AY2010-2011 Annual Outcomes Assessment Report
Natural Science Core Courses
16 August 2011 (preliminary only)
Update 21 June 2012

To: Provost Susan Henrichs
Dean Paul Layer
Ms. Latrice Laughlin, Chair, Core Assessment Committee

From: CNSM Associate Dean John D. Craven

I. INTRODUCTION

The current Student Leaning Outcomes Assessment program for courses in the UAF Core Natural Sciences was implemented in 2004 by then Associate Dean John Aspnes following a committee's development of a streamlined assessment process. (Committee members were Susan Henrichs, Doug Schamel, Rainer Newberry, and John Aspnes.) First use of this assessment model was for GEOS 101X in 2004. These three events remain the formative activities that have underpinned the assessment work since then. The current descriptive material for the assessment process is available at http://www.uaf.edu/provost/assessment-review/assessment/core-assessment/ . Beginning in 2009, assessment reports are fully reviewed by the CNSM associate dean and copies of the resulting review notes for each course are distributed to the instructor, department chair, and CNSM dean, and a copy is attached to the assessment report's notebook or electronic file, which is then electronically archived in the CNSM Dean's Office (REIC 358).

Notebooks from 2004 onward have been scanned to create digital versions, and electronic submissions are being encouraged in the future. Each academic department is urged to keep a copy of reports for their courses and the CNSM hard copies are returned to the departments after an electronic copy is created.

Courses assessed at the Fairbanks campus (FC) and other campuses are identified in parentheses; e.g., BBC denotes the Bristol Bay Campus and NWC the Northwest Campus. No campus indicator is used if FC only. DD denotes FC course by e-delivery.

Assessments Planned for AY2010-2011

Core natural science courses scheduled for assessment in this year were:

Fall 2010	BIOL 112X (NWC), GEOG 111X (FC, BBC), PHYS 102X (BBC), PHYS 213X
Spring 2011	ATM 101X (deferred one year), BIOL 100X (CTC), BIOL 111X (NWC), BIOL 112X (FC, CTC, NWC), CHEM 104X, GEOS 112X, MSL 111X (DD, deferred to fall 2012), PHYS 102X (deferred to spring 2012).
Summer 2011	BIOL 112X

Assessment reports received to date are:

Fall 2010	BIOL 112X (NWC),GEOG 111X (BBC, PHYS 102X (BBC)
Spring 2011	BIOL 100X (CTC), BIOL 112X (CTC,NWC), CHEM 104X, GEOS 112X, PHYS 213X

No late reports have been received for earlier years.

Assessments Planned in AY2011-2012

Fall 2011	ATM 101X, CHEM 103X, MSL 111X (DD), PHYS 175X, PHYS 212X
Spring 2012	BIOL 116X, PHYS 102X, PHYS 115X, PHYS 211X

II. ASSESSMENT REPORT FORMAT AND OBJECTIVES

A Core Natural Science assessment report for a course typically comprises 3-8 pages plus supporting graphs, tables, etc. to provide the following;

1. A brief general discussion that outlines the course objectives, student numbers, composition, etc. so one can gain an overall impression of the enrolled students and the instructional philosophy. This should include the instructor's approach to satisfying the three core expectations given next.

2. Expectation 1 is training in the scientific method. Much of this work is frequently left to the laboratory TA, but the course instructor responsible for course content is encouraged to aid in the training as part of the lectures. Assessment is via a brief writing exercise in which students are asked to study the description of an intentionally flawed laboratory effort (from design through measurements to conclusions) and to identify things inconsistent with the scientific method. The instructor is asked to study the students' work and assess the degree to which they gained a working understanding of the scientific method.

3. Expectation 2 is the impact of science on public policy. Impacts of science (positive or negative) on public policy are discussed within the lectures and the laboratory setting in order to link scientific information and inquiry to the formation of informed public policy. An objective is to improve students' abilities to discern bogus from factual arguments. Assessment is through the preparation of a 1-2 page paper in which a subject of current public policy debate is discussed with regard to scientific evidence. Wide latitude is given in how instructors carry this out. Again, the instructor is asked to study the students' submissions and assess the degree to which they have been successful.

4. Expectation 3 begins with a six-question survey that was designed by the 2004 committee (really a questionnaire) to gain student perceptions of the course's two assessment objectives (scientific method and science and public policy) and their perceptions of their learning outcomes. The students are presented with six questions and asked if they strongly agree, agree, are neutral, no not agree or strongly do not agree. Nearly all courses succeed in getting students to complete the survey, for which an expanding database of results now exists. Again, the instructor is asked to study the results and comment.

5. Summary. Reports should end with a summing up, comments on the course, and areas in the core objectives identified for improvement. Personal views about assessment itself are sometimes offered.

In lieu of reading the lengthy notes prepared while reading an assessment report, the objective here is to simply report on the degree to which an instructor's report satisfies the five areas discussed here. Should additional information be required or desired, the original report and the reviewer's notes are available in the CNSM Dean's Office. The expectation is that "lessons learned" from the assessment activity will be discussed by each department's faculty, but there is little information in support of my aspiration.

III. SUMMARY FOR REPORTS RECEIVED TO DATE

GEOG 111X Earth and Environment: Elements of Physical Geography, Fall 2010
Assist. Prof. Todd Radenbaugh (BBC)

1. Introduction The introduction provides valuable information on student composition, demographics, performance, etc. The syllabus is silent about the expectations of a UAF Core Natural Science course and how this course fulfills these expectations.

2. Scientific Method The evidence presented for Lab 1 and the prior lecture material indicates that this important Core expectation was present in the curriculum, but in what seems to be a somewhat limited manner. Overall, the course appears to meet this Core **expectation**. There is no evidence presented in this report to indicate that an independent **assessment** was carried out.

3. Science and Social Policy Evidence indicating that this Core expectation was part of the course is extremely weak, so the course does not appear to meet this Core **expectation**. There is no evidence presented in the report to indicate that an independent **assessment** was carried out through a student writing assignment.

4. Questionnaire (Survey) The student survey for the standard six outcomes questions was not given to the students and no explanation is provided as to its absence. This course **assessment** was not completed so the course did not meet this requirement.

5. Summing Up Dr. Radenbaugh's assessment of the course is candid and raises important issues about student preparation that should be the subject of discussions between him, the campus director, CRCD, and the UAF Geography Department. The Core expectations seem to be met but the lack of a proper assessment is noted.

III. SUMMARY FOR REPORTS RECEIVED TO DATE - CONTINUED

PHYS 102X Energy and Society, Fall 2010, Assist. Prof. Tom Marsik (BBC)

1. Introduction The introduction provides valuable information on student composition, performance, etc, but provides no information on student demographics. The syllabus is silent about the first Core Natural Science expectation concerning the scientific method but does indicate that the second expectation concerning the impact of science on public policy will be explored throughout the course.

2. Scientific Method There is no direct or indirect evidence provided in the report to indicate that the subject was discussed in either the lectures or the labs. The course does not meet this Core **expectation**. There is a strong suggestion that the UAF Physics Dept lab manual may be a significant part of the problem. This will be pursued prior to the beginning of the fall 2011 semester. The required Core **assessment** activity was carried out and from the instructor's qualitative comments its goals may have been well met by several students. However, it is not possible to gain a wider understanding of student success from the assessment report

3. Science and Social Policy It appears that the course did meet the "science and society" Core **expectation**, but additional direct evidence would have been useful. An **assessment** activity was carried out as required for Core assessment. However, it is difficult to determine if the students gained a working appreciation of the role of science in helping to formulate public policy.

4. Questionnaire (Survey) The questionnaire was completed by four of the five students who completed the course (80 percent), with the outcome summarized in the table below. This is the strongest student support yet attained through this survey instrument (out of the 20 completed to date). The assessment requirement was met.

Table 1. Summary of Student Survey (Percent that Strongly Agree or Agree).

	Question Asked	PHYS 102X, %	Average of 20 reports, %
1	Improved scientific knowledge	100	91
2	Improved knowledge of how scientists conduct investigations	100	72
3	Improved ability to understand science in the media	100	77
4	Improved understand how science impacts policy	100	65
5	Increased desire to learn more science	100	68
6	Agreed that the course was useful	100	81

5. Summing Up This is the first time this course was offered at the Bristol Bay Campus, so the scheduled assessment was, I think, premature. However Dr. Marsik, can take advantage of this early Core assessment and work with the UAF Physics Department to quickly improve on the Core expectations.

III. SUMMARY FOR REPORTS RECEIVED TO DATE - CONTINUED

BIOL 100X Human Biology, Spring 2011, Dr. Pamela Wagaman, Adjunct Faculty (BBC)

1. Introduction The introduction provides valuable information on student composition, performance, etc. The syllabus includes as one of the course goals a basic understanding of the scientific method, but the relation of science to the development of public policy is not included. It does not include information on the planned assessment activities.

2. Scientific Method The course met this Core **expectation**. Overall, the required **assessment** activity was carried out and its goals mostly met. The lack of a quantitative and more critical assessment is noted.

3. Science and Social Policy The Core **expectation** concerning "science and society" was fulfilled. An assessment activity was carried out and the examples provided indicate varying appreciation for detecting tensions between scientific knowledge and its application to public policy. Overall, the method of **assessment** was inadequate.

4. Questionnaire (Survey) This important part of the course assessment was not completed. The course did not meet this assessment requirement.

5. Summing Up In addition to teaching two classes for the first time as a visiting adjunct faculty member, Dr. Wagaman was also confronted with the five-year core assessment task, which had never been done for this course. With regard to the course, she has provided several recommendations for the Biology Department to consider; text, lab manual, three-hour lecture, and the lab practicum. The department will probably benefit from direct communication with Dr. Wagaman. As to her assessment report, it set a new record for promptness and given all the first-time issue she was facing, it is a good report.

III. SUMMARY FOR REPORTS RECEIVED TO DATE - CONTINUED

BIOL 112X Human Anatomy and Physiology II, Spring 2011, Assist. Prof. Wendy E. Johnson (CTC)

1. Introduction The introduction provides valuable information on student composition, performance, etc. The syllabus presents clear course goals but lacks a semester schedule of lecture topics and lab activities for students. An addendum to the course syllabus includes a discussion of how the core requirements for a basic understanding of the scientific method and public policy and ethics was to be carried out and included the assessment requirements.

2. Scientific Method The course appears to meet this Core **expectation**, but the report lacks direct evidence in the report of the work done within the course, for example in the three lab sessions. The Core **assessment** requirement was met through a writing exercise that focused on the scientific method and the instructor's critical assessment of the student outcomes identified in that activity.

3. Science and Social Policy No evidence was presented to show that the course provided instruction within the semester in how scientific knowledge (established and developing) can influence public policy. Hence, it does not appear that this course met this Core **expectation**. An assessment activity was carried out but there is insufficient evidence presented to determine the impact and any resulting learning outcomes. The Core **assessment** was inadequate.

4. Questionnaire (Survey) The assessment requirement was met and the students' responses were generally comparable with or better than the averages from all assessment surveys received to date.

Table 1. Summary of Student Survey (Percent that Strongly Agree or Agree).

	Question Asked	BIOL 112X, %	Average of 20 reports, %
1	Improved scientific knowledge	90	91
2	Improved knowledge of how scientists conduct investigations	71	72
3	Improved ability to understand science in the media	71	77
4	Improved understand how science impacts policy	76	65
5	Increased desire to learn more science	81	68
6	Agreed that the course was useful	90	81

5. Summing Up This is the first assessment of BIOL 112X when taught through CTC and it reveals several shortcomings that can be easily corrected, per comments to the assessment report. In particular, the "Science and Society" expectation requires attention.

III. SUMMARY FOR REPORTS RECEIVED TO DATE - CONTINUED

BIOL 111X Human Anatomy and Physiology I, Spring 2012, Assist. Prof. Claudia Ihl, Northwest Campus (Nome)

1. Introduction The syllabus presents clear course goals/outcomes that include the required core natural science objectives and detailed schedules for lecture topics, quizzes, exams and reviews. Scheduling for the labs is by topic area and not specific for each lab. There are only eight labs topics in the schedule and the syllabus states that "…a 1-1.5 hour lab session is taught once a week…," and there are some weeks without labs. The equivalent on-campus course has more labs. Also, the UAF requirement for one credit of lab instruction is more demanding, and as I read it the requirement is for a minimum of 1600 minutes of instruction (not including out-of-class work); a minimum of nine labs of three hours duration each would meet that requirement. Some courses use the entire first lab to discuss safety, scientific methods, and other "startup" issues. The syllabus and schedule are silent on any assessment activities.

2. Scientific Method The course appears on the right track to meet this Core expectation, but the report does not describe how the second-lab Core-driven requirement is being met and lacks any information on lecture-based contributions. The course does not appear to meet this Core assessment requirement, as the writing exercise looks like a part of the course instruction and not an independent assessment of the student outcomes.

3. Science and Social Policy It appears that this Core instructional expectation is partially met, but the report lacks evidence on how students gain critical thinking skills to detect conflicts between scientific knowledge and public policy. Overall, the writing exercise does not appear to be consistent with the intent of the Core assessment requirement, but contains a sufficient number of parts to indicate that the intent is there.

4. Questionnaire (Survey) The student survey for the standard six outcomes questions was given to the students at the end of the semester, with eight completing the survey out of the 10 who received a letter grade A-F. But for the question related to "how scientists conduct investigations," that is, the "scientific method," the outcomes were nicely about the averages for 25 assessment reports, all being within one standard deviation. The outlier was Question 2, where the nine students were very much less in agreement than the average of the 25 classes regarding "how scientists conduct investigations." This indicates that more work needs to be done with this Core expectation. The course met this Core assessment requirement.

Table 1. Summary of Student Survey.

	Question Asked	BIOL 111X, %	Average of 25 reports, %
1	Improved scientific knowledge	88	92
2	Improved knowledge of how scientists conduct investigations	50	73
3	Improved their ability to understand science in the media	88	79
4	Improved their understand how science impacts policy	63	67
5	Increased their desire to learn more science	88	73
6	Agreed that the course was useful	88	84

5. Summing Up This is the first assessment of BIOL 111X as taught through CRCD at the Northwest Campus in Nome and it reveals to me that Dr. Ihl is doing many of the things expected for a Core Natural Science course. Recognizing the time difficulties, you might reconsideration of how the writing exercises are incorporated into the course each time it is taught as opposed to being distinct assessment instruments that are only required every five years. It is an issue that suggests a need at the college level for reconsideration on how the assessments are done.

III. SUMMARY FOR REPORTS RECEIVED TO DATE - CONTINUED

BIOL 112X Human Anatomy and Physiology II, Fall 2011, Assist. Prof. Claudia Ihl, Northwest Campus (Nome)

1. Introduction The syllabus presents clear course goals/outcomes that include the required core natural science objectives and detailed schedules for lecture topics, lab activities, quizzes, exams and reviews. There are only eight labs topics in the schedule and the syllabus states that "…a 1-1.5 hour lab session is taught once a week…." The equivalent on-campus course has many more labs. Also, the UAF requirement for one credit of lab is more demanding, and as I read it the requirement is for a minimum of 1600 minutes (not including out-of-class work); a minimum of nine labs of three hours duration each would meet that requirement. The syllabus and schedule are silent on any assessment activities.

2. Scientific Method The course appears to be on the right track to meet this Core instructional expectation through lecture-time discussions and a brief experiment, but the report lacks evidence as to how the Core driven two-lab requirement is being met and lacks any specific information on lecture-based contributions. The course does not really meet the Core assessment requirement as there is no differentiation between the instructional element and an independent instructor-design exercise explicitly intended to be the assessment tool.

3. Science and Social Policy The Core instructional expectation is met, in part, through the lecture-time discussion items. Evidence is lacking on how students gain critical thinking skills to detect conflicts between scientific knowledge and public policy. Overall, the writing exercise does not appear to be consistent with the intent of the Core assessment requirement, but contains a sufficient number of parts to indicate that the intent is there.

4. Questionnaire (Survey) The student survey for the standard six outcomes questions was given to the students at the end of the semester, with nine completing the survey out of the 13 who received a letter grade A-F. But for the question #2, "how scientists conduct investigations," that is, the "scientific method," the outcomes were better than averages for 24 prior assessment reports, and the first five were all within one standard deviation of the averages. The outlier is Question 6, where the nine students were much more in agreement than the average of the 24 classes; they really found the course useful. I suggest that in large part this follows from the higher motivation of the students to be successful in their health-related objectives, for which a successful outcome in this course is vital. The course met this Core assessment requirement.

Table 1. Summary of Student Survey.

	Question Asked	BIOL 112X, %	Average of 24 reports, %
1	Improved scientific knowledge	100	92
2	Improved knowledge of how scientists conduct investigations	67	74
3	Improved their ability to understand science in the media	89	79
4	Improved their understand how science impacts policy	78	67
5	Increased their desire to learn more science	89	72
6	Agreed that the course was useful	100	83

5. Summing Up This is the first assessment of BIOL 112X as taught through CRCD at the Northwest Campus in Nome and it reveals to me that Dr. Ihl is doing many of the things expected for a Core Natural Science course. Recognizing the time difficulties, Dr. Ihl might reconsideration of how the writing exercises are incorporated into the course each time it is taught as opposed to being distinct assessment instruments that are only required every five years. It is an issue that suggests a need at the college level for reconsideration on how the assessments are done.

III. SUMMARY FOR REPORTS RECEIVED TO DATE - CONTINUED

PHYS 213X Introduction to Modern Physics, Fall 2011, Prof. John Olson

1. Introduction The syllabus presents course contents, a full schedule of lecture topics and lab activities for the semester, no course goals or specific learning outcomes, and none of the required Core Natural Science expectations. Student cumulative grades are based on several short quizzes (5 percent), 10 labs (20 percent), nine homework assignments (15 percent), a term paper (10 percent), two mid-term exams (15 percent each), and a final exam (20 percent). The lab grade is dominated by the 70-percent for the lab notebook. Each of the three exams is preceded by a recitation session in place of a lab, and there is one lab makeup session near the end of the semester. Separately, a student must pass the lab in order to pass the course. There is no statement in the syllabus on how numerical final scores translate into letter grades, where plus-minus grades are used.

2. Scientific Method The report lacks any evidence that the course satisfies the Core expectation. The report presents no evidence that the course even attempted to carry out the Core assessment requirement. This is the same outcome appearing in the fall 2006 report from Dr. Olson, so there has been no progress in meeting the required Core expectation or assessment requirement.

3. Science and Social Policy There is only limited evidence presented in the syllabus that this expectation is part of the established course outside of the assessment activity. Hence, bases on the general lack of specific evidence it is very unlikely that this course met this Core expectation. The report presents no evidence that the assigned term paper was intended to serve as a "Science and Society" assessment activity. Hence, it does not appear that this course met this assessment requirement. This is the same outcome appearing in the fall 2006 report from Dr. Olson, so there has been no progress in meeting the required Core expectation or assessment requirement.

4. Questionnaire (Survey) The student survey for the standard six outcomes questions was given to the students at the end of the course. Overall, the survey results show that the students' assessments equaled or greatly exceeded the averages for assessments gained from 22 core natural science courses. Based on many prior assessment reports, the lower value for Item 4, "understanding how science impacts policy", is consistent with the subject never having been discussed. Overall, the course met this Core assessment requirement.

Table 1. Summary of Student Survey.

	Question Asked	PHYS 213X, %	Average of 22 reports, %
1	Improved scientific knowledge	90	92
2	Improved knowledge of how scientists conduct investigations	100	73
3	Improved their ability to understand science in the media	90	78
4	Improved their understand how science impacts policy	60	66
5	Increased their desire to learn more science	100	70
6	Agreed that the course was useful	100	82

5. Summing Up In spite of being provided with detailed information on the Core Natural Science expectations and assessment requirements prior to the beginning of the semester, this course continues to fail in its obligation to the two principal expectations and assessment requirements. The Faculty Senate's Core Review Committee should pay increasing attention to these shortcomings. The "scientific method" expectation may have been lost within the labs during the extensive rewrite of the lab procedures. The department should review the existing Core Natural Science expectations.

IV. ASSESSMENT REPORTS NOT RECEIVED TO DATE

Fall 2010 Semester

GEOG 111X Earth and Environment: Elements of Physical Geography, Assist. Prof. Patricia Heiser

Spring 2011 Semester

ATM 101X Weather and Climate of Alaska, Prof. Richard Collins
THIS ASSESSMENT WAS DEFERRED ONE YEAR TO SPRING 2012 TO INCLUDE THE NEW DISTANCE DELIVERY FORMAT. NO REPORT HAS BEEN RECEIVED AS OF THIS UPDATE.

BIOL 112X Human Anatomy and Physiology II, Prof. Able Bult-Ito

The instructor for the Summer 2011, Jill Russell, never made contact and a report is not expected.