2013-14 Program Review

Best Practices Form

Instructions: *Submit this form as a separate attachment with your completed Program Review.* Programs often do something particularly well; usually they have learned through assessment—sometimes trial and error—what solves a problem or makes their programs work so well. These are often called ***Best Practices*** and can help others. Please share the practices your program has found to be effective. The contact information lets others know whom to contact for more information. This part of Program Review is linked to the Student Success Strategic Goal: "Become an exemplary model of student success by developing and implementing best practices." For examples of Best Practices visit the Program Review Committee's website.

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Best Practice(s):

Astronomy: use of lecture tutorials in lecture part of class. Lecture tutorials are designed to have students confront common misconceptions about some astronomical topic and work toward a proper understanding. Students are paired up to work together on the tutorials in class => peer tutoring! Another example of peer tutoring is with the weekly open-note/book quizzes that are very similar to exam questions so the students get practice working through the concepts in a low-pressure situation. Through this practice, students are better prepared for the higher-stakes exams that are closed book, individual effort. Students are paired up during the weekly quizzes to help each other think through the problems. Students are told that one doesn't really know a subject until you have to explain it to someone else. Also, I can be sure that for that 15-20 minutes at least that they are talking astronomy—engaging with the material. Most of the questions are challenging enough that students find working on the questions together very helpful.

Astronomy: Use of email listserv through the district's listserv service for each of the astronomy courses. This makes it easy to broadcast messages to an entire class at once. Broadcasts can also be done via Moodle—whenever you post something to the News Forum, Moodle will send all of the class participants a message with what you posted.

Physics: Prior to the fall of 2010, all physics courses had a discussion component. This amounted to offering an optional 1 hour session for each lab section in the course where students could attend and develop problem-solving skills in the course in an interactive way not possible in the lecture or laboratory venues. From the fall of 2010 until the present, this component of the course has been removed due to restrictions implied within Title V requirements. In the fall of 2006, a CLIP study was done on the effectiveness of the discussion component of physics courses using students in the Physics B4A and the Physics B4B courses and their records. It was found that attending discussion sessions was strongly correlated with competency in problem solving in these two courses. It has been said that the only way to learn physics is to work problems, and many students need extra time outside of the regular course lecture in order to be successful and time-efficient at solving problems in physics. STEM tutoring is effective in addressing this need only if

there are competent STEM tutors willing and able to work in this capacity. Especially in the later courses in the physics sequences, the only students capable of tutoring those subjects are second year students with heavy schedules and would rather not assume that extra work load. A possible avenue in dealing with this situation is to develop a 1-unit "success lab" as has been done in some other disciplines, but when physics students have been polled as to how they felt about the possibility, many indicated that they would not like to incorporate an extra 1-unit in their load if it meant any type of extra work outside of their regular (often very demanding) load. One strategy that has been proposed (and has been used successfully elsewhere) is that of "flipping" the class. In this case that would mean replacing the normal lecture time with a more meaningful, directed problem-solving period in which problem-solving strategies are taught, critical thinking and problem-solving skills are emphasized, and students can work interactively with the instructor on such (much more so than in the traditional lecture format). The more formal lecture and demonstration component of the course can be relegated to students visiting specific lectures selected from online forums such as the MIT physics lecture series or Khan Academy. We have not tried this approach yet, but believe it has considerable potential in partially removing a major weakness in our physics instruction.