With the help of the Teaching and Learning Resources group, the QEP Science Faculty Forum has been up and running since summer 2012. Through this forum, we hope to usher in a new level of communication and collaboration among all HCC science faculty. This is the place where we can come together to ask questions, solicity how-to’s, share resources, exchange ideas, offer comments, laugh at the latest “Science Smile of the Week”, find out what happened at the latest Camp INSPIRE event, or find out about upcoming STEM events and opportunities. Most importantly, science faculty will be able to help shape our QEP project as we go along. We are finding that multiple brains really are better than one; together we CAN make a difference in how well our students learn.

The QEP Science Faculty Forum is structured as an Eagle Online shell. So far, all known HCC Biology, Chemistry and Physics faculty have been “enrolled”. To access the forum, start on the HCC web page and click on “online courses”, followed by “Eagle Online login”. First-time forum users should enter first.last name (same as HCC email login), and
We are happy to report that the new, real-world, active & collaborative modules developed over Summer I, 2012 have now been piloted in 15 sections by our 8 hard-working module developers. Each module was structured as an interrupted case study. In a typical case study, students take on the role of someone responsible for solving a real-world problem or crime. Students cannot solve the mystery unless they truly understand the chapter material:

<table>
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<tr>
<th>Target Course</th>
<th>Central Concept</th>
<th>Real World Application</th>
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<tr>
<td><strong>PHYS 1401</strong></td>
<td>Projectile Motion</td>
<td>“A Bad Day for the Monkey”: Students must use projectile motion concepts and calculations to solve a fatal blow dart shooting on an action movie set. (Developers: Aaron Marks and Yuriy Pinelis)</td>
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<tr>
<td><strong>CHEM 1411</strong></td>
<td>Stoichiometry</td>
<td>“Failure to Launch”: Students must use stoichiometry knowledge and skills to determine if a faulty airbag is to blame for a fatal car accident. (Developers: Paul Clemens and Ammani Krishnaswamy)</td>
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<tr>
<td><strong>BIOL 1406</strong></td>
<td>Cellular Respiration</td>
<td>“Cellular Respiration: A CSI Investigation”: Students must use knowledge of cellular respiration pathways and cellular structure to investigate a possible poisoning. (Developers: Audrey Bush, Jennifer O’Neil, Leena Sawant and Pauline Ward)</td>
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In an interrupted case study, the case is presented in distinct parts over the course of one or two class periods. Each successive part involves disclosure of additional data and/or clues, followed by discussion questions. The latter are carefully designed to encourage critical thinking, actively draw out common misconceptions, and create a need for further knowledge. Hence the case study parts may be “interrupted” by chapter material presented as short lectures, video or animation presentations, reading, and/or other student exercises. In fact, in addition to developing the case study materials, QEP module developers also collected many useful teaching resources for all to share.

Not surprisingly, first-time implementation proved quite a challenge, and we look forward to learning more during each implementation round. Departmental finals data is still being analyzed. However, anecdotal evidence shows that active learning techniques did boost performance on instructor tests. Students participating in the module experience definitely were engaged and thinking critically. Several module pilots reported greater student-to-student interaction (both inside and outside of class), and a much greater willingness on the part of students to ask questions. Many students expressed appreciation for the real-world application of seemingly abstract chapter concepts. With its focus on metacognition, active learning also turns out to be a great way to monitor student thinking in real time, and to draw out major misconceptions that might otherwise have gone undetected and uncorrected. On the instructor side, time of course remains a big issue. However, most module pilots found that incorporation of the case triggered a useful focus on student reception and efficiency. Teaching with the end in mind became very important: what is it we really want our students to learn, and what is window dressing? It also became clear that student-centered teaching techniques such as leading productive group discussions takes some practice (then again, how stellar were our very first lectures?). One of the greatest benefits was the opportunity to share successes and learn from each other. Based on the Fall 2012 pilot experiences, all case study materials were revised extensively.

These revised case study materials, along with interchangeable data/clue sets and relevant teaching resources have been uploaded their own repository – a password-protected shell in Eagle Online. All BIOL 1406, CHEM 1411 and PHYS 1401 instructors who have completed a QEP Module Workshop will be “enrolled” for access during the next implementation round. The first workshop is scheduled for January 10, 2013. Participants were nominated by QEP Module Developers, Chairs and Program Coordinators and include FT and PT faculty from all across the district. Additional workshops will be held on a semesterly basis. As the product and our skills improve, we hope that all BIOL 1406, CHEM 1411 and PHYS 1401 will be able to join our growing faculty learning community!
First of all, we’d like to extend a sincere thanks to all those who contributed to our Camp INSPIRE events on January 11, May 15 and 16, and August 24, 2012. It was great for everyone to get to know one another face to face, and your input gave us valuable direction on how to proceed with the various QEP projects! Our 4th Camp INSPIRE on January 10, 2013 will be no less important (http://imc09.hccs.edu/campinspire). This time, we will be looking for STEM faculty input on two key topics: how to engage STEM students outside of class, and how to prepare first year students for rigorous science course work. For the former, we will want to brainstorm appropriate district-wide activities for STEM club students. Already, several great, faculty-driven ideas are emerging: science fair projects, the “It’s Just STEM” competition, lab skill certification, research “internships”, iGEM competitions, faculty-guided research paper, PowerPoint or poster projects. For the latter, we will want to discuss what we would like for our students to be able to do in terms of reading, processing, and studying scientific information before they enroll in science classes. Once these needs have been catalogued and prioritized, a team composed of science faculty and EDUC 1300 faculty will work together over the summer to create appropriate “science learning modules” for implementation in “science-emphasis” EDUC 1300 sections.

STUDENT QUOTES

“Being able to see that real-world tragedies can be explored w/what we learn in the classroom is pretty awesome” ~ HCC Student

“It really makes me feel like I learned something and could solve a problem on something that mattered rather than just seeing numbers and not knowing their significance” ~ HCC Student

“The whole concept of “grams to moles, moles to moles, moles to grams” sunk in a heck of a lot better” ~ HCC Student

Teaching Science will NEVER be the same!!!

For more information contact:
Dr. Tineke Berends
Tel: 713-718-5875
Mobile: 713-515-8569
Fax: 713-718-8406
E-mail: tineke.berends@hccs.edu

We are on the web hccs.edu/educationmatters/tag/sacs-qep

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