

September 5, 2012

TO: Lori Gonzalez, Provost (provost@appstate.edu) and members of the General Education Advisory Group

FR: General Education – Science Inquiry Faculty Coordinating Committee

CC: Paulette Marty, Director of General Education (martybjw@appstate.edu) and members of the General Education Council

Anthony Calamai, Dean of the College of Arts & Sciences (calamaiaag@appstate.edu)

Diane Mines, Chair of the Department of Anthropology (minesdp@appstate.edu)

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RE: Response to General Education Advisory Group (GEA) Report

The General Education – Science Inquiry Faculty Coordinating Committee, henceforth referred to as the FCC, is currently comprised of faculty members from the Departments of Anthropology, Biology, Geography & Planning, Geology, and Physics & Astronomy. This membership represents all departments teaching courses in the Science Inquiry Perspective except the Department of Chemistry. The committee unanimously opposes both adjustments to Science Inquiry recommended in the General Education Advisory Group Report:

1. the change from 8 semester hours with two laboratory experiences to 7-8 semester hours with at least one laboratory experience,
2. the change in name from Science Inquiry Perspective to Science Literacy.

The FCC feels strongly that Appalachian should not retreat from a strong commitment to science education. As has been reported extensively in the media, the United States continues to decline in worldwide rankings with respect to science and math education. For example, the World Economic Forum in its 2011-2012 Global Competitiveness Report ranked the United States 51st out of 142 developed and developing nations in quality of math and science education. In addition, in 2011, the Statistical Research Center at the American Institute of Physics ranked North Carolina ‘below average’ compared to other states with respect to science readiness. The FCC does not believe that the way to address the declining US rankings and the below-average status of North Carolina is to decrease the level of inquiry-based instruction in Science Inquiry. Taking a science lecture without a laboratory is a bit like taking a literature class without reading a book.

The GEA Report states, “[T]he Goals and Learning Outcomes developed for the current Science Inquiry Perspective may be attained with a combination of laboratory and more lecture-mediated examples and exercises in teaching students the process of science.” In addition, the GEA report states, “[T]his change will allow for a better use of limited resources for courses having a large number of students in multiple lab sections.” The FCC has several issues with these statements. First, requiring science faculty to alter their instructional design holds science faculty to a different standard than faculty teaching in other areas of general education, as the GEA report does not propose to dictate pedagogical strategy to other faculty. Second, while teaching more inquiry-based lectures, as described in the GEA report, is considered a valued teaching methodology, the resources required to convert traditional lectures to inquiry-based lectures are vast and not addressed by the GEA report. The science education research community has published a multitude of articles on this subject describing the enormous amount of resources required for this teaching method. Were a conversion of this type to take place, the resources required to maintain inquiry-based lectures are the same as, if not higher than, the current resources used for laboratories. There will be no resource savings if we convert from traditional lectures to inquiry-based lectures, and, in fact, the conversion itself will require more resources than maintaining the two-laboratory requirement.

Inquiry-based lectures have been implemented in many universities, but require either smaller class sizes or additional instructors in larger lectures to facilitate hands-on activities. Training is also required for these additional instructors. While we could hold smaller classes in the currently available laboratory space, resources would be required to hire new faculty to teach these new sections. If instead the approach is to maintain current class sizes, there will be additional faculty/instructors/teaching assistants required to help in every lecture. Also, classrooms would need to be retrofitted with appropriate lab tables and other equipment needed for inquiry-based lectures. The FCC does not understand how there would be a decrease in needed resources if the traditional lectures were to be converted to hands-on, inquiry-based lectures as described in the GEA report. On the other hand, if a lab is removed from the current curriculum and traditional lectures are not converted, it would be impossible to attain the Goals and Learning Outcomes developed for Science Inquiry.

The proposed change is not only reducing hands-on laboratory experiences, it is completely eliminating them from one of the two required courses. For example, students currently participating in the Life, Earth and Evolution theme can take BIO 1102 (Biology in Society) with laboratory and complete the theme with ANT 1430 (Our Primate Heritage) with laboratory. Currently these students would receive hands-on scientific inquiry in both biology and anthropology. With the proposed adjustment, students could take BIO 1102 with laboratory and ANT 1430 without laboratory. While the student would receive hands-on, inquiry-based methodologies in biology, there would be no such experience in anthropology. In addition, one of the main ways this theme is integrated is through laboratories. By removing a laboratory requirement from this theme, the general education learning outcomes would not be satisfied.

Finally, the GEA report states, “[T]his adjustment would make a significant difference to transfer students who receive transfer credit for 3 semester hours or 7 semester hours of science courses from other institutions.” While the FCC understands the difficulty experienced by transfer students, it is clear that if other proposed changes in the GEA report occur, the burden on transfer students would be substantially reduced. It seems that implementing the Liberal Studies Experience component would significantly change the way that we deal with transfer students. In addition, it is our understanding that the number of transfer students negatively affected by current policy within the Science Departments is limited. While we believe there should be a discussion about these issues with transfer students in science inquiry, the answer is not to change the entire Science Inquiry pedagogy or the requirements for all Appalachian students.

In addition to our opposition to the elimination of a laboratory class, the FCC is concerned about the suggested renaming of the Science Inquiry component to Science Literacy. While we understand that this suggestion is to conceptually group the Science Inquiry component with Wellness Literacy and Quantitative Literacy, science is, by definition, a process of inquiry. Taking the word ‘inquiry’ out of the component and adding the word ‘literacy’ will incorrectly imply to students that science is about reading and writing and not about inquiry and discovery. We understand that this suggestion was to bring the Science Inquiry Theme into line with the other Gen Ed areas, but we agreed that this is not a valid reason to further confuse our students about the process of science by equating it to being able to read about science.

The FCC would be happy to meet with the Provost, the GEA, and members of the General Education Council to discuss this matter in more detail, but please note our strong opposition to the proposed changes.

Best regards,

Science Inquiry Faculty Coordinating Committee:
Gwen Robbins-Schug, Department of Anthropology
Shea Tuberty, Department of Biology
Gabrielle Katz, Department of Geography & Planning
Steve Hageman, Department of Geology
Jennifer Burris (Chair), Department of Physics & Astronomy