Introduction

Each discipline within the liberal arts has its own knowledge, required skills, and ways of thinking and learning. There is some overlap in these between disciplines and also some uniqueness. Historically the differences between the sciences and other disciplines within the college have been called to attention, argued about, cherished, and cursed. At times the sciences have felt left out of broader discussions and at times we have felt ourselves out as well. We have all learned the norms of our particular disciplines and must function within those norms to survive, and yet we are part of a broader community where more universal norms exist and we must also function within those norms. We write this because, as we discussed the standards, we could not help but feel that some standards needed by our students to excel as chemists are not included, and some things that are included are not within the usual repertoire of a chemist. Yet we realize that we are an unusual college—we want to produce chemists who are not only technically competent, but chemists who can think broadly and appreciate things like ethical subtlety, literature, good argument, and historical underpinnings. We want to produce chemists who are educated, not just for doing chemistry, but for doing life, and for doing it well. In that, we are in complete agreement. However, we can’t help but struggle with the idea that, as scientists, we are constantly asked to be broader, to integrate, and to be interdisciplinary, and yet we feel very little interest or desire from the other disciplines to do the same when it comes to science.

Nonetheless it is in the spirit of the community that we look at these standards and evaluate ourselves with respect to them. We can’t help but feel some reservation as these standards leave out some of the things that are important in being a chemist, something that may not be true for those in other departments. Yet we know that these standards paint a picture of our best hopes for our graduates—a picture that we, along with the rest of the community, aspire to and celebrate.

[Please refer to the Addendum for additional comments on the evaluation process in general.]

Standard 1: Christian Orientation

A. Current Strategies, Assessment, and Evidence

There are currently a number of ways in which we create opportunities for our students to participate in the historical dialogue between science and faith. We are interested here both in knowledge and in perspective. We want our students to integrate their scientific and theological beliefs to create a seamless whole. Too often Christians
bifurcate their thinking in these areas—thinking as a scientist six days a week and as a church person the seventh. In our view, this bifurcation is antithetical to what we do as a Christian college, and one of our first goals is to undo this bifurcation. We do this in our introductory and service courses and to some extent in our upper division courses. In a section within these courses, we examine different models by which to understand and process our scientific and theological knowledge. What kinds of knowledge do we obtain from science and what kinds of knowledge do we obtain from faith? How do they overlap? How do they inform each other? What makes a Christian scientist different from a secular scientist? How is our worldview influenced by our faith and by our science? What has been written about these issues in the past and where can that be found? This is a formal part of our course work and is easy to point to and assess. We present these ideas and questions in lectures, discuss them, and assess understanding of them in exams and papers. We also include speakers on science/faith issues in our natural science seminar series and require our students taking seminar to attend those. For the most part, we believe our students get the knowledge part of Christian orientation and leave Westmont with their initial bifurcation at least partially mended.

Our chemistry department has fostered the development of certain aspects of Practice, Affections and Virtues. First, we attempt to model these attributes in how we approach our discipline, our colleagues, our students; along with our church and community involvement. In addition to the modeling, we promote an environment in our classes and labs that is conducive to the development of Virtue. Many of our students are seeking to go to medical or dental school or to graduate school in chemistry. The pressures on them are great to get good grades in all their classes, and especially the sciences. This could result in a very competitive, unfriendly environment (and often does at many schools, including Christian Colleges). Our students are encouraged to work in groups when doing homework and to help each other when doing assignments and in labs. An atmosphere of openness and acceptance is practiced by the instructors and copied by the students. We emphasize the building of a caring community where we are here to help each other grow in the knowledge of Christ and God's creation. Although it is difficult to assess how we are doing in this area, others in the College have commented on how envious they are of the spirit of community the students develop in the sciences. It is clear to us that the subject matter and our approach to it "increases their sensitivity to and enriches their enjoyment of God and other people."

Although we are open and caring about and to our students, we also emphasize the academic rigor that comes from the study of a physical science. Through classroom study and laboratory experiences, we give the students the tools to recognize what is "excellent or praiseworthy," so that they can "think about what is true, pure, lovely and admirable." They learn for themselves how to differentiate between good science and bad science, and to fully appreciate the rewards that come from doing good science. The scientific method for the discovery of truth still works and will continue to work for them.

The best evidence we can think of to assess this standard is simply to look at the lives of our graduates. What are they doing with those lives? What kinds of activities are they involved in? How are they different from graduates at UCSB? Our anecdotal evidence here is patchy at best; we only have some stories and then only those stories which we happen to hear about. We could point to Andrea Lee, for example, one of our
graduates that recently completed her residency in a Michigan hospital. In addition to her technical competency, Andrea was on the hospital ethics board and volunteered one afternoon a week in a woman’s public health clinic. We could also point to Tony and Staci Wiemelt, two chemistry majors who live in the inner city by choice as they complete advanced degrees in neuroscience and veterinary medicine. These graduates have the practices, affections and virtues that we hope all of our graduates would have.

B. Satisfaction

We feel that we are doing as well with Christian orientation as any other chemistry department in a Christian college, but that may not be saying much. There is something about the nature of the discipline that sometimes makes the explicit integration of Christian issues seem strained. In a sense all of chemistry is Christian and in another sense, none of it is. Part of chemistry is simply the learning of certain skills, and the most we can do for that part is what Arthur Holmes calls the “attitudinal” component of faith and learning; that is, the attitude that in what we do, we love and glorify the creator of this universe we have grown so fond of exploring. Indeed, the study of the physical world is a form of worship of The Creator who made it. From that perspective we are satisfied in our efforts. However, we feel that there still remains much ground to cover and new ways to be more explicit about incorporating and assessing Christian orientation into our program.

C. Future outcomes and assessment.

We feel that we can improve our implementation and assessment of Christian orientation in our program. With respect to knowledge, we need more exposure ourselves to what is being written and discussed in the science/faith area. We propose the development of a departmental library with recent books and journals (e.g. The Journal of the American Scientific Affiliation) on science/faith topics, both for faculty and for students. We propose that the library be housed in a lounge area within our department where students and faculty can gather informally to drink coffee, work on computers, read, and talk. Also, we propose that we incorporate science/faith issues into our current seminar course. There is currently a two unit requirement. We propose that one unit be used as it has been for students to present a research paper on a topic of chemical research and that the other unit be used for students to research and present a paper on a science/faith topic.

With respect to practices, affections and virtues, one way to improve these outcomes is to increase informal student/professor contact. In a world where time is scarce, however, that is not an easy task. One idea is to have small “convocation” groups, a group of four to five seniors who would receive a certain amount of chapel credit for meeting with a professor throughout their last semester. We could deliberately design 4 or 5 topics related to history and philosophy of science and key issues in faith/science integration. Or perhaps faculty can receive release time or a stipend for leading a group like this in their homes in the evenings. Also, the provost office may want to sponsor departmental picnics or barbecues or dessert nights or any gatherings that might help bring faculty and students together outside of the classroom. More formal
ways to assess the success in these areas is to more carefully track our graduates and what they are doing with their lives. Perhaps questionnaires can be sent to determine what they are doing and what kinds of activities they are involved in.

Standard 2: Critical-Interdisciplinary Thinking

A. Current Strategies, Assessment, and Evidence

In our discussion of critical interdisciplinary thinking, we realized that interdisciplinary thinking must go hand in hand with disciplinary thinking; you can not have one without the other. The critical thinking skills and problem-solving skills that are learned in chemistry are useful and can be applied to other disciplines. Perhaps the best evidence of this is the performance of chemistry majors in other courses; they tend to do well in those courses as they apply what they have learned in an interdisciplinary way. From their first experience in the general chemistry course, our students are taught how to analyze a problem, develop a solution, and carry out that solution. Our general education courses, such as CHM 04, CHM 05, and NSC 114 all teach students these skills. In turn, we rely on other departments to teach students how to write clearly, communicate well, and think logically so that they can succeed in chemistry.

We teach critical and analytical thinking by assigning weekly problem sets and weekly laboratory assignments. Our upper division students have the opportunity to further expand their skills by participating in chemical research with a faculty member. The most concrete assessment tools come from three sources:

1) The Committee on Professional Training of the American Chemical Society sets forth a curriculum that meets the requirements of graduate schools and industry. All reputable chemistry departments across the country abide by the curriculum standards as do we.

2) The American Chemical Society distributes standardized final exams that we employ in most of our courses. These exams are periodically revised and national norms are available so that we can compare our students to those in colleges and universities across the country.

3) The Educational Testing Service administers the Graduate Record Exams (GRE), and students within the professional track of our major are required to take both the subject and general GRE. We have established a data base of our graduates and their performance on the GRE.

In addition, we look at the success of our students in research and at research conferences as a measure of their ability to analyze a problem, solve it, and communicate what they have done to others.

With regard to the limits of critical thinking and with developing the appropriate attitudes of humility and charity, these are more difficult to attain and even more difficult to assess. There is a part of science that naturally encourages a sort of quiet humility before the creation. That part is not always emphasized in universities, but we try to emphasize it in our courses. While it sometimes seems we can do a lot as scientists, we realize that we barely scratch the surface of the incredible complexity of the natural world. In quantum mechanics, for example, we run straight into a paradox that raises questions about what we can know and the limits of our knowledge. If we can’t answer
simple questions about things as basic as electrons, we should remain humble about all of knowledge. In the research laboratory, we learn the same lessons. In spite of our best efforts to control every possible factor, we come up short of doing that, and there is always an intangible something that makes a project work or not work. Nevertheless we learn what we can make models to try to explain it. In organic chemistry, the students are taught that these models can never be proven, but that good science can only disprove some of them. We know that even our best models are human constructs, and we hold these, as we do all truth, with a soft grip. We try to get this message across to our students in our courses, in our labs, and in our one-on-one research efforts with students.

We assess this part of our program with the very same humility that we bring to the scientific enterprise. We know very little about how to determine if our students ever get it. We hope they do. We look for it in our conversations with our seniors and our graduates; we look for it in the kinds of live that they lead. But in the end, it is a slippery and subjective measure at best.

B. Satisfaction

We are fairly satisfied with the way we teach critical and analytical thinking in the classroom, in the laboratory, and in the research lab. We feel students get the critical and problem-solving skills they need and point to the success of our graduates in graduate programs at the very best chemistry programs in the country as evidence of those skills. With regard to the limits of critical thinking and to appropriate attitudes, we don’t really know how to feel. We have only anecdotal and sketchy evidence in these areas. Although we are not entirely unsatisfied, we do feel we could do more and better assess what we do.

What about how we do for the rest of the students in the College? (See addendum) The previous paragraph addressed how we are doing for our own students in the area of discipline specific critical thinking. But we are also servicing over 100 students per year in our general education classes that do not major in science. Are we doing what we should be to help them develop into critical-interdisciplinary thinkers? In some regards yes, we are doing a good job, and probably as good as most other Christian Colleges. But we cannot help but question whether we should be doing more. Many of the better schools have specific mathematics requirements and a requirement to take at least one science course that has a laboratory. The best way to teach students about the strengths and limitations of science is to have them do it themselves. With only two science/math classes required in the GE curriculum, it is possible for some students to take courses that have little or no quantitative components and/or do not stress developing an understanding of the scientific method.

C. Future outcomes and assessment.

We propose that we can further improve our students’ critical thinking and problem solving skills by developing laboratories where more independent thinking and learning is encouraged. We propose that we experiment with such a program in the honors general chemistry laboratory. Provided with the appropriate resources, a faculty member could completely re-think that program and transform it into one that requires
less recipe-book following and more independent thinking. Currently, general chemistry labs consist of step-by-step instructions on what to do and how to do it. Students are walked through the exercise, fill in the blanks, and turn in their report at the end. We have experimented with labs containing less instruction and more freedom to look at a problem and develop a procedure to solve it. To the extent that these labs have been incorporated, they have been successful. The allotment of appropriate resources would allow us to fully incorporate these ideas into an entire laboratory curriculum. This is an exciting prospect.

We can better track our success in achieving critical interdisciplinary thinking by better record-keeping. We propose a permanent running record of our student’s scores on ACS Standardized exams in the major subject areas of chemistry, as we have on general and subject GRE’s. These exams all assess critical thinking and problems solving skills. Faculty could pass their student’s scores on to the department secretary who could develop a permanent database for this information. We could also formalize our tracking of graduates in graduate schools, developing a list of them, where they attended, and what they are currently doing with their advanced degrees. With regard to the limits of critical thinking and to appropriate attitudes, we are at a loss. We do not know how to even begin to better access this in our graduates, except again by the anecdotal stories we randomly hear.

As far as the non-science students are concerned, there is not much more we can do. We will attempt to keep our GE classes rigorous, teaching quantitative and scientific critical thinking skills. Although a laboratory course requirement is one method to more completely assure that all of our graduates have knowledge of and can use scientific critical-thinking skills, such a change in requirements will have to come from the other areas of the College. We attempted to add a third science/math requirement to the curriculum a few years ago, but the faculty defeated the proposal.

**Standard 3: Diversity**

**A. Current Strategies, Assessment, and Evidence**

This is a tough one. In spite of what Kuhn may have said, this is a place where scientists, sociologists, and philosophers part ways. The former must—at least in practice—believe the idea that our models and theories transcend social class, gender and ethnicity. It may be true that the development of scientific models is influenced by these things; however, when two or more models compete for dominance, the ruthlessness of experimentation usually reveals the more valid model. The amazing thing about going to a scientific conference is not the *difference* in knowledge and theories among people of different cultures, but the *convergence* of them. At an international conference in chemistry, we see Westerners, Asians, Middle-Easterners, and Hispanics all speaking the same language, all developing the same theories, all agreeing—for the most part—about what is right and wrong. It is an amazing thing; no one talks of the cultural biases imposed on molecules and everyone talks the common language of experimentation, data, models and further experimentation. So, when it comes to chemistry, we are at a loss as to what to tell our students, except that, at least in this one area of knowledge, culture and
gender seem to matter a whole lot less than in other areas of knowledge. We know that is an unfashionable statement, but to the extent that we can be honest with ourselves, it is true to our experience. So perhaps the message to our students here is that, at least in science, we can lay a number of our biases down and together search for ways of understanding the physical universe of which we are all a part.

We see a great deal of value in the diversity that is present in the global scientific community. We cherish the ethnic diversity in our own department and celebrate that people of different cultures can come together to do science, both at Westmont and around the world. We want students to see that and we encourage them to attend conferences where they are exposed to it. We also want students to realize that in other areas of knowledge, culture and gender have more profound influences than they do in chemistry. We also want to see more ethnic and gender diversity within the science division, both in our students and in our faculty.

B. Satisfaction

We are, in general, satisfied about how we teach chemistry and the influence of culture on chemistry. As we have said, we feel that, at least in practice, the influence is subtle at best. We are not, however, satisfied with the level of cultural and gender diversity among our students and especially among our faculty, nor are we satisfied with the exposure of our students to the positive effects of seeing others different than themselves doing the same thing. The science division faculty members are almost all male. This is a hindrance, especially when half of the chemistry majors are female. Our first and foremost goal must be the hiring of more women faculty in the sciences. However, we again know first-hand the difficulties with this prospect. Talented female chemists are difficult to attract and retain and are being fiercely recruited by academic institutions.

C. Future outcomes and assessment.

One concrete way that we might assess diversity is numbers. We desire to see the number of underrepresented people choosing careers in science increase. Tracking of these students should provide one quantitative method of assessment. Since many chemistry majors choose a career in chemistry, the recruitment of majors from underrepresented groups will provide a conduit for them to choose a career within the sciences. This is already happening with women in our department. We currently graduate more women than men—unusual in the physical sciences—many of which go on to advanced degrees. We want to encourage efforts to continue to diversify the campus and provide a pool from which we might diversify our major. We also want to have the resources available to send our students to conferences where they will see more diversity among scientists than they encounter at Westmont.

Attracting qualified minority and female faculty in the sciences is a challenge, and will continue to be difficult. The pool of viable candidates is small. One idea we have to increase the pool is to use our strength in research. Each summer there are from 10 to 20 students working in the science departments on original research projects with faculty. Since there are only a few other Christian colleges a summer research program, there
must be a significant number of Christian minority students who do not have the opportunity to experience research as an undergraduate. Perhaps we could obtain funding from appropriate sources to establish a Summer Minority Student Research Program. A student in such a program would be more likely to choose to go on to graduate school and eventually become a candidate for an academic position.

Another way to promote this standard is to encourage off-campus experiences for our students. A number of our majors are already involved in off-campus programs and we want that number to continue to grow. Our numbers probably would not support a specific off-campus semester for chemistry students, but such options are being explored.

Standard 4: Written and Oral Communication

A. Current Strategies, Assessment, and Evidence

There are currently several avenues by which our students learn written and oral communication. Beginning in sophomore level courses and proceeding through senior level seminar courses, we require students to prepare and present both written papers and oral presentations on a variety of topics ranging from current technology issues to reviews of current research and their own original research. We also encourage our students to make presentations, both in poster and oral form, at undergraduate research conferences and local and national research conferences and symposia. Our majors are also widely employed in our own courses as T.A.'s and tutors, both of which require them to communicate chemistry effectively to others. Many of our majors also undertake honors projects in which they participate in research with a faculty member and then prepare a written honors thesis. This thesis is then presented and defended in an open forum which is attended by the thesis committee. The committee then meets privately with the student to discuss and critique the thesis and the presentation. Finally, the entire project is assessed and given a grade that determines whether or not the student will graduate with major honors. We also encourage and instruct our students, when appropriate, to use visual aids and software programs in making oral presentations.

We assess their skills by sitting in on the seminars and presentations ourselves and in many cases assigning letter grades based on their performance. We have also employed peer review, where students listen to each other's presentations and evaluate them. Our students have in general performed well. Several of our students have won awards for best presentation at regional undergraduate research conferences and within our own college's spring research poster symposium.

B. Satisfaction

In general, we have a high level of satisfaction in this area. We feel that our students leave our program with experience in preparing written papers and giving oral presentations. When we send them out to off-campus conferences, we are confident in their ability to represent us well in their presentations.
C. Future outcomes and assessment.

Although we are satisfied in this area, we still feel that we could do more, both as a department and as a campus. Some of our ideas include a technical writing component to our English Composition requirement as well technical writing workshops for science faculty. We feel that as faculty, we could benefit from someone reading and critiquing our own writing so that we, in turn, may help students improve theirs. We can also incorporate more writing into our curriculum if we adopt the explorative honors general chemistry laboratory discussed under standard two. The kind of independent and exploratory laboratory assignments in such a course would be more conducive to written lab reports.

Standard 5: Active Societal and Intellectual Engagement

A. Current Strategies, Assessment, and Evidence

Working in groups is an important component of our program in chemistry. Beginning in first-year general chemistry labs and progressing through senior year research projects, our students work together to solve problems in the laboratory. They must work together in order to get their projects done. We also have an extensive summer research program that employs a number of students to work together on faculty-led research projects. In this environment, students work together to solve real problems in chemical research. Some of our challenges during these summer months are interpersonal dynamics among student researchers—they must learn how to work together because they are occupying the same laboratory space, working on the same project, with the same people, eight hours per day. They also must take responsibility for their own learning during this time because, as faculty, we don’t spoon feed them information; rather, we lay out a broad series of experiments and goals and let the students themselves map out the best route to solve the problem. They must take it upon themselves to read the background literature as well as educate themselves about the specific details of the experiments. In this way, we begin to treat our students in the way they might be treated in graduate schools, more like peers and less like students.

Our students also get a sense of community through involvement in the micro-community of the chemistry department. From their freshman year on, we involve students in the community through employing them as stockroom assistants, teaching assistants, graders, tutors, and research assistants. They also become a part of the larger community through filling the constant need for chemistry tutors to high school students in Santa Barbara, and by participating as judges in local high school science fairs. Our students take part in the responsibility of daily life in the chemistry department and so learn how to be engaged in a community where learning and scholarship are central.

Our students get a sense of Christian vocation, both by example from faculty, and by direct discussions during academic advising. From early on, we encourage our students to keep attentive to what they like to do, to what they can do well, and to what needs to be done in the world. If students can find a match between these three things, they have discovered vocation.
We assess our success in this area by the outcomes of cooperative laboratories and research projects. In general, our students do well as is evidenced by well-executed laboratory experiments and well-written laboratory reports. In the research area, student presentations at conferences and published papers provide evidence of their success in working together and taking responsibility for their learning. In the community area, we feel the evidence of our efforts is the close community that is unique to the chemistry department. Our students have a sense of belonging to and participating in the chemistry department. They see their role in making the department what it is and therefore take personal pride in being a part of it.

B. Satisfaction

We have a high level of satisfaction in this area. A community of scholars, involving both students and faculty, has actually formed in our department. This is noted by our students as well as the rest of the campus which sees the chemistry department, both students and faculty, as being a close community.

C. Future outcomes and assessment.

Although we are satisfied in this area, we are not complacent; more can be done to foster societal and intellectual engagement within our graduates. The lounge area discussed under standard one would help in this area as well. We could also formalize a tutoring-pool where the connection between community members needing tutoring and our students would be more deliberate. Professor Nishimura has recently been significantly involved in CAL-SOAP, an outreach program to underrepresented students in our community. We could involve students in CAL-SOAP as camp counselors, which would also benefit the diversity standard.

We are in the process of starting a student affiliates chapter of the American Chemical Society (ACS) here at Westmont. A group of chemistry students such as this can more effectively build interpersonal competence and group cooperation. They can also develop a more complete understanding of vocation in chemistry. This will also give them more opportunities to reach out to the community and society by getting involved in projects promoted by the ACS. National Chemistry Week is one example where the students could go to schools and public areas to show others how chemistry is being used to help solve problems.

With regard to Christian vocation, we feel that we are not doing enough in this area. We propose that our department write a paper on Christian vocation in chemistry, exploring the ideas and issues of finding a God-given calling as a scientist, in general, and as a chemist in particular. Perhaps we can publish this paper on our web-page and incorporate its ideas into our advising.
Standard 6: Technology

A. Current Strategies, Assessment, and Evidence

Our students learn how to use the basic software packages used in most chemistry laboratories including Excel, PC Model, Chemdraw, Hyperchem, Powerpoint and MathCad. We begin in the first-year general chemistry course, teaching students how to graph and analyze data using Excel. In sophomore level organic chemistry students learn how to use PC Model and Chemdraw, and in their upper division courses they use Hyperchem. MathCad and Powerpoint are introduced on an informal basis as needed for research and seminar presentations. Research students are exposed to specialized software and computer interfacing for data acquisition and experimental control. Students also learn how to search electronic data bases such as Chemical Abstracts OnLine, both in the sophomore level organic chemistry course, and as part of their research experience. Assessment in this area seems pretty straightforward. We assign work that requires the student to use these programs and they turn in the work for a letter grade.

B. Satisfaction

At this point, we feel we are doing as much as possible with the available resources, but also feel that we are not preparing students adequately when it comes to technology. We are, in general, unsatisfied in this area.

C. Future outcomes and assessment.

Much of chemistry today is done with the aid of computers in some or all aspects. Most data searches are done online and even many journals are becoming web-based. We could improve our students’ competency in this area in a number of ways with additional technology. The general chemistry laboratory should be equipped with networked computers and interface hardware and software for data acquisition, experimental control, and data analysis. There should be a computer lab within the chemistry department where students have access to modern, high speed, networked computers for searching databases, analyzing experimental data, and working on classroom assignments. All of our courses should have websites where students could access information and engage in electronic discussions. There is little or no support for any of this right now and our students suffer as a result.
Addendum

I. Self-Assessment: We need to separate it into the GE requirements and the major requirements.

Separate questions need to be asked and addressed:
A. How are we doing at meeting the needs of students in other majors in achieving these outcomes?
B. How are other areas meeting the needs of our majors to achieve these outcomes?
C. How are we doing at meeting the specific and special needs of our own majors?

In attempting to respond to the Standards, it was not clear if we were to focus only on our own majors, or to also evaluate how we are doing at meeting the general education needs of all students. Only a couple of departments are not directly involved in the G.E. curriculum. It seems that each of the rest of us should be evaluating what we are doing to assure that the other majors are getting what they need from us. That is quite different from evaluating what we are doing for our own majors.

Also, we should be attempting to evaluate how our majors are being served by the other areas. It would seem that we would be the best ones to do such an evaluation, with some input from those that teach the GE classes that all students take. We would know best what the elective GE classes are that our students usually take and how these help satisfy the Standards.

II. Breadth and Depth model. What happened to it?

At least one additional standard is needed to address how each department is doing at meeting their primary goal of preparing students in an area of concentration, their major.

The College has always stated in its literature that our distinctive is to prepare students to be liberally educated, but vocationally prepared. The model that liberal arts colleges have used in recent times is to have the students focus in depth on at least one area or academic discipline (the major) while learning the basics in several others. The rationale for this is that one could never be an expert in all areas, but we can get a flavor of many. It can and has been effectively argued that a true appreciation of the other areas can come only after studying one area in depth. Of course each supports the other, and knowledge in other areas puts the major area in perspective. But if we attempt to do one without the other, as the College has always said, the result will be an incomplete education.

It appears from the specifics of the Standards, that the major plays a very minor or unimportant role in the development of a Westmont educated person. When we attempted to address how we were meeting the standards for our majors, some of what we do and value for our students was left out. In our response to the Standards, we have attempted to include some of the components that we feel are chemistry major specific, but not directly stated in the Standards. There are other aspects of what we do that should also be included. It is hoped that there may be some further input on the standards so that the College can address all aspects of what we are doing for our students.