- to influence policy and provide leadership for organizations

**Evidence-Informed Decision Making**
- to use evidence to solve problems of practice and make educational and therapeutic decisions
All of the courses offered through the NW Teacher’s Learning Center are based on the same philosophical approach as expressed above. This supports consistency in our courses and ensures we are presented the most successful theories and strategies to increase teacher effectiveness and encourage accelerated life-long learning in students. When educators strive for improvement, we often work to transform our learning environments. However, classrooms often remain the same because our own beliefs about teaching stay the same. For real change to occur, we must refine our own thinking. If we want our students to evolve, we must examine our own beliefs and be willing to adapt to meet the pressing needs at hand. All of our courses strive to provide you with this knowledge where you become empowered.

Empowerment is the desire and ability to continue the journey. Desire is kindled with excitement and encouragement through the development of personal interests. Personal interests are central to teaching and learning. Teachers and students who are aware of learning processes, strategies, and multiple intelligences, and employ these elements toward developing their interests, will become powerful players in shaping their lives as well as their communities.
Cultivating Scientific Literacy in the K-12 Classroom

Course Description
Being able to understand and interpret science is one of the most important skills of 21st century learners. Helping students become more scientifically literate should be an educational priority across schools in America. According to a recent study conducted by the American Association for the Advancement of Science, a mere 28% of Americans can interpret, understand, and analysis scientific issues (Miller 2007).

This course will help all teachers, from elementary to high school, design lessons to encourage, inspire, and engage students in the study of science. Learn how to develop effective demonstrations, labs, projects, and assessments to foster scientific literacy. Extend your knowledge of science pedagogy, transform lessons to foster self-discovery and inquiry, while helping students build valuable science process skills. This class aligns with local science programs, Common Core curricula, and Next Generation Science Standards.

Prerequisites
An interest in fostering scientific literacy in your classroom.

Course Outcomes
a. Build a comprehensive understanding of scientific literacy, and research ways to foster it in your teaching.

b. Create inquiry-based lesson plans aligned with NGSS.

c. Design instruction to assess students’ scientific literacy, thinking strategies, and science process skills.

d. Develop lessons that incorporate constants and variables from the text, Science as Thinking: the constants and variables of inquiry teaching by Wendy Ward Hoffer.

Course purpose:
The purpose of this course is to help teachers design lessons related to scientific literacy. In the process, you will develop strategies and pedagogy to navigate labs, demonstrations, lectures, discussions, fieldwork, and activities from the lens of inquiry-based instruction.

Graduate Credit
Students will receive graduate credit upon successful completion of the course requirements

A. Scientific Literacy Reflection
B. Science as Thinking Journal
C. Independent Project
D. Science Book Analysis: Documenting Thinking

In this course, you will have the opportunity to participate in the following activities:
• Explore cutting-edge digital resources for science teaching, including Phet simulations, The National Center for Case Study Teaching in Science, University of Utah’s Genetic Science Learning Center, and educational games from Nobelprize.org.
• Interpret STEM education data from the National Science Foundation webpage.
• Construct a concept map on scientific literacy using free, engaging programs: Text2Mind Map, MindMup, Simple Mapper, and GoConqr.
• Learn how to align learning outcomes with scientific literacy and connect lesson plans to big ideas in science.
• Design labs to foster science process skills and engage all students in the learning process.
• Brainstorm ideas for a local field trip and explore connections with local non-profit organizations.

Fifth Credit Option
To receive the additional fifth credit you will be required to do an additional work. You will complete a second independent project from the three options presented below.

1. Big Ideas as a Framework for Scientific Literacy
Transform your science lessons.
Browse the AAAS Benchmarks for Scientific Literacy website.
Link big ideas and essential questions to scientific literacy benchmarks.
Start class with compelling images that foster a sense of wonder and discovery.

2. Creating a Culture of Scientific Literacy & A Commitment to Science Literacy
Construct a project summarizes key insights from the course.
Share the benefits of inquiry-based science instruction with your school community.
Develop one of the following: multimedia presentation, website, informational newsletter, brochure to share with colleagues, educators, and parents at your school.

3. Lesson Plans that Facilitate Scientific Literacy
Refine your lesson planning by using a backwards design model.
Implement new ideas in your classroom, with a focus on student thinking and cognitive engagement.
Align assessments and learning activities with your goals.

Instructional Format: Online, visual learning (concept maps, website, videos, animations), readings, email feedback

Course Text:
Science as Thinking: the constants and variables of inquiry teaching
Wendy Ward Hoffer
Publisher: Heinemann
The course text *Science as Thinking* is an excellent guide to scientific literacy that will help all teachers develop confidence and competence in lesson planning and classroom instruction. Divided into thematic chapters with many examples of student work samples, rubrics, and vignettes from practicing science educators, this book will transform your teaching!