

UW Colleges Assessment Planning and Reporting Form  
2005-2006

Email your reports to [SAC@uwc.edu](mailto:SAC@uwc.edu)

Department	Biological Science
Assessment Coordinator(s)	Laura Lee

NOTE: Please attach relevant supporting information used to complete the Report Summary Sheet.

**PART 1: Assessment of General Education Outcomes**

**Section 1: Identify the Proficiencies and Performance Indicators Assessed**

- ❖ at the **Planning** stage, mark the performance indicators to be assessed in the left hand column below
- ❖ at the **Reporting** stage, report the numbers of students who did not meet, met, or exceeded expectations

Proficiency	Performance Indicators	Courses Fall Semester	Courses Spring Semester
<b>A. Analytical Skills</b> <b>X</b>	1. Interpret and synthesize information and ideas.	BIO 109 ZOO 101 BAC 101 BIO 103/107 PHS 202	BIO 109 ZOO 101 BAC 101 BIO 103/107 BOT 130 PHS 203 PHS 235 PHS 230 BIO 260

**Section 2: Explain how, in general, the institutional rubric was applied to assessment activities.** Please attach examples of assessment activities (i.e. modified rubric, assignment, questions) and measurements used to place individuals into the three categories (exceeds, meets, fails to meet) as an Appendix. **When completing this section, it may be best to explain the results by course (or course cluster if there were similar tools or results) rather than by instructor.**

In Fall 2005, instructors used an exam question, homework assignment or in-class activity to assess the proficiency (see Appendix A for examples). Although there was some attempt to use a common tool among instructors teaching certain courses (Anatomy & Physiology, for example), it was not required, and the tools were not applied in a similar manner. In addition, after grading each question or activity, each instructor applied each of the standards identified within each of the three categories (meets, exceeds, does not meet expectations) to the student's response for that question or activity. Most instructors submitted specific instructions as to how they applied the rubric (see Appendix A for examples). Most instructors constructed a single tool to evaluate both the Institutional and Departmental proficiencies.

At our spring department meeting, the department members agreed that we needed a common assessment tool and grading rubric for all instructors in all courses. A common assessment tool was developed (see Appendix B), and was used by the vast majority of the instructors during the last week of class (a few instructors had already completed assessment by the time of the spring meeting). We agreed that the tool could be presented as an in-class activity, would not be graded as required points in the class, but that students would receive extra credit points (amount to be determined by each instructor) for completing the assessment.

The assessment tool was designed so that we could use it to evaluate both Analytical Skill A1, and Biology Department Proficiency #1 (Interpret Graphical Information – see Part 2). The department then devised a mechanism for applying the Institutional Rubric to the student’s answers on the common assessment tool in order to assign each student to the “Fails”, “Meets” or “Exceeds” category (see Appendix B).

Our overall results were as follows (fall + spring = total)

Proficiency	Exceeds	Meets	Fails to meet
A1	185 + 255 = 440 (38.6%)	248 + 220 = 468 (41.1%)	164 + 67 = 231 (20.3%)

### Section 3: Use of Results

1. **Use by instructors** - Summarize the ways individual instructors plan to use assessment results to improve the instructional process.

Instructors will continue providing students with as many opportunities as possible to practice their interpretation and synthesizing skills in a variety of formats (small group activities, homework, lab activities, etc.).

2. **Use by department** - What changes will you and/or the department assessment committee recommend to your department. Include changes to:
  - a. assessment process
  - b. proficiencies selected
  - c. performance indicators used to measure proficiency
  - d. assessment activities
  - e. evaluative rubrics
  - f. student performance in a specific course (if there is something that stands out with department discussion).

Overall, the department was quite pleased with student performance on the A1 Analytical Skills proficiency: About 80% of students either met or exceeded expectations. Although the assessment tool tests the ability to interpret and synthesize

information in the context of extracting and interpreting information in graphical form, we feel that it accurately represents the students' abilities. Because this is a revised proficiency, we have nothing to compare the results to. However, the percentage of students meeting and exceeding expectations increased from 2003-2004, when we assessed the "old A1" proficiency (75% of students met or exceeded expectations). In addition, we noticed that the spring results (88% of students met or exceeded expectations) were better than the fall results (72.5% of students met or exceeded expectations). Whether this was due to the common assessment tool or because the spring emphasis was on upper-level courses (with a larger percentage of sophomores) is not clear.

a) The department assessment committee was very pleased with the improvements that the department has made to the assessment process this year. As discussed in d), a common assessment tool was developed for all instructors to use in all courses. This tool evaluates both the institutional and departmental proficiencies. We have also put into place a standard procedure for administering the tool (when, how, etc.); we piloted the procedure in Spring 2006, and encourage all department members to follow this procedure in 2006-2007. At the fall meeting, we discussed the improved assessment process, and noted any problems or vague areas. It was decided not to change anything on the tool, in order to have valid comparisons when we repeat the assessment in 2007-2008. The committee will meet later in the fall to evaluate and address these concerns. Additionally, at the fall meeting, the department made some changes to the assessment process. We agreed to distribute the assessment during the final 3 weeks of the semester. We will not make it part of an exam, but rather an in-class activity. Instead of extra credit, actual course points will be given to students for doing the assessment activity – the allotment of points will be left to the discretion of the instructor.

b) and c): There was no question within our department that we would choose the analytical skills proficiency over the aesthetic skills proficiency – it makes sense for a science department. In addition, the department chose to assess the new A1 performance indicator, because we had assessed the old A1 last time, and we wanted to continue assessing within the same general area of interest.

d): The department assessment committee was very pleased with the improvements that the department has made to the assessment activities this year; we have addressed several of last year's concerns, yet some remain to be worked on. Many of the following concerns relate to the lack of time that has been available for the department as a whole to spend on assessment activities. By utilizing the assessment budget funds and working closely with the department chair, this problem was rectified this year. Spending a half-day discussing and working on assessment tools/rubrics was very helpful this year. We recommend that the department continue to allot large chunks of time to assessment activities at all department meetings.

One of our concerns from last year was the lack of a common tool; one of our suggested changes was a move toward a common tool. We have accomplished that this year. We will encourage all instructors to continue using the common tool, and report any problems to us. Anecdotally, several members of the department

assessment committee noticed that most students were doing very well on the assessment tool, even those that did poorly in the class. We will discuss this with the department members at the fall meeting, to determine if the assessment tool is too “easy”, and whether it accurately measures student skill. The consensus was that while the tool may be too “easy”, it would not be changed, in order to maintain consistency of results between 2005-2006 and 2006-2007.

Another concern from last year was that there seemed to be little enthusiasm for assessment in our department, and that instructors don't seem to understand that the assessment process can be useful to us. This led to some problems with participation, especially in IAS that don't attend department meetings. The construction of a common tool and rubric has improved departmental enthusiasm for assessment, but we still have a way to go. Therefore, the committee recommends that the department assessment coordinator work with the department chair to find a way to reach all IAS, encouraging them to participate in assessment, and contacting faculty who do not participate in assessment. We also encourage the department to wisely spend its assessment time at meetings by having meaningful discussions on how we can continue to make assessment meaningful to us.

There was also concern from last year about “closing the loop”. Since this is our first year assessing the “new” A1, we recommend that the department discusses ways to “close the loop” in the coming year, even though we will not be assessing this proficiency again until 2007-2008. The development of a common assessment tool will make the process easier and more meaningful for both the committee and the department as a whole.

e) The department assessment committee is very pleased that the department constructed a “revised” rubric to correspond to the assessment tool. One of our concerns from last year was that each instructor had his/her own “rules” about how to apply the rubric and assign each student to a “meets”, “exceeds” or “fails to meet” category. By having a standard rubric to go with the standard assessment tool, our results will be much more rigorous and meaningful. We encourage all department members to utilize the rubric, and report any problems to the department assessment coordinator. As noted in d), the assessment committee noticed that most students were doing very well on the assessment tool, even those that did poorly in the class. The assessment coordinator noticed that it was often easier to get an E on the department rubric (4 bullets) than on the institutional rubric (2 bullets). In addition to examining the rigor of the assessment tool, we also recommend examining the rigor of the grading rubric, especially the end key that determines the students' overall “score”.

f) As in previous years, students in BIO 109 (Introductory Biology) scored lower on the assessment than students in other courses. This has been discussed at previous department meetings, and will be discussed in the fall. The prevailing view is that BIO 109 contains many freshmen, mostly non-majors, and that many of these students have little vested interest in doing well in the course. The assessment results seem to correspond well with grading trends in the class. Therefore, the department feels that this is not an anomaly.

3. **Course of action** - After discussion of the results by the department, what course of action will **the department** take to improve student performance with respect to the assessed proficiency?

The department made some changes to the assessment process. We agreed to distribute the assessment during the final 3 weeks of the semester. We will not make it part of an exam, but rather an in-class activity. Instead of extra credit, actual course points will be given to students for doing the assessment activity – the allotment of points will be left to the discretion of the instructor.

Because the department is pleased with student performance on this proficiency (see 3.2), the department will do nothing further except to continue encouraging individual instructors to give students plenty of opportunities to improve their analytical skills.

## PART 2: Assessment of Department-Specific Outcomes

❖ at the **Planning** stage, complete section 1

### Section 1: Identify department-specific learning objectives.

	Outcomes/Performance Indicators	Courses Fall Semester	Courses Spring Semester
	1. <i>After completing ANY biology course at the University of Wisconsin Colleges, students should be able to demonstrate an ability to interpret the graphical presentation of data.</i>	BIO 109 ZOO 101 BAC 101 BIO 103/107 PHS 202	BIO 109 ZOO 101 BAC 101 BIO 103/107 BOT 130 PHS 203 PHS 235 PHS 230 BIO 260

**Section 2: Insert the rubrics used here and explain how the rubric or standards were used to assess each outcome or performance indicator.** Please attach examples of assessment activities (i.e. modified rubric, assignment, questions) and measurements used to place individuals into the three categories (exceeds, meets, fails to meet). **When completing this section, it may be best to explain the results by course (or course clusters if there were similar tools or results) rather than by instructor.**

In Fall 2005, instructors used an exam question, homework assignment or in-class activity to assess the proficiency (see Appendix A for examples). Although there was some attempt to use a common tool among instructors teaching certain courses (Anatomy & Physiology, for example), it was not required, and the tools were not applied in a similar manner. In addition, after grading each question or activity, each instructor applied each of the standards identified within each of the three categories (meets, exceeds, does not meet expectations) to the student's response for that question or activity. Most instructors submitted specific instructions as to how they applied the rubric (see Appendix A for examples). Most instructors constructed a single tool to evaluate both the Institutional and Departmental proficiencies.

At our spring department meeting, the department members agreed that we needed a common assessment tool and grading rubric for all instructors in all courses. The following assessment tool was developed (see Appendix B), and used by the vast majority of the instructors during the last week of class (a few instructors had already completed assessment by the time of the spring meeting). We agreed that the tool could be presented as an in-class activity, or as an add-on to an exam, would not be graded as required points in the class, but that students would receive extra credit points (amount to be determined by each instructor) for completing the assessment.

The assessment tool was designed so that we could use it to evaluate both Biology Department Proficiency #1 and Analytical Skill A1, (Interpret and Synthesize Information & Ideas – see Part 1). The department then devised a mechanism for applying the Institutional Rubric to the student’s answers on the common assessment tool in order to assign each student to the “Fails”, “Meets” or “Exceeds” category (see Appendix B).

Our overall results were as follows (fall + spring = total)

Departmental Outcome/Performance Indicator	# Exceed	# Meet	# Do Not Meet
1. ability to interpret the graphical presentation of data	176 + 353 = 529 (44%)	262 + 206 = 468 (39%)	146 + 60 = 206 (17.1%)

### Section 3: Use of results.

1. **Use by instructors** - Summarize the ways individual instructors plan to use assessment results to improve the instructional process.

Many instructors noted that they have been successful in implementing further exercises and activities to increase students’ skill in this area. However, there is always room for improvement. The most common way that instructors will try to improve the instructional process is by providing more graphing opportunities for students (as class activities, examples in lecture, lab reports, on exams, etc.). Instructors plan to have students construct graphs from raw data, as well as practice explaining the meaning and significance of findings from a graph. Students’ biggest problem was losing the “big picture” by not realizing that two different trends could be shown in a graph at the same time – instructors need to remind them of this, and provide practice opportunities. Instructors also mentioned “nuts and bolts” issues: giving complete instructions, reminding students to give complete answers, etc. On the other hand, some instructors voiced concerns that their students could adequately describe the “big picture” on a graph, but had trouble with details such as labeling axes, etc. These instructors feel that having students practice making more graphs will increase their skills in terms of graphing “details”.

2. **Use by department** - What changes will you and/or the department assessment committee recommend to your department. Include changes to:
- assessment process
  - proficiencies selected
  - performance indicators used to measure proficiency
  - assessment activities
  - evaluative rubrics
  - student performance in a specific course (if there is something that stands out with department discussion).

Overall, the department is very satisfied with the results from the assessment of the departmental proficiency "Interpretation of Graphs". This year, 83% of students either met or exceeded expectations. This percentage has increased from 81.5% in 2003-2004, and 82.4% in 2004-2005. In addition, we noticed that the spring results (90.3% of students met or exceeded expectations) were much better than the fall results (75% of students met or exceeded expectations). Whether this was due to the common assessment tool or because the spring emphasis was on upper-level courses (with a larger percentage of sophomores) is not clear.

a) The department assessment committee was very pleased with the improvements that the department has made to the assessment process this year. As discussed in d), a common assessment tool was developed for all instructors to use in all courses. This tool evaluates both the departmental and institutional proficiencies. We have also put into place a standard procedure for administering the tool (when, how, etc.); we piloted the procedure in Spring 2006, and encourage all department members to follow this procedure in 2006-2007. At the fall meeting, we discussed the improved assessment process, and noted any problems or vague areas. It was decided not to change anything on the tool, in order to have valid comparisons when we repeat the assessment in 2007-2008. The committee will meet later in the fall to evaluate and address these concerns. Additionally, at the fall meeting, the department made some changes to the assessment process. We agreed to distribute the assessment during the final 3 weeks of the semester. We will not make it part of an exam, but rather an in-class activity. Instead of extra credit, actual course points will be given to students for doing the assessment activity – the allotment of points will be left to the discretion of the instructor.

b) and c): At this time, the biology department has only one departmental objective, so it is the one that we have been assessing for the past 2.5 years. It contains 4 performance indicators, all of which are being assessed. We will continue with this objective for one more year, in order to more fully evaluate the new assessment tool and rubric. The assessment committee has encouraged department members to think of ideas for further departmental objectives – this is difficult because the courses taught in our department are extremely variable and wide-ranging. The goal of the assessment committee is to work with department members to complete two more objectives with rubric during 2006-2007.

d): The department assessment committee was very pleased with the improvements that the department has made to the assessment activities this year; we have addressed several of last year's concerns, yet some remain to be worked on. Many of the following concerns relate to the lack of time that has been available for the department as a whole to spend on assessment activities. By utilizing the assessment budget funds and working closely with the department chair, this problem was rectified this year. Spending a half-day discussing and working on assessment tools/rubrics was very helpful this year. We recommend that the department continue to allot large chunks of time to assessment activities at all department meetings.

One of our concerns from last year was the lack of a common tool; one of our suggested changes was a move toward a common tool. We have accomplished that this year. We will encourage all instructors to continue using the common tool, and report any problems to us. Anecdotally, several members of the department assessment committee noticed that most students were doing very well on the assessment tool, even those that did poorly in the class. We will discuss this with the department members at the fall meeting, to determine if the assessment tool is too "easy", and whether it accurately measures student skill.

Another concern from last year was that there seemed to be little enthusiasm for assessment in our department, and that instructors don't seem to understand that the assessment process can be useful to us. This led to some problems with participation, especially in IAS that don't attend department meetings. The construction of a common tool and rubric has improved departmental enthusiasm for assessment, but we still have a way to go. Therefore, the committee recommends that the department assessment coordinator work with the department chair to find a way to reach all IAS, encouraging them to participate in assessment, and contacting faculty who do not participate in assessment. We also encourage the department to wisely spend its assessment time at meetings by having meaningful discussions on how we can continue to make assessment meaningful to us.

There was also concern from last year about "closing the loop". Over the time period that we have been assessing this proficiency, levels of student performance have remained fairly constant, at a high level (at least 80% meet or exceeds). Although many individual instructors have employed a variety of mechanisms to increase student practice and performance, success rates have remained the same. It may be that the remaining students are putting in little effort, have poor attendance, or do not turn in assignments. We will further discuss this at the fall meeting. It will be interesting to see how the new assessment tool and rubric affect student performance.

e) The department assessment committee is very pleased that the department constructed a "revised" rubric to correspond to the assessment tool. One of our concerns from last year was that each instructor had his/her own "rules" about how to apply the rubric and assign each student to a "meets", "exceeds" or "fails to meet" category. By having a standard rubric to go with the standard assessment tool, our results will be much more rigorous and meaningful. We encourage all department members to utilize the rubric, and report any problems to the department assessment coordinator. As noted in d), the assessment committee noticed that most students were

doing very well on the assessment tool, even those that did poorly in the class. The assessment coordinator noticed that it was often easier to get an E on the department rubric (4 bullets) than on the institutional rubric (2 bullets). In addition to examining the rigor of the assessment tool, we also recommend examining the rigor of the grading rubric, especially the end key that determines the students' overall "score".

f) As in previous years, students in BIO 109 (Introductory Biology) scored lower on the assessment than students in other courses. This has been discussed at previous department meetings, and will be discussed in the fall. The prevailing view is that BIO 109 contains many freshmen, mostly non-majors, and that many of these students have little vested interest in doing well in the course. The assessment results seem to correspond well with grading trends in the class. Therefore, the department feels that this is not an anomaly.

3. **Course of action** - After discussion of the results by the department, what course of action will the department take to improve student performance with respect to the assessed proficiency?

The department made some changes to the assessment process. We agreed to distribute the assessment during the final 3 weeks of the semester. We will not make it part of an exam, but rather an in-class activity. Instead of extra credit, actual course points will be given to students for doing the assessment activity – the allotment of points will be left to the discretion of the instructor.

In 2004-2005, the department assessment committee recommended that the department create an animation or Power Point presentation about graphing that could be made available to students. This did not happen during 2005-2006. The department realized that there were already many websites that have interactive graphing activities and tutorials. In addition, many instructors provide their own graphing handouts to their students. Therefore, the department decided to create a "master handout" that would contain key issues for both creating and interpreting graphs, as well as a list of online references for graphing. Material from department members is being gathered during the first few weeks of fall 2006 semester, and the master will be distributed to all department members by the mid-point of fall 2006 semester.

### **PART 3: Additional Assessment and Contributions**

**Section 1: Please discuss activities that were supported by the assessment budget for the department assessment committee.** In particular outline the department assessment committee activities for the academic year.

The department assessment committee conversed by email for most of the academic year. We met in April at UW-Fox Valley for a very productive meeting. We reviewed the Fall 2005 data, discussed department attitudes and behaviors in regards to assessment, and devised a plan of action to increase department participation and to move the department toward developing and using a common assessment tool for each course assessed. Assessment budget money was used primarily for transportation and food expenses.

**Section 2: Please discuss activities that were supported by the assessment budget for overall department assessment activities.** In particular outline the department assessment activities for the academic year.

Using the department assessment budget money allowed us to turn a one-day spring department meeting into an overnight meeting focusing primarily on assessment. Instructors were asked to bring assessment tools and rubrics to the meeting with them, as well as any results from Fall 2005 that had not yet been turned in. We spent the entire morning on Saturday doing assessment activities. We reviewed and discussed the results from the Fall 2005 assessment. We discussed the aspects of assessment that department members found difficult or confusing, and brainstormed ways to improve the process. The majority of the discussion centered on instructor's difficulty in and frustration with trying to devise assessment tools for their classes, and applying the rubric to these tools. The department agreed that a common tool for assessment was needed that could be used by every instructor, no matter what course he/she is assessing. The rest of the morning was spent devising a tool for all instructors to use. The tool is able to be used for both Analytical Skills 1 and Department Proficiency 1 (graph interpretation). We also devised a schema for applying the rubrics to this assessment tool. Almost all instructors used the tool and rubric for their spring assessment. In order to further standardize our results, we even agreed upon a set time range and procedure for administering the tool. It was a very productive meeting, and would not have been possible without the overnight meeting.

**Section 3: Please ask for and include in the report information from department members about any other assessment activities they have conducted, particularly in conjunction with grant-funded innovations.** Also ask for and describe briefly any additional contributions to assessment such as publications, presentations, qualitative classroom innovations (**such as** Scholarship of Teaching and Learning activities), and other items relating to assessment that the department wishes to note.

**SoTL:** In 2004-2005, a member of the biology department received a SoTL grant funded by the University of Wisconsin's Office of Professional and Instructional Development. This project was focused on assessing student understanding of the ways in which ideas are developed in the sciences, and the development of teaching tools and strategies to improve that understanding. During the 2005-2006 academic year, this project was implemented. The group has developed both assessment techniques and preliminary teaching approaches that address these subjects. The principal investigator reports that:

"The first part of our work centered on defining the problem from an instructional standpoint, which allowed us to generate a list of essential overarching concepts we feel are central to student understanding regarding the way ideas are developed in the sciences. We selected the most basic of these to address in the first year, and subsequently settled on a case-study approach to both reveal and address student misconceptions regarding the relationships among hypotheses, predictions, and data. We subsequently developed two cases used for assessment, and four individual cases were developed as teaching tools. The work was highly fruitful, and was extremely well-received at various conferences where it was presented, including the 2<sup>nd</sup> Annual Conference of the International Society for the Scholarship of Teaching and Learning in Vancouver, B.C. in October of 2005, and the April 2006 OPID sponsored Carnegie Colloquium in Madison. We are currently analyzing case study responses from students across the campuses to help us further determine both common misconceptions and whether or not 'practice' cases with class discussion improved student understanding of these relationships. We anticipate that this work will be ready for dissemination by the end of fall semester."

**Other:** The assessment coordinator participated in an assessment project of the ESFY First-Year Seminar on the UW-Marshfield/Wood County campus. As part of a staff member's Master's degree thesis project, all First-Year Seminar instructors distributed an end-of-semester survey to students, evaluating student perceptions of the course and their first semester on campus. The evaluation was designed to examine the effectiveness of the First-Year Seminar, and to compare between two formats: stand-alone sections, and sections that were part of a learning cluster. Other, individual comments on assessment contributions are as follows:

Currently assessing student understanding of the relationships among hypothesis, prediction and data as part of the SoTL project directed at improving student understanding of the process of scientific inquiry. I presented this work at the 2<sup>nd</sup> annual conference of ISSOTL in Vancouver in October of 2005 and at the Carnegie Colloquium in Madison in April of 2006.

Am working as a Wisconsin Teaching Fellow to implement a study characterizing roadblocks to student's ability to synthesize information as it is traditionally presented in the sciences.

*I routinely ask students to tell me (through short essays) the state of their knowledge on a given topic before I begin lecturing on it. For example, I might ask them to list the name of every muscle they know. This sort of information allows me to gauge what my students know and address deficiencies accordingly.*

Every activity I have students complete during the semester that I evaluate is meant to assess their learning and provide feedback to help them improve their learning. Assessment methods used include: daily reading quizzes, online chapter quizzes, exams, laboratory reports, laboratory exams, independent laboratory research projects, and metacognitive essays.

I am participating in all assessment activities on our campus including the teaching circle and assessment of our strategic plan.

#### PART 4: Historical Trends

**Section 1: History of General Education activities.** Please add more rows as necessary. This should be an on-going list copied from each previous report.

Proficiency	Year Assessed	Results	Year Assessed	Results	Year Assessed	Results
A1	2003 - 04	E = 30.7% M = 44.8% F = 24.5%	Closed (PI changed)	E = M = F =		E = M = F =
B2	2004-05	E = 35.0% M = 53.2% F = 11.8%	2006-2007	E = M = F =		E = M = F =
A1 (new)	2005-06	E = 38.6% M = 41.1% F = 20.3%		E = M = F =		E = M = F =

**Section 2: History of department learning objective activities.** Please add more rows as necessary. This should be an on-going list copied from each previous report.

<b>Objective</b>	<b>Year Assessed</b>	<b>Results</b>	<b>Year Assessed</b>	<b>Results</b>	<b>Year Assessed</b>	<b>Results</b>
<b>1. (Interp. Graphs)</b>	<b>2003 – 04 (spring only)</b>	<b>E = 37.3% M = 44.3% F = 18.4%</b>	<b>2004-2005</b>	<b>E = 39.8% M = 42.6% F = 17.6%</b>	<b>2005-2006</b>	<b>E = 44.0% M = 39.0% F = 17.0%</b>