



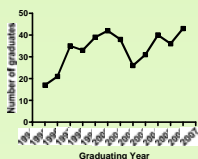
# Biology Department



## Who we are:

The Biology major at Westmont equips students for professions related to laboratory, environmental, and medical studies. It also cultivates the knowledgeable care and appreciation of the living world as a means of developing a fuller appreciation of God. Components of the Biology program include: a schedule of required and elective coursework emphasizing biological concepts at the molecular, cellular, organism, and ecosystem levels; a laboratory program involving student investigations with opportunities for individual laboratory or field research; and a senior seminar series in which each student develops work on a topic in the biological literature and on an issue of bioethics.

- **Faculty:** 5 full-time professors including 4 tenure-track and 1 multi-year contract faculty.
- **Staff :** 1 full-time laboratory coordinator and 1 part-time administrative assistant.
- **Students:** On average, 36 graduating seniors per year



Number of graduates by degree and track

	B.A.	B.S. - General	B.S. - Cell/Mol	B.S. - Nat/Env/Environmental
1999-2000	12	17	4	9
2000-2001	14	20	1	3
2001-2002	5	17	0	2
2002-2003	8	20	1	2
2003-2004	10	16	7	7
2004-2005	11	16	2	7
2005-2006	14	22	2	5

## Summary of results:

- Assessment of Introductory, Bio-005 Posters

### Outcomes consistently demonstrated:

- ✓ Use of IMRAD format
- ✓ Accurate reporting of results in Abstract
- ✓ Clear statement of experimental question in Introduction
- ✓ Appropriate graphical representation of data
- ✓ Inclusion of Citations

### Outcomes consistently deficient:

- ✓ Very general background in Introduction with no direct connection to specific question
- ✓ Lack of in-text citations
- ✓ Insufficient detail in Materials and Methods section and written in present tense
- ✓ No text for Results section and presentation of raw rather than calculated data (i.e. averages and means)
- ✓ Inclusion of results in Discussion section
- ✓ No consistent bibliographic format and inappropriate, non-scholarly references.
- ✓ Informal, non-scientific tone and lack of a consistent passive voice

- Comparison with upper-division, summer research student posters

- ✓ Demonstrated an appropriate scientific and formal tone
- ✓ Figures were more sophisticated with descriptive legends
- ✓ Still lacked in-text citations in Introduction and discussion

## Future Assessment

Our review of student poster presentations this year gave us a fairly good sense of what the students are doing well and the areas in which they need to improve. When we were done, however, we realized that the task of evaluating the posters would have been simplified if we had developed a form for tallying the strong and weak points of each poster. Since this would put the evaluation on a more quantitative basis, it should also facilitate the process of comparing student work from year to year and in relation to instructional changes such as those described in the previous section. We will be expanding our assessment activities to include oral presentations and written research reports in the next years.

## Learning Outcome: goal #3

**Biology students will be able to present the findings and implications of scientific research through written reports, oral presentations, and posters.**

## Assessment strategy:

As a whole department, we dedicated 2-4 hours a day for one week in May, 2006 to group reflection of 1st-year student posters from our introductory General Biology I course. We accomplished the following:

- ✓ Refined expectations regarding Goal #3 and developed specific criteria to assess each (See table on right)
- ✓ Collectively reviewed a stratified sample of student posters (6/32 or 19%), and 2 posters from upper-division summer research students
- ✓ Collectively discussed findings and developed strategies to address student weaknesses

### Revised Objectives and Sample Criteria

Students use the IMRAD (introduction, methods, results, abstract, discussion) format for scientific literature correctly in their presentations and papers.

- The Abstract is an effective summary (i.e., it describes purpose, methods and results). It does not read like an introduction.
- The Methods section reports what was actually done. It should be thorough enough to allow someone to repeat the experiment. It should be written in past tense, a description of what was done rather than a series of instructions.
- The Discussion draws conclusions, addresses unanswered questions, and compares the results to other published work.

Students develop the question posed in their presentation through a survey of the relevant background literature

- Students use different types of literature in their presentations in ways that indicate their understanding of the differences between popular and scholarly literature and between primary and secondary sources.

Students present experimental results effectively in figures, graphs or tables.

- Figures are computer-generated rather than hand-drawn.
- Graphs are drawn according to scientific standards with appropriate axis labels, and they are accompanied by a descriptive caption.

Students write or speak in ways that are stylistically appropriate for scientific communication

- Students have good English usage.
- Students write with correct scientific tone, using passive voice.

Students are able to appropriately cite sources and provide complete bibliographic information.

- Students cite sources in their work in a way that honors academic integrity and which effectively directs their audience to the supporting literature.
- Students properly cite the sources for ideas, data and quotations in the body of their work.

Students are able to use technology effectively in oral and poster presentations.

- Students produce poster presentations using PowerPoint or a similar program, formatting them as described in the departmental style manual.

## Interpreting the Results:

Students in the General Biology I (BIO-005) course receive instruction on the nature of scientific literature and on how to prepare a scientific poster, and their work showed that they had learned the basic structure for scientific literature. However, it was clear from examining examples of their work that additional guidance and feedback would facilitate their learning to express themselves much more effectively in this medium. They need to have a greater understanding of the basic format of scientific literature – what one is trying to accomplish with each of the sections of a scientific presentation – and they need to develop a better ear for the tone of scientific writing. In these two respects the posters by upper division students were written at a higher level of sophistication, reflecting the students' growth in the discipline. However, for both groups of students, the use and citation of published studies was an area that needed considerable improvement.

## How our program was modified:

We have identified 3 ways to change our curriculum to improve instruction and address the concerns identified this year in our assessment process.

### 1. Development of a Departmental Style Guide

We want to provide our students with a more detailed introduction to scientific writing and presentations, and we want to have some consistency across the major regarding the standards for excellence in this area. Although we anticipate revising the manual as we continue our assessment, at present, our plan is to include sections in the manual covering the following topics: Writing a Research Report, Preparing a Scientific Poster, Producing a PowerPoint Presentation, General Tips for Effective Writing, When and How to Cite References in Scientific Writing.

### 2. Modifying the General Biology I Laboratory Sequence

We will change the sequence of labs in the course so that the introduction to scientific literature occurs as a part of the work on their project. Second, we will have the students submit a list of references that they plan to use in their posters along with a statement about how the sources will contribute their work.