Western Oregon University Memorandum

From: Jeff Templeton and Steve Taylor, Earth and Physical Sciences Department
To: Kent Neely, Provost and Vice President for Academic Affairs
Date: December 3, 2008
RE: Follow-up Assessment Information for Earth Science Curriculum Proposal

Provost Neely:

As per our meeting on November 13, 2008, please find attached an expanded explanation of the assessment plan for the proposed Earth Science Curriculum Changes. At your suggestion, we have expanded our response to "Question C" on the WOU Curriculum Log Degree Program Change: "how and when will the effectiveness of these changes be determined?" Specific details follow, please let us know if you have any additional questions.

Sincerely,

Jeff Templeton, Chair Earth and Physical Sciences

Steve Taylor, Chair Division of Natural Sciences and Mathematics

WOU Curriculum Log
Degree Program Change - Assessment

Degree Program: Earth Science
Academic Major and related Minors: Earth Science Major, Earth Resources Minor, Earth System Science Minor, Geology Minor

C) How and when will the effectiveness of these changes be determined?

The Earth Science Major was completely reorganized and approved by the WOU administration and the Oregon University System in 2001. The original purpose for developing a new Earth Science major at WOU was to align our geosciences curriculum with nationally-recognized education standards and to update the program to better prepare graduates for careers as scientists and educators in the 21st century. The modifications proposed herein reflect a fine-tuning of the Earth Science curriculum in the spirit of continuous improvement of this overarching objective.

The proposed changes will go into effect during the 2008-09 and 2009-10 academic years, pending approval by the WOU administration. The Earth Science program is in the process of implementing a comprehensive evaluation plan that includes the following strategies: (1) formative embedded assessment, (2) summative assessment of the degree program, and (3) survey-based tracking of current students and graduates. The evaluation strategies described below will commence during the 2008-09 academic year with formative assessment strategies and continue until 2012 when we plan to conduct our external review of the Earth Science program.

1. **Formative Embedded Assessment**: Formative assessment of the Earth Science Program is currently being conducted via a series of Embedded Assessment Strategies. Initiated in Spring 2008, these strategies specifically link student performance on course activities to program outcomes (refer to attached template for example). A variety of methods and course activities are used for embedded assessment, including inquiry-based lab exercises, field studies, writing assignments (informal short essays and longer-form research papers), active-learning exercises, oral group presentations, and multi-media work samples. These types of embedded assessment strategies will are incrementally being deployed in all Earth Science

courses, including the new and modified courses that are part of this curriculum change packet.

2. **Summative Assessment of Degree Program**: The capstone course, Senior Seminar (ES 407), will continue to serve as the primary Degree Program Assessment mechanism for Earth Science graduates. The objective of Senior Seminar is for students to conduct in-depth study and research on current topics in the Earth Sciences. By requiring Earth Science students to draw on information from the full range of major courses they have completed during their time as an undergraduate, students must demonstrate proficiency in a broad range of Earth Science content areas. Students are required to complete ES 407 during the final term of their senior year and must satisfactorily complete the capstone course to graduate from the program. Senior Seminar has been successfully incorporated into the campus-wide, Academic Excellence Showcase event sponsored by the Program for Undergraduate Research Experiences and Phi Kappa Phi.

   In conjunction with seminar inquiry-based, work-sample method described above, standardized exit exam models are currently being explored by Earth Science faculty members. Several ideas have been pilot tested. One model utilizes an online exit exam based on national standards established by the Educational Testing Service in the 1990's that comprised part of the Advanced Geology Graduate Record Exam. A second model utilizes the education-based PRAXIS exam for teaching candidates with an emphasis in Earth and physical science content. The third summative assessment tool currently under evaluation is the nationally standardized Fundamental Geology Exam that forms part of the Oregon State Board of Geologist Examiners professional licensing process. Select student test groups have engaged each of above summative models over the past 8 years, their collective effectiveness and practicality are currently being evaluated.

3. **Survey-Based Tracking of Current Students and Graduates**: The Earth Science program is currently in the process of developing student and alumni tracking mechanisms, along with other programs in the College of Liberal Arts and Sciences. This is a work in progress with an implementation timeline spanning the next two years. Earth Science students and graduates will be tracked through several different mechanisms including the collection of numeric data and the utilization of Alumni Surveys. The types of numeric data that will be collected will include course enrollments, grade distributions, and time to degree completion. This data will be provided by the WOU Office of Institutional Research. Focus groups of current Earth Science students will be formed to determine the degree to which the proposed

curriculum changes are accomplishing the intended outcomes. Senior Seminar (ES407) will serve as the gateway for conducting focus group surveys. We currently collect post-baccalaureate data via informal correspondence and networking between graduates and faculty (e.g., emails, phone calls, requests for recommendation). To more comprehensively gauge alumni satisfaction, formal surveys of Earth Science graduates will be conducted to help guide us in continually refining the degree program. Alumni surveying methodologies will be developed in collaboration with the College of LAS and the Office of Institutional Research.

Earth Science Program - Learning Outcomes Embedded Assessment Strategy - TEMPLATE

Course: ES XXX – _____

Course Activity: _____

Demographic Data:

Student Name: _____ **Gender:** M / F

Grade on Assignment: _____ **Overall Course Grade:** _____

Major: _____ **Minor:** _____

Year in School: _____

Assessment of Learning Outcomes:

1. Acquire a comprehensive understanding of the interrelated physical, chemical, and biological processes operating in the Earth system.
   a. *Content displays understanding of physical processes operating in the Earth system*

Needs Improvement	Meets Expectations at introductory level	Meets Expectations at upper-division level	Exceeds Expectations

   b. *Content displays understanding of chemical processes operating in the Earth system*

Needs Improvement	Meets Expectations at introductory level	Meets Expectations at upper-division level	Exceeds Expectations

   c. *Content displays understanding of interrelated nature of the Earth system*

Needs Improvement	Meets Expectations at introductory level	Meets Expectations at upper-division level	Exceeds Expectations

2. Develop proficiency in using technology-enriched analytical techniques to solve geologic problems.
   a. *Rate degree to which technology-enriched analytical techniques are used to solve given geologic problem*

No use of technology	Low level of Use	Medium level of Use	High level of Use

   b. *Use of technology-enriched analytical techniques is appropriate to solve given geologic problem*

Needs Improvement	Meets Expectations at introductory level	Meets Expectations at upper-division level	Exceeds Expectations

   c. *Student demonstrates proficiency / competence in applying technology-enriched analytical techniques to solve a given geologic problem.*

Needs Improvement	Meets Expectations at introductory level	Meets Expectations at upper-division level	Exceeds Expectations

3. Gain experience in conducting inquiry-based science in the context of outdoor adventure.
   a. *Rate degree to which student was engaged in inquiry-based science.*

No inquiry-based science activity.	Low level of inquiry-based science activity.	Medium level of inquiry-based science activity.	High level of inquiry-based science activity.

   b. *Rate degree to which student engaged science in field setting.*

No field-based activity in course.	Low amount of field-based activity.	Medium amount of field-based activity.	High amount of field-based activity.

   c. *Student demonstrates skills in applying the scientific method, including ability to define problem, present relevant observations and data, and develop interpretations based on these observations and data.*

Needs Improvement	Meets Expectations at introductory level	Meets Expectations at upper-division level	Exceeds Expectations