

TIDES Environmental Education Hub

How EE fits into Science Methods Course (Sample Syllabus – Woven)

Curriculum and Instruction Methods (Science) - Fall
Curriculum, Planning, and Assessment (Science) - Spring

Course Description:

Fall - first course in a two-part sequence of science methods/planning courses for undergraduate and graduate pre-service science teachers. The course is designed to build fundamental knowledge of science teaching and learning including standards-based curriculum design and research-based teaching strategies, especially in the context of high-needs school contexts and students. The course focuses on connecting secondary science curriculum to inquiry based instructional methods and appropriate assessments to understanding students' knowledge and application of science concepts and the nature of science. Teacher candidates will plan science lessons, implement lessons in a middle or high school classroom, observe and assess students' learning, and apply skills in reflective teaching by analyzing student outcomes and their own practice. The practicum and this course are interwoven, with the practicum providing the opportunity for applying many of the skills taught in class.

Spring - second course in a two-part sequence of courses for pre-service science teachers. It is a field and university-based course designed to provide students with an opportunity to reflectively apply their skills and knowledge about teaching science. The course is designed to build on the fundamentals of curriculum design and teaching from the prerequisite course and to focus on the refinement and revision of students' ideas about teaching, using technology for students to investigate science, and adapting instruction for the diverse needs of learners. The pre-service teachers will design and implement instruction that incorporates technology and adaptations for diverse learners. The course emphasizes skills called for by the state and national science standards and as outlined by the National Council for Accreditation of Teacher Education (NCATE), the National Science Teachers Association (NSTA), and the Interstate New Teacher Assessment and Support Consortium (INTASC).

Objectives of the course/INTASC Standards: By the end of the course, science teacher candidates will be able to:

- Build a repertoire of science teaching and assessment strategies by reading, writing, observing, participating in, and reflecting on the teaching and learning of science.
- Develop strategies to help students become scientifically literate, think critically and creatively, understand the nature of science, and see relationships among science, technology, and society.
- Plan standards-based units of science study including daily lesson plans for students that reflect research in effective science teaching and learning.

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- Construct science lessons and hands-on experiences that address the needs of a variety of student populations including English language learners, special needs students, and gifted and talented students.
- Develop inquiry-based lessons for students to use technology to conduct science experiments, to research science issues, to analyze science data, and to communicate findings
- Construct, adapt, and critique standards-based lessons including assessment and hands-on experiences for the diverse needs of learners including gender equity, cultural diversity, English language learners, high and low achievement, and the physically, socially, and emotionally challenged
- Construct and critique assessment tools for evaluating student learning outcomes

NSTA Standards: Preservice teachers will enact all science teacher preparation standards in their clinical field placement course

(<http://www.nsta.org/preservice/docs/2012NSTAPreserviceScienceStandards.pdf>)

Major Activities:

To accomplish an introduction to environmental education with pre-service teachers, I've scheduled three days over the course of one semester to introduce this topic during the science methods course. For my university, this is the best place to include this work. With a semester of only 14-15 weeks, each of these three parts may be ½ to a whole class period, but is reasonable to accomplish the other objectives of the course in addition to this content.

Over a three-part class experience, pre-service teachers will be introduced to environmental literacy, conducting field experiences, analyzing results, and creating action projects. An example of the three-day split includes (highlighted parts showcase specifically how I would include the Earth Force curriculum)-

Fall

- **Pre-Work** - Students will complete Level 1 and 2 of MWEE 101 course - <https://cbexapp.noaa.gov/course/view.php?id=5555>
- **Class 1** - Introduction of environmental literacy, tie to the state standards and the NGSS Science and Engineering Practices, best practices for keeping it local and relevant
 - Introduce Driving Question
 - Students generate Supporting Questions
 - Introduction to Student Voice in environmental education
 - Utilize Root Causes handout once issue is selected
- **Class 2** - In-class or on-site investigation (suggestions include macroinvertebrate sampling, water quality testing, and/or plant transects) including data collection and if time, analysis
 - Tie to civic action on campus - who are the stakeholders involved

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- Utilize Stakeholder map handout
- **Class 3** - Data Analysis and Conclusions
 - Claim, Evidence, Reasoning
 - Data interpretation and communication
 - Conclusions and generation of ideas and vetting for Action Projects
 - Discussion of logistics for action projects

Spring

In the spring semester, the course focuses mainly on assessment, but also on planning. I've included one major assignment focusing on environmental literacy and how to create a lesson plan for that type of experience. The major experience in the spring semester for pre-service teachers is a culminating field experience off-site to showcase the benefits of taking students outside to a new location for experiential learning.

- **Assignment** - Completed ELM for MWEE turned in as lesson plan
 - Discussion of MWEEs as a performance-based assessment
- **Field Experience** - Attendance on off-site field experience
 - Discussion of field trip logistics, permission, liability, resources that placement school has for field investigations, etc.
 - Discussion of youth-adult partnerships - who are the external providers that you can partner with to help achieve a MWEE?
- **Optional** - If time allows, have students offer field investigation for students in their placement or with external partner